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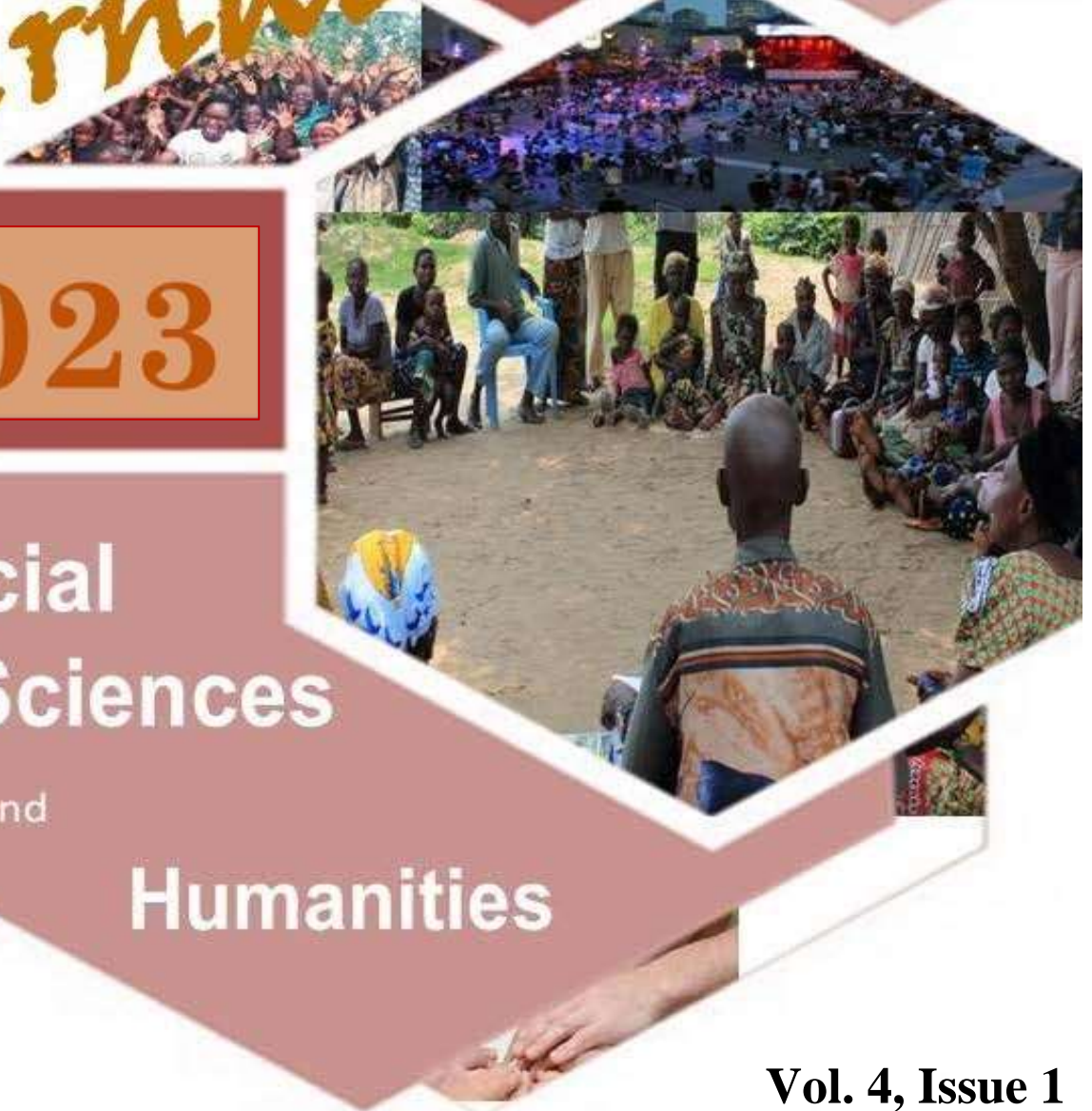
# Journal

## 2023

## Social Sciences

and

## Humanities



**Vol. 4, Issue 1**

# ASRIC JOURNAL ON SOCIAL SCIENCES AND HUMANITIES

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Vol. 4, Issue 1

2023

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Published by: African Scientific Research and Innovation Council  
Plot 114 Yakubu Gowon Crescent Asokoro  
Abuja, Nigeria

asric\_editor@yahoo.com  
www.asric.africa

ISSN 2795-3599 (online) 2795-3602 (print)

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**ASRIC JOURNAL ON SOCIAL SCIENCES  
AND HUMANITIES**





## Ambiforms as an African Indigenous Literary Theory – A Reading of Chinua Achebe’s *Things Fall Apart* as a Comedy

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### Abstract

Africans spring surprises: laughing during the most sensitive disastrous moment or crying during the most sensitive amusing moment. A critical literary theory that accommodates this erratic lifestyle should have emerged as a framework, following the endless void created by the ever-expanding critical space. This is the void ambiforms/ambigenres has emerged, as an African culture-specific indigenous theory, to fill: paying attention to the unsaid in the said and or the said in the unsaid. Thus, a text could be studied as both a tragedy and a comedy, yet not a tragicomedy. This departure from conventionality is a search for a new African culture-based literary theory that exists not to imitate European theoretical postulation just as it is not just a facsimile of traditional African virtuosity in protest against colonization of knowledge invention by the West. Rather, it is to justify literature as a profound experience of inevitable shifts particularly when inspired by cultural canons. With Achebe’s *Things Fall Apart* as the source of evidence, this paper, relying on all the evidences in the text, locates the missing logics to offer it to dialectical interpretations of six fundamental processes and mechanisms.

**Keywords:** Tragedy, comedy, tragicomedy, African culture, African indigenous theory

### Introduction

The focus of ambiforms/ambigenres is that living and evolving scholarly studies should have transcended the limits of conventionalities which privileges the grouping of literary texts into two main conventions: tragedy and comedy by some dialectical thinking of the constant vacuum created by the dynamic and ever-expanding critical space, (Ogunfeyimi, 2018). Therefore, as a way of decolonizing knowledge, ambiforms privileges the studying of a literary text as a tragedy at one time, and a comedy at another paying attention to the *unsaid in the said* and or the said in the unsaid in any literary text of both genres: tragedy and comedy. (Nwoko, 1981), in “Search for a New African Theatre”, says, “...this new art should not ape European art and should not be a mere copy of traditional African art.” (pp. 467-8). Ambiforms/ambigenres emerges a critical thinking revolution of decolonizing knowledge production that literary convention should have transcended or broken away from the West’s restriction of a text being entirely tragedy or comedy in defence of African critical, cultural thinking or indigenous knowledge.

Africans spring surprises or cannot be predicted particularly when it comes to issues of tragedy and comedy. (Yerima, 2009), in *Discourse on Tragedy*, observes that Africans “laugh during the most sensitive tragic moments...” (p.13). For instance, he reports a situation where a man once told him that, the Nigerian audience laugh at the tragic predicament of Odewale, the protagonist in (Rotimi, 1975), *The Gods Are Not to Blame*, particularly when he emerges from the room, groping with the eyes plucked in the final scene “trying weakly to maintain law and order among his three children born by his mother and wife, Ojuola.” It is not because the audience do not feel the tragic essence of the scene, but each and every one of the audience is scared, frightened at the action on stage, and do not feel comfortable with watching it on stage. “So they laugh or chuckle off their discomfort,” (p.13). The justification provided here by Yerima may be appropriate. However, it is not the only or a major reason the Nigerian audience have to laugh at the “laugh during the most sensitive tragic moments...” (p.13). Laughing is an important part of African particularly

the black African (Nigerian) culture. Nigerians are happy and so laugh in the midst of the most depressing conditions. According to *The World Happiness Report* in 2023, a periodical of Sustainable Development Solutions circulated every year to index the United Nations International Day of Happiness, Nigerians, even in the midst of abject poverty, chaos, insecurity, crises, etc., remain one of the happiest people on earth. Although laughter is not synonymous with happiness or a measure for happiness because Iraq, Palestine and Morocco, very strong Islamic countries where excessive laughter or extreme humor is prohibited, made the list likewise, it is also one way to express happiness, *Premium Times* (2023)

According to the report, one way to measure a nation's happiness is to ask a nationally-representative sample of people how satisfied they are with their lives. A population will only experience high levels of overall life satisfaction if its people are also pro-social, healthy, and prosperous. Dapo Adelugba, in an interview with (Dasyilva, 2007), as contained in *Dapo Adelugba on Theatre Practice in Nigeria*, does not subscribe to Yerima's reason, although he admits that Africans laugh during the most sensitive tragic moments in plays. He, however, says the African comedic spirit is very expressive. "And I think our natural medium is comedy... we want to get it out of our systems, even at the most tragic moments when you find the bereaved groping for jokes, and that, I think, is very healthy," (p.111).

The truth also is, Africans cry in the most superficial moments. You see a man crying in sympathy for Brother Jero in (Soyinka's, 1986) *The Trials of Brother Jero*, when he is being chased by Chume with cutlass, "murder bent" by the so-called man of God because, in Africa, a so-called man of God should not warrant such a consequence particularly coming from a member irrespective of the crimes committed. Tragedy and comedy in African critical and cultural dialectics, intertwine. This is the focus of ambiforms or ambigenres as a hypothetical understanding of the possibility of any literary text being both a tragedy and a comedy (not tragicomedy). According to (Ogunfeyimi, 2018), "The thrust of this theoretical construct rests on the fact that it is based on (1) the liberal humanist interpretation, and (2) creative insight into [any literary text] that sees a great poetical work as consisting of the harmonious blending of tragedy and comedy," (80). With (Achebe's, 1958) *Things Fall Apart* as the current source of evidence, a good reader, casting his astute readership consciousness on all the evidences provided in the text itself and guided by some fundamental mechanisms, locates the missing logics in the text as a way of maximizing his/her unfathomable creative influence. For ambiforms, the meaning of a literary text is as objective as its physical existence on the page. It is constructed of words placed in a specific relationship to one another – in a specific order – which creates a complex of meaning offering the text to dialectical interpretations.

### **Methods, Techniques, Studied Material and Area of Descriptions;**

Stephen E. Toulmin method of argumentation was adopted as framework, while the interpretive design was used. (Achebe's, 1958) *Things Fall Apart* was purposively selected and subjected to literary analysis with Toulmin method of argumentation as a tool for breaking the text down into six component parts. The first three fundamental component parts: the claim, the grounds, and the warrant, serve as the foundations and the pillars upon which the discussion rests, while the other three elements—backing, qualifier, and rebuttal, hue and ornament the discussion with a premise to guarantee the truth of the conclusion such that as the premise was true, it was impossible for the conclusion to be false. In other words, with this method and technique, the premise that, literature has the capacity to lead a different if not an eccentric literary existence specific to African dramaturgy, thus, recommending itself to those who have always been enamoured by the vagaries of literary attitude, necessitates the truth of the conclusion that every great literary work could be analyzed as both a tragedy and or a comedy (not a tragicomedy). Deductive arguments provide an unflinching guide to the knowledge of this conclusion.

Thus, applying this framework, the study establishes, first, the claim that, ambiforms or ambigenres is a critical theory which studies a text as a tragedy at one time, and a comedy at another. In other words, ambiforms or ambigenres is a hypothetical understanding of the possibility of any literary text to be analyzed as both a tragedy and a comedy (not tragicomedy). Consequently, it has emerged as a novel African indigenous literary theory set to fill a vacuum in literary topography and criticism. The grounds of the current argument are i) the history of literary studies has privileged the grouping of literary texts into

two main conventions: tragedy and comedy; ii) following the constant vacuum created by the dynamic and ever-expanding critical space, living scholarly study should have transcended the confines of these conventionalities by some dialectical thinking as a way of decolonizing knowledge; iii) thus, there should have developed a critical theory which studies a text as a tragedy at one time, and a comedy at another; iv) the need to pay attention to the unsaid in the said and the said in the unsaid in any literary text within the contexts of tragedy and or comedy; v) the need for a new African culture-based literary theory that exists not to imitate European theoretical idea just as it is not just a facsimile of traditional African virtuosity in protest against colonization of knowledge invention by the West; vi) Africans spring surprises or cannot be predicted particularly when it comes to issues of tragedy and comedy. They laugh during the most sensitive tragic moments, and cry during the most sensitive comic moments. and sometimes, they cry during the most sensitive comic moments.

Finally, the link between the grounds and the claim of this discourse is that, such a judgmental exploration of the major narratives in the texts relates the contents to the existing realities or phenomena in the society, that is the way of life of the people. The backing of the argument refers to the fact that the text, being a living and ever-growing socio-telic organism, ceases or discontinues being what the author expresses it – tragedy or comedy, and assumes what the critic sees it– tragedy and comedy; tragedy or comedy. Presently, it becomes more meaningful, richer and more complex than the author realised. (Tyson, 1999) says, its meaning is “simply different from the meaning the author wanted it to have,” (p.119). Ostensibly, it does not have to be interpreted to meet the author’s intention, tragedy or comedy, but to sooth the analytical or literary demands of the society.

With *Things Fall Apart*, as the source of evidence, subjected to literary analysis, the paper, relying on all the claims and grounds in the text, locates the missing logics to offer it to dialectical interpretations of six fundamental processes and mechanism, namely: i) readership license, ii) concept of laughter (laughing at or laughing with), iii) audience’s specificity of emotion, iv) open-endedness, v) omniscient creativity and vi) end-product.

### **Findings**

Casting an astute readership consciousness on all the evidences provided, the missing logics in the text (the unsaid in the said and the said in the unsaid) were located as a way of maximizing an unfathomable creative influence. With ambiforms/ambigenres, the meaning of the text was as objective, neutral and nonaligned (to a specific convention, comedy) as its physical existence on the page. It was revealed that, every novel is constructed of nuances placed in a specific relationship to one another – in a specific order – thus creating an ambi-coated meaning that offers the it to dialectical interpretations of the six fundamental processes and mechanisms to assume comedy or tragedy. This critical thinking has the capacity to lead a different if not an eccentric literary existence specific to African dramaturgy, recommending itself to those who have always been enamoured by the vagaries of literary attitude.

### **Discussion: Ambiforms as an African Indigenous Literary Theory – A Reading of Chinua Achebe’s *Things Fall Apart* as a Comedy**

*Things Fall Apart* details the efforts of a man, Okonkwo, the son of the creatively and artistically energetic but *physically* or *manly* lethargic Unoka, who strives to make his way in a world that seems to value *masculinity*. In so doing, he rejects everything for which he believes his father stood. Unoka, as Okonkwo and some critics see him, is *idle*, poor, profligate, cowardly, gentle, but musically creative, and he possesses rhetorically resourceful and ingenious attributes. Okonkwo consciously adopts opposite ideals and becomes productive, wealthy, thrifty, brave, violent, and adamantly opposed to music and anything else that he perceives to be “soft,” such as conversation and emotion. He is apathetic to an error.

Okonkwo’s embrace of these ideals earns him great social and financial successes. He has several children from three women. The novel, however, yields itself to comedy when Okonkwo, just as his father, unable to adapt to changing times as the white man comes to live among the Umuofians, is at odds with the values of the community around him, and yields himself to idiosyncrasy. As it becomes evident that compliance

rather than violence constitutes the wisest principle for survival, Okonkwo realizes that he has become a relic, no longer able to function within his changing society.

The society represented in *Things Fall Apart* is one that strongly believes in the existence of the Supreme Being whose name varies in Africa according to localities. Among the people represented in the novel, “the Supreme Being is called Chukwu... Chineke... the author of Heaven and earth...” Now, “Chi”, among the same people, stands for the Soul which Chukwu entrusts with destiny. In other words, the Chi is the guardian Angel or personal god. The belief of these people is that, the Chi may be good or bad. Whichever Chi any man has, will lead the man to an end: good or bad. However, if it leads the man to a good end within the milieu of the people, the man is a hero, a superman and a conqueror. If it leads him to a bad end also within the context of the people, the man is a villain, a scoundrel, and a rogue who does not deserve the people’s pity and compassion. The truth, however, is, no man can dictate to its chi. No man can rise above his Chi. To the Africans, this is a universal principle of life. And this is what Okonkwo wants to tamper with. “That had been his life-spring”. Achebe sums him up in a very memorable passage:

...Clearly his personal god or *chi* was not made for great things. A man could not rise beyond the destiny of his *chi*. The saying of the elders was not true – that if a man said yes his *chi* also affirmed. Here was a man whose chi said nay despite his own affirmation.

This rebelliousness against one’s chi leads to a man making himself an object of scorn. Consequently, Okonkwo is cast out of the society like a fish onto a dry, sandy beach, panting, and, eventually, dies, as predicted by (Rotimi, 1975), “Cut from his roots. Expelled from his land of his birth... unmourn by men who know him, and buried by vultures who know him not,” (p.24).

Okonkwo realises that he has been cut from his root when he sees the reaction of his people after he kills the Whiteman’s messenger, a black man. He realises that he has been rejected by his own people. “He heard voices asking: ‘Why did he do it?’ He wiped his machete on the sand and went away”, (pp. 144-5). His decision is to die dishonorably even worse than his father he so much hates for being dishonorable. That is Africa for you! What the West celebrate as heroism, Africa may celebrate it as stupidity. It is upon this calculation the novel begins to yield itself to *ambiformic* dialectics as a comedy, with the framed ideas and themes of this study, as indicated in its title, hovering around and mostly merely inflicting the exegetical tasks and the sheer intellectual pleasure of tackling the rich, complex texture of Achebe’s artistic prowess against the background of the tumultuous experiences of the strong breed and the critical reception of its compositions.

Exploring the nature of Shakespearean comedy, (Snider, 2009), opines:

The Tragic and the Comic fade into each other by almost insensible gradations, and the greatest beauty of a poetical work often consists in the harmonious blending of these two elements. Not only in the same drama may both exist in perfect unison, but even in the same character. Great actors generally have a similar quality, and frequently it is hard to tell whether their impersonations be more humorous or more pathetic. This happy transfusion and interchange of tragic and comic coloring is one of the characteristics of supreme art; it brings the relief along with the pain; it furnishes the reconciliation along with the conflict, (1).

Comedy, as generally agreed, is a form confined to the descriptions of literary text with “happy endings” or a happy resolution of the thematic conflict. In the late 20th century, however, the tendency to pragmatically prefer the term laughter to comprehensively refer to the whole range of the comic emerged among scholars to avoid the classification in ambiguous and problematically defined genres and fields like humor, grotesque, irony, and satire. This informed its contemporary usage as any discourse or work generally intended to be humorous or to amuse.

Discoursing comedy, (Yerima, 2009), says it is the genre of dramatic literature that deals with the light and amusing or “with the serious and profound in a light, familiar, or satirical manner.” (Achebe, 1960)

subscribes to this dialectical classification in his view of Graham Greene's, (1948) *The Heart of the Matter*, as the only sensible novel any European has written on West Africa only that "it was nearly ruined by the happy ending.... The European police officer commits suicide", because he thinks such a "suicide ruins a tragedy," (35-6). Much comedy contains variations on the elements of surprise, incongruity, conflict, repetitiveness, and the effect of opposite expectations, such as summed up of Okonkwo by Achebe: "His life had been ruled by a great passion – to become one of the lords of the clan. That had been his life-spring. And he had all but achieved it."

Comedies can be separated into at least three subordinate categories or sub-genres--identified and briefly characterized as follows: farce, romantic comedy and satire. But, the most relevant to this study is satire, which ridicules mainly the foolishness of the protagonist perceived by the protagonist himself as what is right and wise. Satirical comedies trace the rising fortune of a central character. However, in this case, the central character is likely to be cynical, foolish, or morally corrupt, such as Okonkwo who, for the thought of being seen as a weakling, defying every warning of the wise old man, kills the boy who calls him father. Yet he boasts about it, "...How can a man who has killed five men in battle fall to pieces because he has added a boy to their number? Okonkwo, you have become a woman indeed.' He sprang to his feet, hung his goatskin bag on his shoulder and went to visit his friend, Obierika," (p.45).

The history of literary study has privileged the grouping of literary texts into two main conventions: tragedy and comedy. However, following the constant vacuum created by the dynamic and ever-expanding critical space, living scholarly study should have transcended the limits of these conventionalities by some dialectical discerning as a way of decolonizing knowledge. In other words, there should have developed a critical theory which examines a text as a tragedy at one time, and a comedy at another. This is the void ambiforms/ambigenres has emerged to fill – paying attention to the unsaid in the said in any literary text of both genres: tragedy and comedy. (Nwoko, 1981), in his paper: "Search for a New African Theatre", says, "...this new art should not ape European art and should not be a mere copy of traditional African art." (pp. 467-8). Hence ambiforms/ambigenres employs two morpheme of English to argue that African critical thinking should have transcended the West's restriction of a text to tragedy or comedy particularly because Africans spring surprises or cannot be predicted particularly when it comes to issues of tragedy and comedy. For instance, (Yerima, 2009) observes, Africans "laugh during the most sensitive tragic moments..." (p.13).

A scholar once tried to explain to me that the Nigerian audience laugh at Odewale, the protagonist in Ola Rotimi's *The Gods Are Not to Blame* when he comes out groping with the eyes plucked in the final scene trying weakly to maintain law and order among his four children born by his mother and wife, Ojuola, not because, they, the audience, do not feel the tragic essence of the scene, but each and everyone of the audience is scared, frightened at the action on stage, and do not feel comfortable with watching it on stage. So they laugh or chuckle off their discomfort, (p.13).

Dapo Adelugba, in an interview with (Dasylyva, 2007), as contained in the book, *Dapo Adelugba on Theatre Practice in Nigeria*, does not subscribe to this reason that "the audience... do not feel the tragic essence of the scene, but each... is scared, frightened at the action on stage, and do not feel comfortable with watching it on stage. So they laugh or chuckle off their discomfort...." Although he admits that Africans laugh during "the most sensitive tragic moments in plays." He, however, says, "...the African comedic spirit is very expressive. And I think our natural medium is comedy... we want to get it out of our systems, even at the most tragic moments when you find the bereaved groping for jokes, and that, I think, is very healthy," (p.111). In other words, tragedy and comedy in Africa intertwine. This is the focus of ambiforms or ambigenres. Ambiforms or ambigenres is a hypothetical understanding of the possibility of any literary text being both a tragedy and a comedy (not tragicomedy). With (Achebe's 1958) *Things Fall Apart* as the source of evidence, a good imaginative reader, casting his shrewd readership consciousness on all the evidences provided in the text, locates the missing logics in the text as a way of maximizing his unfathomable creative influence. For ambiforms, the meaning of a literary text is as

objective as its physical existence on the page. It is constructed of words placed in a specific relationship to one another – in a specific order – which creates a complex of meaning offering the text to dialectical interpretations of six fundamental processes and mechanisms: i) readership license, ii) concept of laughter (laughing at or laughing with), iii) audience’s specificity of emotion, iv) open-endedness, v) omniscient creativity and vi) end-product.

### **1. Readership (Criticism) License**

Critics enjoy some resourceful privileges and freedom exploring a text for a study. Speaking on this license, which he calls “unusual freedom of convention”, (Williams, 1945), in his essay on “How To Stage *The Glass Menagerie*” posits that expressionism and all other unconventional techniques in drama have only one valid aim, and that is a closer approach to truth. Thus, “When a play employs unconventional techniques, it is not... trying to escape its responsibility of dealing with reality, or interpreting experience, but is actually... attempting to find a closer approach, a more penetrating and vivid expression of things as they are,” (p.1).

This is informed by the efforts of the critic to provide an answer to a question, that: Why do fiction writers engage their precious time in writing fictions with books of information, instruction, and discussion waiting to be written? In his answer, (Laurence Perrine, 1974), articulates two eternal reasons: “enjoyment and understanding”. According to him, whatever – without causing harm – serves to make life less tedious, to make the hour pass more quickly and pleurably, surely needs nothing to recommend it. But, unless a novel gives something more than pleasure, it hardly justifies itself as a subject of critical study and can hardly stand the test of time. Hence Perrine observes that, to have a compelling claim on “our attention” a novel must yield not only “enjoyment” but also “understanding” or “interpretation”, (p.3). By this he means, while a novel entertains, the reader learns from the experience it explores and applies it appropriately.

Therefore, for the reason that every good novel offers reward, the critic is challenged to see more deeply into the minds and hearts of the characters designed metaphorically to give this pleasure and understanding. For this reason, (Tyson, 1999) opines, it does not have to be interpreted to meet the author’s intention (either tragedy or comedy).

...it is even more meaningful, rich and complex than the author realized. And sometimes the text’s meaning is simply different from the meaning the author wanted it to have. Knowing an author’s intention, therefore, tells us nothing about the text itself, which is why new critics coined the term intentional fallacy to refer to the mistaken belief that the author’s intention is the same as the meaning of the text, (119).

However, this is not an arbitrary or illogical license that does not have underpinning in the text. Rather, it is a license excused by obvious instances in the text.

### **2. The Concept of Laughter (laughing at or laughing with)**

Laughing is an involuntary, physical reaction in humans, consisting typically of rhythmical, often audible contractions of the diaphragm and other parts of the respiratory system. It is a response to certain external or internal stimuli. Laughter can arise from such activities as being tickled, or from humorous stories or thoughts. It is human nature to laugh. However, there are limits. The Prophet (peace be upon him) has prohibited every right-thinking human being from “excessive laughter” because it dampens the heart.” (Kamdar, 2013)

Most commonly, laughter is considered a visual expression of a number of positive emotional states, such as joy, mirth, happiness, relief, etc. On some occasions, however, it may be caused by contrary emotional states such as embarrassment, apology, or confusion (nervous laughter), which helps to clarify individuals’ intentions in social interaction and providing an emotional context to conversations. (Meredith, 1877), in *Essay on Comedy*, describes this as “thoughtful laughter.”

Laughter plays two essential roles in the creation of masterpieces of world literature: ridicule and celebration. (Provine, 2001), in the article, “Laughter: A Stereotyped Human Vocalization,” says: “most *laughter* isn’t about humor.” It is about “a celebration of the good and it’s also how we deal with the bad.” Reading a masterpiece like *Things Fall Apart*, one reader may *laugh with* (celebrate) the protagonist while another may *laugh at* (ridicule) him. The onus is now on him/her (the reader), through character analyses, to identify those instances that provoke laughter such as the unsaid in the said and or the said in the unsaid him, what he does or refuses to do, which drives the reader’s consciousness either to celebration or ridicule. For instance, Achebe represents Okonkwo as a figure whom every successful and wise man will scorn for his insensitive and reckless approach to sensitive issues. Okonkwo symbolizes the struggle of modern man within a changing social current—he cannot break class or ideological barriers, nor create new ones. Like Yank in (O’Neill’s 1922) *The Hairy Ape*, he is the outsider... to “be buried as a dog”, and eventually just the freak at “a small bush behind Okonkwo’s compound [on] the tree from which Okonkwo’s body was dangling...” for people to point at otherwise, scorn, (p.147).

This is Africa. Whatever you think you want to do for heroism usually attracts scorn from fellow Africans particularly if it fails because we hardly celebrate our heroes/heroines or our definition of heroism is not what I call *successful failure*. Our definition of heroism is fruitful success. Your story of how you succeed, not how you failed or how you almost succeeded, makes you a hero. It is one reason it is said of us that, “Africans do not have history” or that our histories go into extinction because we hardly celebrate our great ones who have made great exploits and succeeded not to talk of those who failed in spite of their very great attempts. Only foreigners like Europeans celebrate such for us. And the reason is, every African thinks him/herself a hero/heroine. We do not appreciate whatever feat achieved by someone other than us, even if they are our own children.

Okonkwo lives a life dominated by fear of failure and weakness like his own father who dies and is “buried like a dog”, too, (p.147), and fear that “the reputation and wealth he had built up would pass on to a worthless son, Nwoye. Of course, Okonkwo’s actions and reactions provokes ridiculous laughter. For instance, he finds Nwoye very disgusting that he said, “I will not have a son who cannot hold up his head in the gathering of the clan. I would sooner strangle him with my own hands,” (p.24). The same Okonkwo kills Nkemefuna whose positive influence on Nwoye has begun to endear the boy to him (Okonkwo) because he does not want to be seen as weak. Among the Igbo, such an action provokes hisses, spitting and scornful laughter. Of course, no moral Igbo man will like to identify with Okonkwo. Many will even see him as a man who makes his wealth through ritual killings – the likes of the Nigerian Otokoto. No tragic hero will ever kill anybody who is never a threat to his achievement. (Snider, 2009), observes:

The comic individual is, in one form or another, the victim of deception. He fights a shadow of his own mind, or pursues an external appearance; his end is a nullity, his plan an absurdity; he is always deceived; he really is not doing that which he seems to be doing. His object may be a reasonable one, his purpose may be a lofty one, but he is inadequate to its fulfillment; the delusion is that he believes in his own ability to accomplish what he wills. His object also may be an absurd one; he pursues it, however, with the same resolution. It may be called a foible, a folly, a frailty — still the essential characteristic is that the individual is pursuing an appearance, and thus is the victim of deception, though he may even be conscious of the absurd and delusive nature of his end, (p.1).

(Adelusi and Adejumo, 1973), in their book, *Things Fall Apart Notes and Essays* identify some factors that bring about Okonkwo’s tragedy, asking an enquiry of aesthetics and depravity of Art:

He comes to grief when he borrows yam seeds to start him in life as a farmer and the harvest that year fails most sadly,

He participates in the killing of Ikemefuna against his conscience and serious warning;

He borders on tragedy when he shoots at Ojiugo, one of his wives. Fortunately, the aim misses;



His gun explodes and a piece of iron from it kills Ezeudu's son;  
He kills the District Commissioner's head messenger consequent upon which he commits suicide, (84-85).  
However, as earlier said, any hero who ever kills anybody who poses no danger to his achievement is never fit for the description of a tragedy hero but a frustrated element. Thus, Okonkwo commits suicide out of frustration. Tragedy characters do not commit suicide out of frustration. Rather, they commit suicide mainly out of defiance, amity and honor. Okonkwo's suicide is factorized by frustration. (Adelusi and Adejumo, 1973) captures it aptly,

Okonkwo choked with hate and rage...(his) patience reaches its limit. Seized by a convulsive rage, he murders the leaders of the messengers, and the meeting is stopped.... The horror-stricken people of Umuofia break into tumult. Okonkwo has thought that the people will rise and fight. But it is a stampede and not a war that follows. Okonkwo is finally abandoned.... (His) greatest hope... betrayed and ruined... the murderer has hanged! Okonkwo has thus committed a double abominations murder and suicide. The customs of the clan...now prevent any of his own people from touching and bringing his body down...." (39-40).

### **3. Reader's Specificity of Emotion**

Every great writer always throws open the emotion contained in the experiences represented to meet the demands of every reader. A text will appeal to the emotion of readers depending on the existing circumstance and situation to generate pity or compassion.

In his *Society and Literature 1945-1970*, (Sinfield, 1983), opines that the structure of emotions in literature is class-specific, and being class-specific means, it is reader-specific. This class-specificity could be viewed from commonplace and patrician perspectives. Usually, there are two major types of readers of fiction – the aristocrats and the ordinary. Each operates under different emotional psychic: *pity* and *compassion*, and at different situations. *Pity*, as earlier defined, is the deep responsiveness of a character, feeling total admiration for its value but without the desire to help. This pity derives from the conscious or unconscious consolation that the protagonist has the same weight as his plight or that he is equal to what he is experiencing. The human psychic, therefore, does not wish to help because it occurs to the subliminal psyche that he – the character – has all it takes to rescue self or bear the consequences of his exploit. *Compassion* – the deep awareness of the suffering of another, feeling total appreciation for its value that motivates a desire to help sets in when the character is not equal to his plights.

### **4. Open-endedness**

According to *The American Heritage Dictionary of the English Language* (2000) open-endedness is when a novel is not restrained by definite limits, restrictions, structure or form. Such responsibilities have several correct answers, solutions or outcomes and can be accomplished in more than one way. They can take the formula of declarations, queries, assignments, developments or teaching approaches. Different scholars may apply dissimilar types of discerning. (Kirzner 2003) opines that, "knowledge is **open-ended** in the sense of always being seen as incomplete. It is always only a fragment of that which is available to be known."

An open-ended reading allows for modifications as things develop designating or of a question allowing for a freely formulated answer rather than one made by a choice from among predetermined answers. In an open-ended story or narrative, the reader is left to draw her/his conclusions from what is presented to her/him. Basically, in character-based open-ended story lacks a clear-cut ending that follows from the nature(s) of the protagonists. Every good story has a catchy start, a fluid free-flowing middle and a satisfying end. Critics applying ambiforms/ambigenres find that such stories have the drawback of not being able to communicate the complexities they want to unravel. Yes, it may end, but the conclusion is not clearly stated. The reader is left to resolve the situation with her/his imagination. The writer simply presents before the reader a sequence of events. Nothing more. For instance, Okonkwo realizes that he is no longer in sync with his society. No one applauds his action, and Okonkwo sees that he alone wishes to go to war



with the Europeans. Caught between his rage that the nine villages would succumb to European rule and the futility of fighting the Europeans alone, Okonkwo retreats to his compound and hangs himself. With this act, Okonkwo becomes a comic character scorned even by his own people. According to the text, the Igbo consider suicide a “feminine” rather than a “masculine” crime. Okonkwo’s suicide is an unspeakable act that strips him of all honor and denies him the right to an honorable burial. He dies an outcast, banished from the very society he fought to protect because, Africans, until taught how to do so, hardly celebrate their own.

### 5. Omniscient Creativity

Creativity is an eternal elasticity that transforms, transits and evolves into infinitive status. It is a revolving circle or a voluntary recycling with a bottomless insight into existence. It maps out the ethical dimension of critics’ perceptibility, and recognizes their never-ending capacity for *surpriseness* (the ability to spring surprises while exercising artistic freedom of choice). Every critic possesses this surplus of humanness to explore, appreciate and enjoy the surplus of vision the author uses to create his characters, props, costumes and language with respect to the text, the social context that produces it and the contemporary realities that test its validity and timelessness. He/she has complete awareness, understanding, and insight into the thoughts, feelings, and motivations of some or all of the characters in the story. In these characters, the writer hides treasures.

To see the treasure the author has hidden, the critic must surrender his essential surplus of vision to the elements of the text. He must not ignore even the insignificant details contained in a text because, in most cases, great authors conceal some significant truths in some insignificant contents and contexts predominantly by exploring the suppleness of language to suit the purpose. For instance, what yields (Soyinka’s 1975), *Death and the King’s Horseman* to comedy with *ambiformic* thinking is, first, the report of the native police officer, Amusa, who says: “the Elesin Oba, is to commit death...” (p.26). Commit here means: *entrust, assign, command* or *obligate*. (The King’s Horseman is to “commit,” *entrust, assign, command* or *obligate* death with some responsibilities). The second is the question asked by Elesin’s Praise-singer: “There... is only one world to the spirit of our race. If that world leaves its course and smashes on boulders of great void, whose world will give us shelter? (p.11). Then the third factor is the death of Olunde, which comes as a sacrifice to save the Yoruba “world” and “people” represented in this text from extinction as, today, they live happily together as a people. In *Things Fall Apart*, Achebe hides it in several events.

### 6. End-product

Discussing this point, a question always beckons for an answer: What effect does a novel have on the reader? That is the question a critic must try to ask and answer, which will help him think how to approach a text either as a tragedy or a comedy. For instance, a critic who wants to critique the story of the death of Jesus Christ should first ask: Is the death of Jesus Christ a tragedy or a comedy judging by the fact that if he did not die the “world” will not be saved? Achebe provides an answer to this question in his *Things Fall Apart* with his representation of Okonkwo as an irrational man whose life, like every great man, is “ruled by a great passion – to become one of the lords of the clan,” but unlike every great man, refuses his passion to be driven by wisdom but by violence. Those who are still aspiring to such a height may see Okonkwo as a tragic character particularly the young ones because they are more driven by sexuality (*Eros*), and aggression (*Thanatos*) instincts of the internal psychic energy which drives Okonkwo to destruction. But, great men in the same clan who achieved greatness through passion driven by wisdom, will definitely laugh at him particularly considering how he, at different times, reacts to whatever he finds disapproving. For instance, he grows restive when the general reaction to the Christians seems to be “It is not our custom to fight for our gods.”

‘Let us not reason like cowards,’ said Okonkwo. If a man comes into my hut and defecates on the floor, what do I do? Do I shut my eyes? No! I take a stick and break his head. That is what a man does. These people are daily pouring filth over us, and Olele says we should pretend not to see.’ Okonkwo

made a sound full of disgust. This was a woman clan, he thought. Such a thing could never happen in his fatherland, Umuofia, (p.113).

Another spark point that renders the novel to comedy occurs on the far-reaching level of antiquity. Achebe signals this by ending the novel with a shift from an African to a European perspective. In the novel's final two pages, the District Commissioner echoes on how he will represent the happenings surrounding Okonkwo's death in his proposed book, *The Pacification of the Tribes of the Lower Niger*. In what assume a denigration, he threatens to erase the specificity of Okonkwo's tragedy by removing the events from their context and simplifying them into a tale meant to entertain his readers: "The story of this man who had killed a messenger and hanged himself would make interesting reading." [Emphasis mine]. Even more troubling, the District Commissioner threatens to reduce Okonkwo's story to a fleeting anecdote in the European history of conquest: "One could almost write a whole chapter on [this man]. Perhaps not a whole chapter but a reasonable paragraph, at any rate."

### Conclusion

The thrust of this theoretical construct rests on the fact that it is based on **i.** the liberal humanist interpretation and **ii.** creative insight into plays. Two important intentions guide these pursuits: **a).** the process of creativity and productive responsibility to firmly ground any directing in general human nature and, **b).** the social context reflected and reflecting. The polemical power of these comes from the conviction that a text has to be interpreted in its own terms; that the tools of interpretation have to be literary in nature contained both in the text and in the society. The in-depth and socio-cultural and period interpretations not only arm the critic with powerful tools of assessment, but also induce him/her to return to the novel with fresh curiosity and a view to exploring new meanings, hidden structures and untapped energies supposedly lying buried in it. He/she tampers with the generic or conventional genre of the play, whittles it down and interferes with its dynamics.

I am tempted to conclude the paper the way Ola Rotimi ends *The Gods Are Not To Blame*, "They start on their journey, passing through a mass of Kutuje townspeople who kneel or crouch in final deference to the man whose tragedy is also their tragedy..." (p.72), and Achebe, *Things Fall Apart* After Okonkwo kills the Whiteman's messenger, he realises that he is not a hero to his people, and that his tragedy is not their tragedy, for "He heard voices asking: 'Why did he do it?' He wiped his matchet on the sand and went away", to hang himself, (pp144-5).

### Acknowledgments

I sincerely want to appreciate the writers of all the materials I have used for this study, particularly, Chinua Achebe. I also appreciate the organisers of the conference, the 6<sup>th</sup> ASRIC Scientific Conference 2023, Morocco.

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## Analysis of the Impacts of Climate Change in N'Zerekore

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### Abstract

For several years now, West Africa has been experiencing very high levels of climate variability. At first glance, climatology is concerned with the mean values of meteorological parameters, their dispersion around this mean, extreme values and their return periods. The calculation of means is therefore the basis of climatic analysis. The calculation of averages is therefore the basis of climatic analysis. The variability of meteorological parameters is research that consists of analysing and synthesising data that mainly concerns the atmosphere of a place and whose complex action influences the existence of the beings that are subject to it. The meteorological data used in this study, i.e. rainfall, humidity and temperature (minimum and maximum) from the N'Zerekore Synoptic Station.

**Keywords:** Interannual variability, number of rainy days, cumulative rainfall, climate analysis.

### Introduction

All national climatological activities, including research and applications, are based primarily on observations of the state of the atmosphere or the weather. 2017 was the third hottest year on record over the African landmass since 1950, after 2010 and 2016 (ACMAD, 2017). Analysing the impact of climate change in N'Zerekore is research that consists of analysing and synthesising data mainly from the atmosphere of a place whose complex action influences the existence of the beings subject to it. The meteorological data used in this study, namely rainfall, humidity and temperatures (minimum and maximum) from 1991 to 2020, were extracted from the National Directorate's well-preserved archives.

The analysing of the impacts of climate change aims to study trends that quantify rainfall over time. Trends can be observed over time. Here, with 30 years of data, the series are long enough to identify changes in temperature and rainfall. For the climate diagnosis, it is mainly changes in rainfall that will be studied.

However, we need to distinguish between climate variability, which is a natural and normal phenomenon, and climate change linked to anthropogenic phenomena, which is a sustained and irreversible modification of the climate. Worldwide, these changes have been observed since 1990, with significant warming of between 0.4 and 0.8 degrees.

### Methods, Techniques, Studied Material and Area Descriptions

#### Studied Material Area Description

N'Zérékoré is one of the six (6) Prefectures of Forest Guinea. It lies between 07°32 and 08°22 latitude North and 9°04 longitude West and covers an area of 47.3 km<sup>2</sup>.

It is bordered to the east by the Prefecture of Lola, to the west by the Prefecture of Macenta, to the south by the Prefecture of Yomou and the Republic of Liberia, and to the north by the Prefecture of Beyla. N'zerekore covers an area of around 4,625 km<sup>2</sup> and has a population of 284,903, with a density of 62 inhabitants per km<sup>2</sup>. It is made up of ten (10) sub-prefectures and one urban commune.



Source: ([Les Merveilles de la Guinée Forestière](#))

### Techniques

These data are available for the period 1991-2020 at the N'Zerekore synoptic station in the network of Guinea's National Direction of Meteorology. This period will constitute our temporal base for the study and will enable us to better appreciate rainfall variability, relative humidity and temperatures.

**Table 1:** Characteristics of synoptic stations

Stations	Code OMM	Latitude (North)	Longitude (East)	Altitude	Observation start date
Koundara	61812	12,34	-13,31	79	1970
Boké	61816	10,56	-14,19	69	1922
Conakry	61832	9,34	-13,37	26	1903
Kindia	61810	10,03	-12,52	458	1922
Mamou	61820	10,22	-12,05	782	1921
Labé	61809	11,19	-12,18	1029	1903
Faranah	61830	10,02	-10,03	340	1923
Siguiri	61811	11,26	-9,10	362	1922
Kankan	61829	10,23	-9,18	377	1922
Kissidougou	61830	9,11	-10,06	450	1903
Macenta	61847	8,32	-9,28	543	543
N'Zérékoré	61849	7,45	-8,47	395	1922

### Methods

The methodological approach is based on records of climatic data observed at the N'Zérékoré synoptic station; meteorological data for the period 1989-2018 were used as the basis for this study, which covers rainfall, humidity and temperature, which are published in the form of climatological bulletins (monthly, seasonal and annual). Monthly climatological tables (TCM) are also drawn up to summarise the physical state of the environment during the month.

The treatment products are: The average of the daily values recorded during the month (mean values); the highest or lowest value recorded during the month (extreme values); the sum of the daily values recorded during the month (cumulative values); the number of days above or below a given threshold, or during which a phenomenon occurs.

N'Zerekore's climate is characterised by two alternating seasons: a dry season and a wet season. This alternation is caused by inter-tropical convergence zone. The data collected was processed using advanced Excel software, to aggregate certain monthly data into annual data, for statistical processing and presentation of the results. The gentleness or rigour of this study is confirmed by the variation in the observed parameters calculated in relation to the average over the period under consideration. This study analyses these variations and interprets the results.

## Results

### *Interannual variation in rainfall in N'zerekore*

Rainfall patterns in West Africa have varied considerably over time. After the relatively wet 1950, it has seen a sharp drop in rainfall in recent decades [f, g - h]. However, since the mid-1990s there has been an attempt to return to better rainfall conditions in several areas, albeit with increased inter-annual variability characterised by a sudden alternation of wet and dry years. Averaging is used to describe the climate and to make spatial and temporal comparisons.

The Technical Regulations of the World Meteorological Organisation (WMO) contain the following definitions:

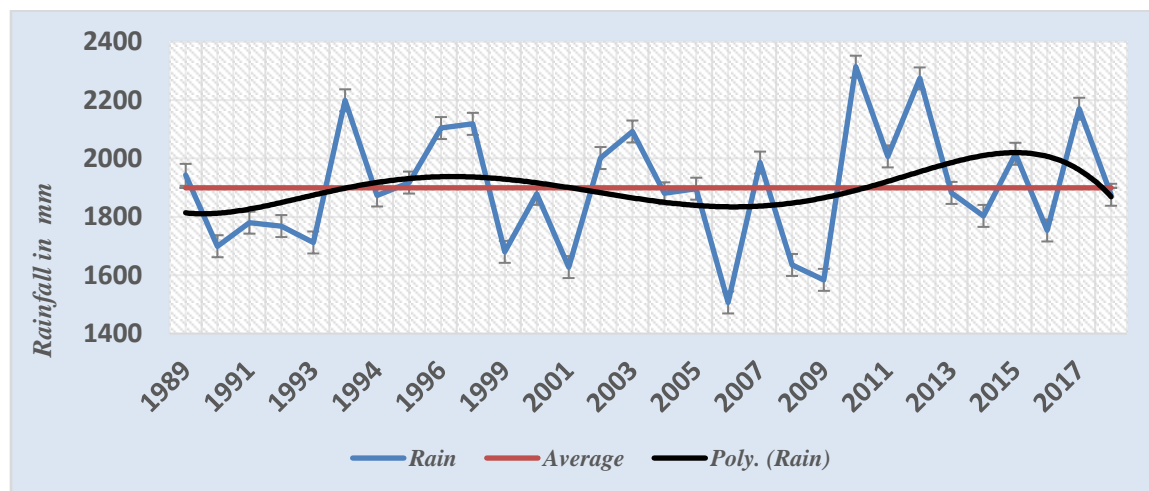
Period average: the climatological data calculated for any period of at least ten years beginning on 1st January of a year.

Reference period average: average calculated over the longest period.

Climate normal: average value 30 years and used as a reference to characterise the climate.

The rainy season lasts 8 months, beginning in May and ending in October. Annual rainfall varies between 1506.6 mm in 2006 and 2314.7 mm in 2010, with an average of 1899.49 mm. The following periods can be deduced from the moving average (*see Figure 1*).

- One surplus period: 2010 - 2017
- Two periods of deficit: 1990 - 1993 and 2001 - 2009
- One period close to normal: 1994 - 2004



**Figure 1: Interannual variation in rainfall in N'Zerekore from 1989 to 2018**

Annual rainfall monitoring in N'Zerekore shows an upward trend in average cumulative rainfall per year. The linear regression line (red dotted line) shows that it has risen from around 1443 mm in 1989 to over 2170 mm in 2017. Cumulative rainfall trends are initially marked by inter-annual variability. The increase observed is mainly due to increasingly high maximum annual totals, with minimum totals remaining between 1,500 and 1,700 mm (*see Figure 2*).



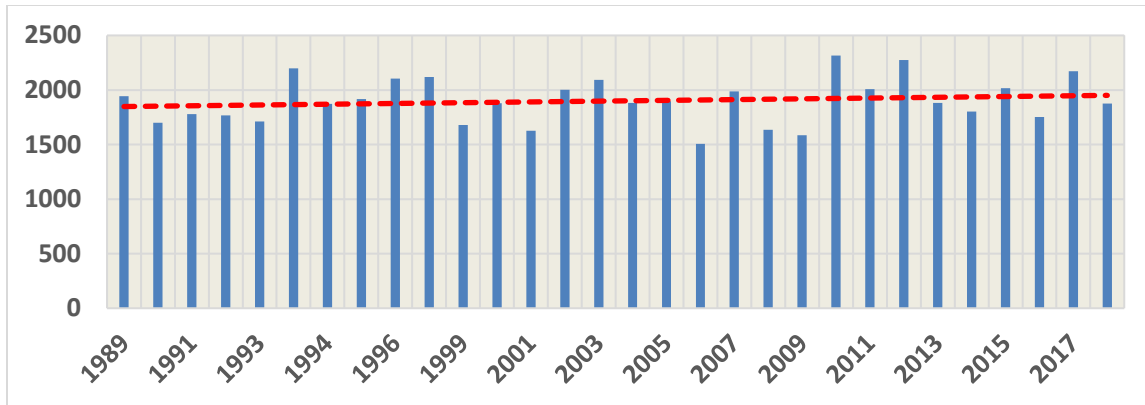


Figure 2: Cumulative rainfall by year in N'Zerekore form 1989 to 2018

**Monthly total:**

N'Zerekore is characterised by two alternating seasons, a dry season a rainy season lasting 8 months; wettest months are: June, July, August and September with an average 1090.61 mm respectively (Figure 3).

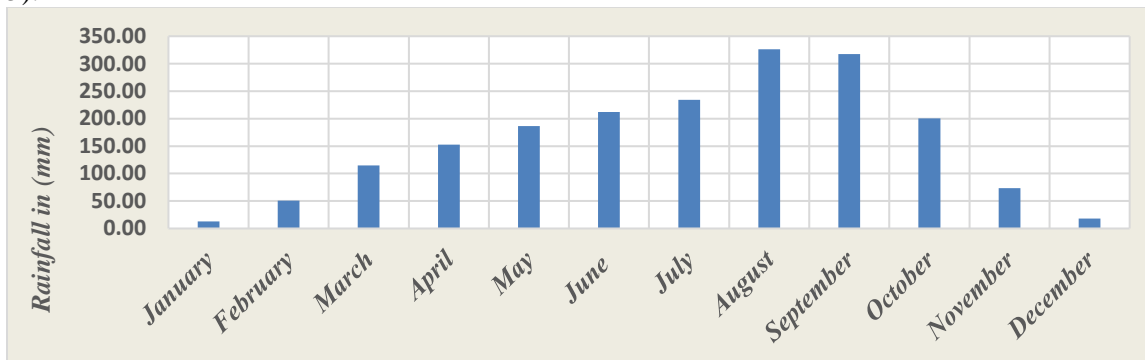


Figure 3: Monthly variation in rainfall in N'Zerekore from 1989 to 2018

Figure 4 shows the histogram of annual rainfall distribution and the annual curve in N'Zerekore. Rainy are those on which the cumulative rainfall is greater than or equal to 1 mm. Below this threshold, the uncertainties are too great to know whether it has rained.

The analysis of the number of rainy days will give an idea of the frequency and distribution of precipitation by seasonality of precipitation and their distribution over the year, season or month give an indication of the distribution of rainfall.

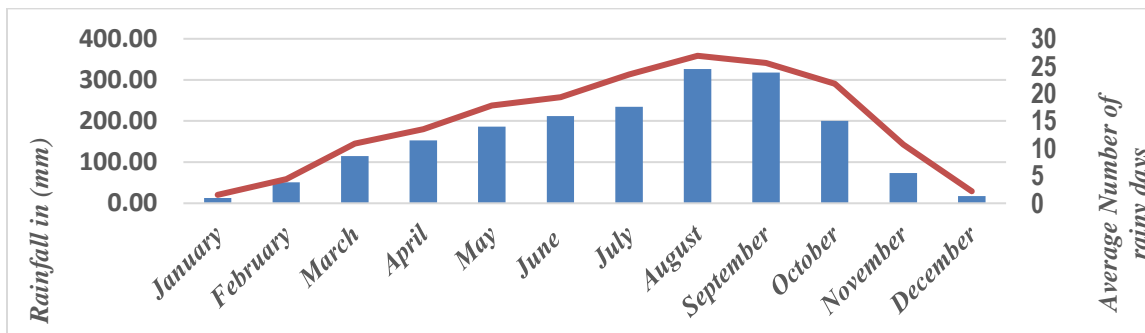


Figure 4: Annual distribution curve of the number of rainy days in N'Zerekore.

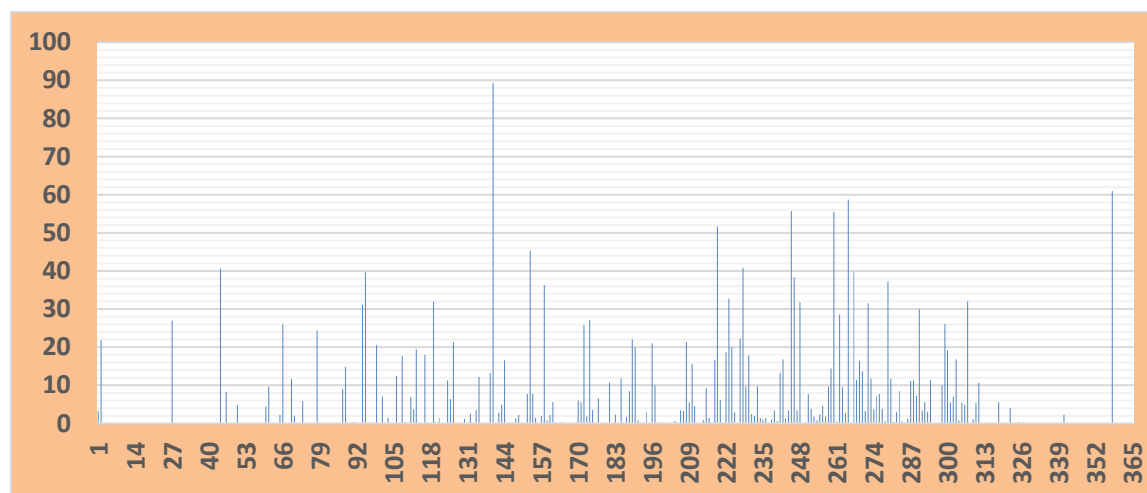
Table 2: Monthly rainfall statistics (1989-2018)

Months	Precipitation				Rainy days			
	Average	Maximum	Minimum	Deviation	Average	Maximum	Minimum	Deviation
January	13,06	74,6	0	20,6	2	6	0	1,9
February	50,59	133,8	0	35,6	4	11	0	3,1
March	114,84	262,2	25,7	60,9	11	16	5	3,0
April	152,75	270,05	52,3	57,9	14	18	9	2,3
May	186,30	329,1	107,2	67,5	18	24	11	3,0
June	212,01	350,9	107,2	81,4	19	23	13	2,8
July	234,40	404,4	89,3	84,1	24	29	17	3,5
August	326,25	539,6	185,5	78,6	27	31	21	2,2
September	317,72	517,6	135	80,5	26	29	21	2,1
October	200,24	452,4	135	39,5	22	28	12	3,5
November	73,51	162,5	4,9	24,6	11	18	4	3,8
December	17,83	82,3	0	206,3	2	7	0	1,9
<b>Total</b>	<b>1899,49</b>	<b>2315</b>	<b>1507</b>	<b>-</b>	<b>15</b>	<b>31</b>	<b>0</b>	<b>-</b>

### Daily:

A climate analysis of N'Zerekore requires a detailed analysis of rainfall. For a climatic analysis, daily data are the most suitable, and provide a good level of precision in the climatic analysis. While hourly data is too accurate for long-term climate analysis, monthly totals mask a wide disparity in rainfall on a daily scale and are therefore not relevant for climate analysis. The absolute daily maximum observed was 125.2 mm recorded on 17/09/2017.

Daily rainfall is generally highly variable. To illustrate this highly variable daily rainfall in N'Zerekore, example diagrams (Figures 5a, 5b and 5c) of annual daily rainfall records are shown for the wettest year (2010), the driest year (2006) and a normal year (2005). From these diagrams, we can see that there is a clear difference between these years. In 2006 (see **Figure 5b**), a dry year, the rainy season began on 8 February and ended on 8 November with 2 daily rainfalls in excess of 50 mm. By contrast, in 2010 (see Figure 5a), a very wet year, the season began on 01 January and ended on 25 December with 5 daily rainfalls in excess of 50 mm. In 2005 (see Figure 5c), a normal rainy year, the season began on 30 January and ended on 25 December. Although it was a normal year, 4 daily rainfalls in excess of 50 mm were recorded. So wet and dry years differ not only in terms of the quantity, length and distribution of rainfall during the season.



*Figure 5b: Daily rainfall totals for N'Zerekore in 2006.*



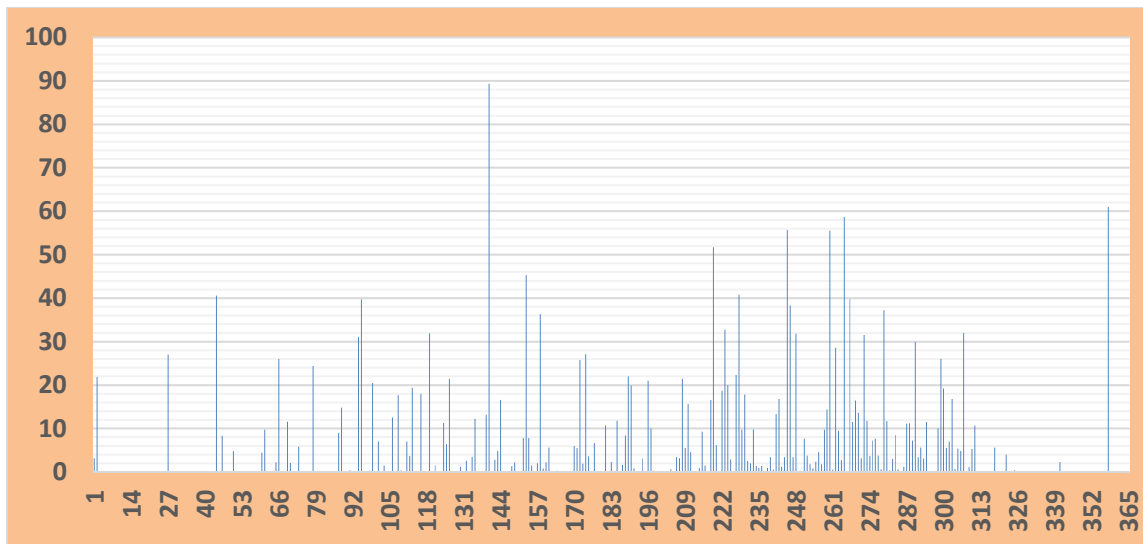


Figure 5a: Daily rainfall totals for N'zerekore in 2010.

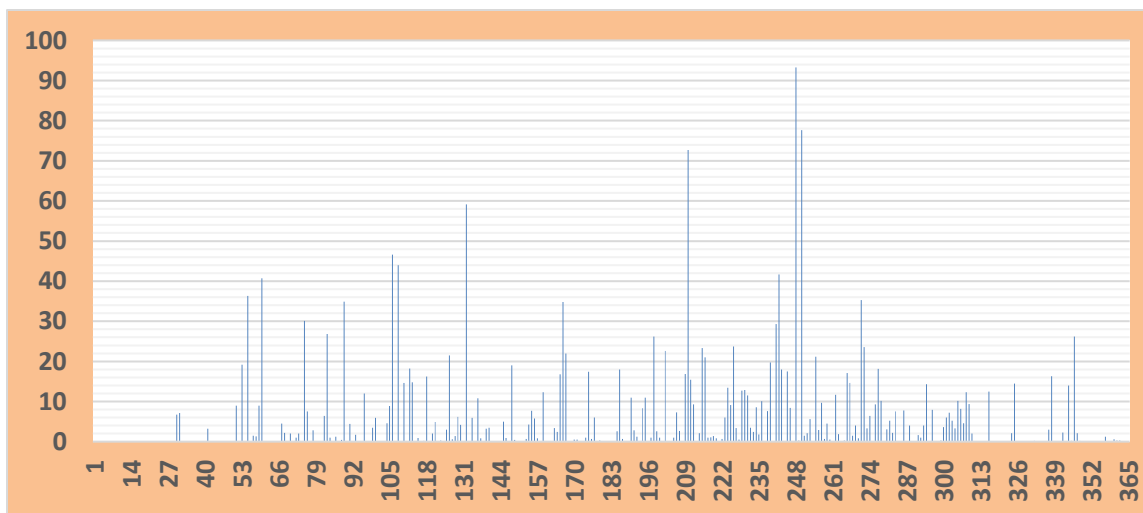


Figure 5a : Daily rainfall totals for N'zerekore in 2005.

### Temperature

For some time now, extreme climate variations have manifested themselves in a drastic increase in temperature and a scarcity of rain due to mining, the use of chemical products and excessive logging... and the socio-economic consequences have had a lasting impact on communities.

Temperature is the result of various heat exchanges in the environment. The temperature of an environment is essentially a manifestation of solar radiation and the energy balance. Temperatures in N'Zerekore are softened by the action of the vegetation and vary very little. The average temperature is 25.4°C. Extreme values of 38°C were observed on 29/02/1998 and 9.5°C on 01/01/ 1989 for the minimum temperature.

Figure 4 the variation curves for maximum and minimum temperatures in N'Zerekore. Maximum temperatures 31.9°C and 33.2°C, while minimum temperatures ranged 17.2°C and 21.6°C.

Tableau 2: Monthly temperature distribution N'Zerekore period (1989 – 2018)

Mois	January	February	March	April	May	June	July	August	September	October	November	December	Average
T min (°C)	17,2	19,5	21,2	21,6	21,6	21,3	20,9	20,9	21,0	20,6	20,4	18,3	20,4

<i>T maxi (°C)</i>	31,9	33,2	32,5	31,4	30,6	29,3	27,7	27,8	29,0	29,8	30,4	30,9	30,4
<i>T average(°C)</i>	24,5	26,3	26,8	26,5	26,1	25,3	24,3	24,3	25,0	25,2	25,4	24,6	25,4

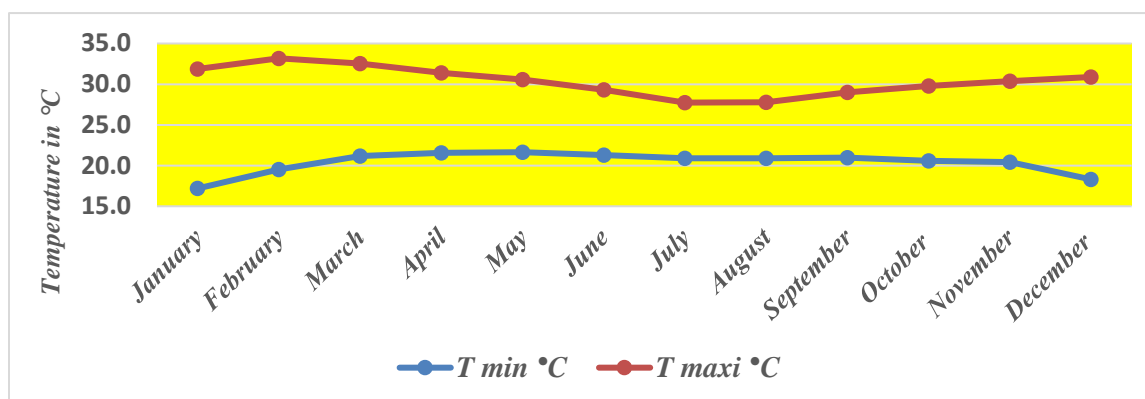


Figure 7: Variation in mean maximum and minimum temperature in N'Zérékoré, 1989-2018

### Relative humidity

Relative humidity in N'Zerekore is highly variable. It can reach 90% during the rainy period (April to October) in the early morning or during heavy rains. On the other hand, during the harmattan period (January to March), relative humidity is low. It can fall below 70% in the afternoons. Average relative humidity fluctuates between 65 and 90%.

Table 4: Monthly distribution of relative humidity in N'zerekore for the period (1989 - 2018)

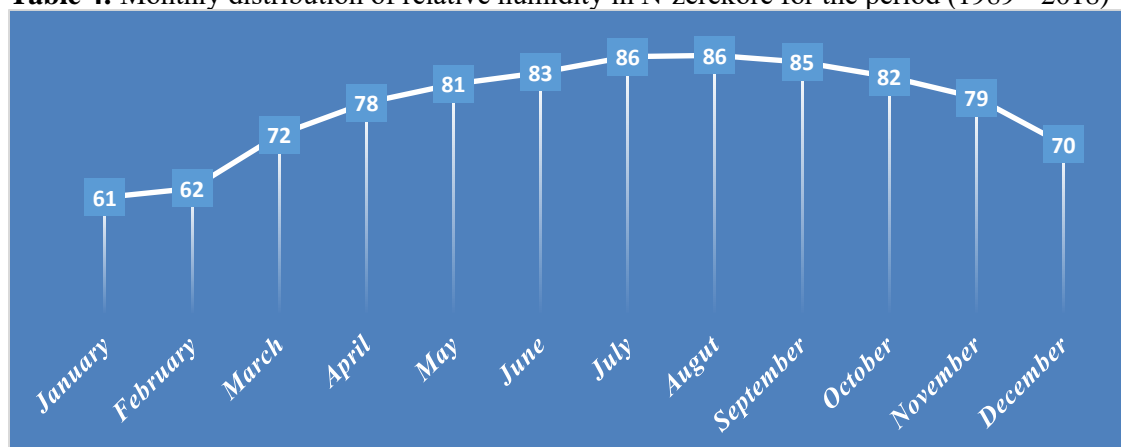


Figure 8: Monthly variation in average humidity in N'Zerekore, 1989-2018

Climatic elements such as temperature, humidity, wind, radiation and evapotranspiration have a certain influence on plants. Data on temperature thresholds and humidity will guide the choice of the best techniques for preserving agricultural produce. Depending on rainfall data (quantity, distribution, length of season) and temperatures (maximum, minimum, average, variation) in N'Zerekore, all cereal crops (rice, fonio, maize, millet) are suitable, and vegetable crops (potatoes, cabbage, carrots, beans, tomatoes, chillies, etc.) can be grown several times a year.

### Conclusion

Many diseases are directly or indirectly associated with climate. Vector-borne diseases such as malaria are sensitive to changes in meteorological parameters such as rainfall, temperature, wind and humidity. Malaria and other vector-borne diseases generally occur in regions with high temperatures (18°C to 32°C) combined

with relative humidities (>60%), monthly rainfall exceeding 80mm (Hellmuth et al. 2007) and high vegetation cover. These climatic and environmental parameters create favourable conditions for the survival and development of the vector mosquitoes responsible for malaria.

By analysing the variation curves for temperature, rainfall and humidity, we can see that the climate conditions for survival of the mosquito responsible for malaria transmission are met March-October and November-February respectively. Knowing this climatic information will enable health services to plan ahead and raise awareness in order to reduce the risk of epidemics.

According to B. Givoni, comfort conditions are linked to temperature and humidity. And the comfort zone is delimited by temperatures of 20 and 27°C and relative humidity of 20 and 80%. According to the analysis of the temperature and humidity curves, N'Zérékoré is in the comfortable zone during the day, with the exception of the periods from January to February because of the high temperatures and from July to September because of the high humidity. On the other hand, nights are uncomfortable and require heating.

For the recommendations: Particularly in December-January due to the drop in temperature caused by the harmattan, and from July to September due to high humidity and the drop in temperature caused by heavy rain and low sunshine. The meteorological data used in this study, i.e. rainfall, humidity and temperature (minimum and maximum) from the N'Zerekore Synoptic Station the 1991 - 2020, were extracted from the well-preserved archives of the National Directorate. The climatic data collected underwent statistical processing and analysis, including: trend development over the study period; inter-annual variation, cumulative annual rainfall and cumulative monthly rainfall, number of rainy days, variation in mean maximum and minimum temperature and monthly variation in mean humidity. The analysis of these variations and the interpretation of the results are the subject of this work.

### **Acknowledgements**

Our very sincere thanks to all the meteorologist colleagues and other technicians who have been involved throughout this century in the observation and preservation of meteorological archives, without whom we would not be able to do this work. Our thanks go to all our colleagues at the computer centre (Mrs Aminata Camara, Mr Ilaye Camara, Mr Moriba Maomou and Mr Ibrahima Sow). Finally, our thanks and recognition go to the dynamic National Meteorological Directorate, headed by Dr René Tatö LOUA and Mrs Finou DIAWARA, who initiated and encouraged this initiative.

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## Implementation of E-Government in Nigerian Public Sector: Problems and Prospects

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### Abstract

The quest for a better administrative idea have been the major concern of countries in the world in a bid to foster efficiency and effectiveness in the public service. E-government has become a vital component of public sector reform mostly to the developing countries because of its instrumentality in transforming public sector by enhancing citizen's participation, monitoring and evaluation, government accountability and transparency, efficiency and effective service delivery. Nigeria is not left out in seizing the opportunity of adopting e-government into it public service. In the light of this, the Nigerian government established the National Information Technology Development Agency (NITDA) in 2003 to serve as the driving agency for implementation. Therefore, this paper examines the Implementation of e-government in Nigerian Public sector. It is a conceptual paper that relies primarily on existing literature. The paper makes a clear distinction between e-government and e-governance as it further identifies those product of e-government. The paper concludes that e-government is more than just a government on the website meant to links ministries, departments, parastatals and local governments but the strategies to enable government effectuates representation and regulation; public service delivery or information dissemination as well engage and partner with each other and other stakeholders. The paper recommends that there is need for value reorientation and attitudinal change and there should be first of all value reorientation and change of attitudes of our public servants towards computer system.

**Keywords:** E-government, E-governance, Implementation, Information and Communication Technology, Public Sector

### 1.0 Introduction

World over, the quest for a better administrative idea have been the major concern of governments. This is in a bid to foster efficiency and effectiveness in public service. At a point, the bureaucratic model was employed as veritable tool to initiate and implement public policies and programmes aimed at meeting the needs of the populace. This was met with abysmal failure due to it slow and non-responsiveness to the dynamic needs of the masses. In addition to corruption and increased cost in delivery of services (Abah & Nwokwu, 2019). Consequently, the idea of using information technology to facilitate government operations were mustered which led to the paradigm shift from traditional governance to e-governance. E-government or e-governance connote the use of Information and Communication Technologies (ICTs) to enhance information and service delivery, encouraging citizen participation in the decision-making process and making government more accountable, transparent and effective (Hassan & Siyanbola, 2010).

Over the years, e-government has become a vital component of public sector reform mostly to the developing countries. E-government has been instrumental in transforming countries' public sector by enhancing citizen's participation, monitoring and evaluation, government accountability and transparency,

efficiency and effective service delivery and the transfer of information from one sector to another (Nchuchuwe & Ojo, 2016; Abah & Nwoku, 2019). In addition to providing the capacity to reform the way public administrations operate, which can result in more customer focused and responsive government (Sani, 2018).

ICT have long been embraced by both Advanced and some developing countries. Countries such as South Africa, Malaysia, South Korea and India (Lawan, Ajadi, Kayode & Yaru, 2020) have applied it in their Public Administration. This is most critical by virtue of the increasing responsibility of the public service delivery and the concomitant possession of the infrastructure, capacities, competencies and skills necessary to drive e-governance. Consequently, the global drive in the adoption of e-governance was more or less an unstoppable movement which found its way into Nigeria. Accordingly, Nigeria did not hesitate in seizing the opportunity of adopting ICT in its governance and administrative processes due to its desire to improve service delivery as well as be more responsive and responsible to the changing needs of the citizen.

Thus, the public sector, undergone massive process of reforms in the last two decades (Bureau of Public Service Reforms, 2007). Starting in early 2000s with the ICT revolution. The Federal Executive Council (FEC) approved a National Information Technology Policy in March, 2001 and began the establishment of National Information and Telecommunication Agency (NITDA) in 2003 to serve as the driving agency for the implementation (Abdulkareem, Ishola & Abdulkareem, 2021). Since then, some government services can now be assessed online such as the application for e-passport, processing of driver's license, registration of National Examinations such as Joint Admission and Matriculations Board examinations, filing of tax returns, registration for National Identity Cards among others (Lawan, Ajadi, Kayode & Yaru, 2020).

Other strategies for the actualization of e-governance are linking the citizens with the numerous services provided by the government whether Federal, State or Local via web. Moreover, features such as tourism, drug administration, company registration, immigration, tax, investment, driver's license, education, health, housing projects, corruption reporting, national identity management are embedded in government portal. (Abdulkareem et al., 2021). Many other reforms meant to reduce corruption through e-governance within the public sector were put in place, such as Treasury Single Account (TSA), Biometric Time and Attendance, Integrated Payroll and Personnel Information System (IPPIS), Prepaid Meter. Other initiatives include e-passport, online registration of Joint Admission Matriculation Board (JAMB) by candidates, introduction of computer based examination as well as implanting if CCTV to monitor and reduce exam malpractice, the use of card reader during election, e-reporting of human rights abuse, monthly publishing of local and state governments allocation by the ministry of finance (Ojo, 2019).

## **2.0 Conceptual Clarifications**

E-governance entails the simplification of governmental functions using Information Communication Technology (ICT) like the Internet, World Wide Web, computer and other mobile computing devices. According to Duru and Anigbata (2015), e-governance refers to the use of ICTs as apparatuses for achieving better governance. This implies the use of modern communication technology by government as a political strategy to showcase its activities. In essence, it covers all interactions between the government and the governed by way of e-voting, e-democracy and e-representation. The definition by Coleman (2008) has better captured the essential constituents of e-governance in his assertion that e-governance involves digitized coding, processing, storage and distribution of data relating to three key aspects of governing societies mainly the representation of the citizens and regulation of citizens behaviour; the delivery of public services to the citizens; and the generation as well as circulation of official information between and among the citizens. In essence, Coleman identifies three governmental activities which e-governance facilitate that is, representation and regulation; Public Service delivery; as well as information disseminations. Sheridan and Riley (2006) as cited in Palvia and Sharma (2014) have buttressed further that e-governance is a broad concept that deals with wide spectrum of relationship within government using ICT to foster it. Therefore, e-governance can simply be referred to as the use of ICT within the government to foster good governance.

On the other hand, E-government involve the use of ICT by the government in accessing information that will enable them relate with citizens, businesses, and other organs of government. In other word, e-government portrays the use of internet, mobile computing and wide area networks by the government agencies to transform relationships with businesses, citizens and other government entities. Government can engage others through retailers, e-portals, banks, government, and private sectors. This is in line with Almarabeh and AbuAli (2010) in their reference to E-government as government uses of ICTs to offer for citizens and businesses the opportunity to interact and conduct business with government by using different electronic media such as telephone touch pad, fax, smart cards, self-service kiosks, e-mail / Internet, and Electronic Data Interchange. The definition shows that government interact with external bodies to conduct business or to interact with the citizen as well as other governmental entities. This position is perfectly captured in the definition provided by Abdulkareem, (2015) where he conceived e-government as government interacting electronically with individuals and organizations in four forms as follows; Government to Government (G2G), Government to Business (G2B), Government to Citizens (G2C) and Government to Employee (G2E).

The two concepts must not be confused, Umaru (2014) has skillfully put while e-governance focuses on administration and management within an organization be it public or private, large or small. E-government on the other hand focuses on constituencies and stakeholders outside the organization.

### **3.0 Implementation of E-government in Nigerian Public Sector**

Scholars have predicted that Nigeria has a lot to gain from its potential since the implementation of e-government; however, the implementation has not reached optimum capacity to generate that multiplier effect in public sector reform (Nchuchuwe & David, 2016). The goal of implementing e-government was to provide a solution to the problem of excessive public service bureaucracy by providing a channel for the government to increase productivity, efficiency, and transparency in the delivery of public services.

The Nigerian government launched e-government in the early 2000s with the goal of freeing public services from excessive administrative bottlenecks, improving service delivery, creating a culture of accountability and effectiveness, and combating the corruption threat. The Obasanjo administration demonstrated its willingness to pursue e-government implementation by enacting the Nigerian National Information Technology (NNIT) policy (1999 – 2007). The National Information Technology Policy was launched in 2001, and the implementation of this policy began in 2003, with the establishment of the National Information Technology Development Agency (NITDA) as the driving agency for implementation. The agency was supposed to champion IT development in Nigeria and oversee the implementation of the national IT policy (Omeire and Omeire, 2014). Even though e-governance implementation varies by level and agency, an attempt was made to provide a Unified National Framework of Information and Communication Technology Adoption in Governance (David, Onyepuemu, & Qazeem, 2022).

NITDA, the primary agency in charge of overseeing nationwide e-governance implementation in Nigeria, outlined the specific goals that the e-governance national policy aimed to achieve: Creating a technologically-driven, conducive business environment for local and foreign investors; Responding promptly and without delays to citizens' needs in the course of service delivery; Strengthening good governance by involving the public in decision-making; Improving the overall value of life for the citizenry; Ensuring consistency in job creation, wealth generation, and poverty eradication; Increasing MDA productivity and efficiency; (NITDA, 2007, in David, Onyepuemu, & Qazeem, 2022).

Although e-government has grown slowly but steadily in Nigeria, the emergence of the General System for Mobile Communication (GSM) network in 2001 contributed to the country's economic growth. According to the Nigerian Communication Commission (NCC), the country's teledensity is increasing at an alarming rate (Ojebode et al., 2017). In 2017, it was estimated to be greater than 110%. However, the consequences of these performances have not reached the citizens who are in desperate need of a private sector replica of a seamless citizen-centric type of service delivery. In 2015, nearly four out of every five households had a mobile phone, including 90% of urban homes and 71% of rural homes.

In addition, the government established the National E-Government Strategies Limited to assist with the implementation of a national e-governance strategy (NeGST). According to Adeyemo (2011), the NeGST was a three-way private-public partnership (PPP) arrangement in which the government held a 5% stake and the private sector held 15% and 80% in the form of a consortium of banks and a strategic partner. The NeGST PPP arrangement was charged with developing "a practical strategy and a single architecture to guide the evolution of digital government solutions with consistent standards, operating platforms, and applications across agencies and government systems" (Adeyemo, 2011). The idea behind the PPP-driven approach to e-governance in the form of NeGST, according to Abdulkareem and Ishola (2016), was to use the private sector as "the driving force for infrastructural development and investment creation" in enhancing e-governance implementation in Nigeria.

E-governance implementation in Nigeria was boosted further in 2011 when the Jonathan administration established a new Ministry of Communications Technology at the Federal level, tasked with "coordinating ICT development and driving the nation's e-government agenda" (Omeire and Omerie, 2012). The ministerial committee on ICT policy harmonisation presented a National ICT draft policy to the Nigerian National Assembly the following year, in 2012, which included several policy recommendations and reports.

Without a doubt, concerted and deliberate efforts were made to ensure the long-term implementation of e-governance in Nigeria. The opportunities and benefits of e-governance are too obvious for any modern nation to overlook. This notion became more apparent with the outbreak of the COVID-19 pandemic, which caught the entire world off guard and ultimately forced mankind to limit physical gatherings and interactions for nearly the entire year of 2020 in order to slow the virus's spread. Thus, there has never been a better time for the world in general, and Nigeria in particular, to maximize the use of e-governance to combat the spread and control of the COVID-19 pandemic (David, Onyepuemu, & Qazeem, 2022).

Nigeria received a score of 0.3291 on the United Nations Development Economic and Social Affairs (UNDESA) E-government Development Index. It was ranked in the lower middle class, alongside Kenya, Iran, the Maldives, and Indonesia (United Nations, 2016). Despite the deployment of e-government in the early 2000s, the country remains plagued by corruption and inefficiency in service delivery. Transparency International's 2013 Global Corruption Perception Index (CPI) ranked Nigeria as the 36th most corrupt country in the world, with a CPI of 25%. Similarly, she recorded 26% and 28% in 2015 and 2017, respectively. Many people have wondered what went wrong. Could it be our e-governance model or the human factor?

#### **4.0 Problems of E-government in developing countries**

Alshehri et al., (2012) and Alshehri and Drew, (2010) classified E-government challenges in developing countries such as Nigeria into four categories: Technical impediments that include ICT infrastructure, privacy, and security. Top management support, resistance to change to electronic methods, a lack of partners and collaboration, a lack of qualified personnel and training, and policy and regulatory issues are all examples of organizational barriers. Social impediments such as the digital divide and culture. Economic or financial barriers, such as high costs and a lack of funds

#### **4.1 Technical Barriers:**

##### **4.1.2 ICT infrastructure**

A robust and efficient technological infrastructure is necessary for a successful e-government system and service delivery. The supporting information is made up of hardware and networks such as local area networks (LAN), wide area networks (WAN), and some other technical aspects such as databases and operating systems. However, because most developing countries face these challenges, deployment of appropriate ICT infrastructure is lacking, resulting in large disparities in Internet access and, as a result, impeding the effective adoption of e-government (Alkhwaldi, 2018).

### **4.1.3 Privacy**

privacy refers to the assurance of a suitable degree of protection which disclosures attributed to an individual (Alshehri et al., 2012), it necessitates both policy and technical responses when addressing the privacy issue in an e-government context. Citizens, particularly those in developing countries, are concerned about information sharing, website tracking, the mishandling of private information, and the government's ability to monitor and intrude on their privacy (Weerakkody et al., 2011). As a result, governments must address privacy concerns in e-networks effectively in order to increase citizens' trust in e-government services (Lean et al., 2009). Furthermore, governments are required to protect citizens' privacy rights, as well as to process and collect personal data for legitimate purposes only (Sharma & Gupta, 2003); as a result, they must prioritize privacy and confidentiality issues when developing and maintaining websites in order to ensure the secure collection of data (Almarabeh & AbuAli, 2010). Because it is difficult to implement privacy safeguards after an e-system has been built, privacy considerations must be incorporated into the planning and design of e-government systems. The comprehensive privacy policy should define citizens' privacy rights and require that personal data be collected and used only for legitimate purposes (Shareef et al., 2011).

### **4.1.4 Security**

There is agreement that one of the critical factors for the global implementation of e-government systems is security for both citizens and governments (Almarabeh & AbuAli, 2010). Security is defined as "the protection of information and systems from unintentional or intentional disclosure, unauthorized access, or unauthorized modifications or destruction" (Layton, 2007). As a result, it refers to the protection of assets, information systems, and the control of access to information (Lean et al. 2009), and security can have technical or non-technical issues, with non-technical issues having more influence in developing countries. Security policies and standards that meet citizen expectations are critical in addressing concerns about the trust relationship between citizens and government (Colesca, 2009).

However, information security is an expensive part of e-government, and it includes data protection, as well as personnel training and oversight, the integration of software and hardware, service continuity, which is critical to the availability and delivery of services, and the establishment of citizens' confidence and trust.

Many elements of security are covered, including computer security, document security, network security, and personal data confidentiality (Smith & Jamieson, 2006), as well as e-infrastructure protection and maintenance in the form of firewalls and limits on who has access to the data. Furthermore, security technology usage includes digital encryption, signatures, bank account numbers, credit card numbers, passwords, user IDs, and other electronically transmitted and stored data over the internet; these can aid in the achievement of security goals in e-government applications (Weerakkody et al., 2011). Furthermore, security systems include ongoing protection against the growing threat of viruses and worms.

### **4.1.5 Availability**

The term "availability" refers to "the number of e-services that are available to citizens 24 hours a day, seven days a week" (Almarabeh & AbuAli, 2010). It also increases citizens' satisfaction with the e-government system due to its impact on service quality (Rehman & Esichaikul, 2011). As a result, the availability of services is critical to the success of e-government. As a result, governments must focus on improving the available e-government services and increasing the number of these services.

### **4.1.6 Accessibility**

The term "accessibility" refers to "how citizens obtain online government services and information via various e-channels." Because the presence of e-channels allows all types of citizens to access e-government services regardless of residence, religion, or disability, service accessibility can be proposed as an important predictor of the establishment of "citizen-centric" e-government services (Alomari et al., 2012). Because availability and accessibility are critical success factors in e-government, government agencies should ensure the availability and accessibility of their web services to all stakeholders from various locations (Alkhwaldi et al., 2018).



## **4.2 Organizational Barriers**

Leader and top management support, resistance to change, a lack of partnership and collaboration, a lack of qualified personnel and training, and policy and regulatory issues are all examples of organizational challenges.

### **4.2.1 Leader and Top Management Support**

Top management support is critical in adopting any new innovation, and it is especially important in adopting and implementing e-government (Al-Khafaji et al., 2012), as it refers to "top management's commitment to provide a positive environment that encourages participation in e-government applications" (Hussein et al., 2007). As a result, the successful implementation of e-government requires the highest level of government support.

Similarly, leadership is one of the primary motivators in any new and innovative project or initiative, and it is required for e-government implementation. As a result, leadership involvement and clear lines of accountability for improving management are critical in gathering the necessary resources for improving management, overcoming natural resistance to organizational change, and establishing and maintaining organizational-wide commitment to new methods of conducting e-government systems (Almarabeh & AbuAli, 2010). It has been observed in developing countries that e-government development is driven by political leadership and an integrated vision of IT.

As a result, the government must train potential government managers, administrators, and leaders in the planning and management of ICTs across all public sectors, with a focus on effective delivery, access opportunity, and economic development of public information and services (Olasina, 2014).

### **4.2.2 Resistance to change to electronic ways**

E-government is the conversion of manual work methods to electronic methods, resulting in a new advanced environment that is completely different from what has been used in traditional government departments (Alshehri & Drew, 2010). These changes cause many employees to see the e-government revolution as a threat to their future rather than an opportunity; in other words, "they are afraid of losing their jobs," so these employees tend to resist these changes, posing a barrier to public office modernization and change initiatives. This resistance to change was caused by the transition from a known organizational structure to a new one, as well as unqualified employees for using and utilizing information technologies (Al-Khafaji et al., 2012), as well as factors such as income, education, and age. As a result, one of the organizational challenges of implementing e-government is resistance to change. It is clear that the e-government system faces not only internal employee resistance, but also citizen resistance, which can result in negative outcomes for e-government participation (Alzahrani & Goodwin, 2012). This resistance to change, whether internal or external, poses a risk because it has the potential to bring e-government systems to a halt. As a result, e-government leaders must identify the sources of resistance and devise a strategy to address them, such as retraining employees and developing their skills to deal with the implemented information system (Alshehri & Drew, 2010). As for citizen resistance, governments must improve their social life and establish a knowledge-based society in order to change their citizens' IT-culture (Alkhwaldi, 2018).

### **4.2.3 Lack of partnership and collaboration**

Collaboration and coordination with both public and private organizations are essential for the successful implementation of e-government (Altameem et al., 2006). The government should motivate all sectors to engage in the implementation and development of e-government. As an example, "the ICT private sector is able to support the government with technical skills and infrastructure; meanwhile, universities will provide the required staff, learning, and training courses for government staff and citizens, and other government departments and agencies can contribute in data and information flow and knowledge sharing for problem-solving" (Alshehri, et al., 2012). As a result, one of the primary causes of e-government failures is a lack of collaboration and cooperation between organizations and e-government (Almarabeh & AbuAli, 2010).

Collaboration and cooperation are difficult to achieve because citizens distrust their governments, especially those with a history of political instability, widespread corruption, or dictatorship. As a result, the government must make efforts to increase citizens' trust in their government in order to ensure public and stakeholder participation in e-government. In addition, the government must act as a facilitator and encourage the private sector to participate in the development and implementation of e-government (Alshehri et al., 2012).

#### **4.2.4 Lack of qualified personnel and training**

Technical skills for designing, implementing, installing, and maintaining ICT infrastructure, as well as skills for using and managing online functions, processes, and customers, are required for a successful e-government implementation (Alshehri et al., 2012).

Lack of ICT skills is a particular issue in developing countries due to a constant shortage of qualified personnel and inadequate human resource training (Mahmood et al., 2019). As a result, it is regarded as one of the most significant challenges to e-government initiatives. As a result, governments must invest in human capital by implementing knowledge management initiatives such as seminars, staff training, and workshops to create and develop basic e-government skills (Abdulkareem, 2015). To improve e-government projects and reap the full economic benefits of ICT, governments must prioritize training, education, and learning skills (Gyamfi et al., 2019)

#### **4.2.5 Policy and regulation issues**

To address electronic activities such as electronic archiving, information transmission, electronic signatures, data protection, copyright issues, intellectual property rights, and computer crime, the implementation of e-government functions and principles necessitates a slew of new laws, policies, rules, and government changes (Almarabeh & AbuAli, 2010). Dealing with e-government necessitates the execution of a digital agreement or contract that must be recognized and protected by a formalized law that is designed to safeguard these activities (Alshehri et al., 2012).

Furthermore, many countries do not yet have e-government and e-business laws (Dawes, 2008), so during e-government implementation, policymakers must consider the impact of law and public policy (Mahmood et al., 2019), as well as establish safeguards and legal reforms to ensure the security, privacy, and legal recognition of electronic signatures and electronic interactions (Alshehri et al., 2012).

### **4.3 Social Barriers**

The social implications of new IT as well as the usability by a wide range of people are central to the implementation of e-government. Many challenges exist in the social aspect, such as culture and the digital divide (Alshehri et al., 2012).

#### **4.3.1 Digital Divide**

The ability to use computers and the internet is required for successful e-government implementation, so a lack of these skills is a barrier to e-government (Mahmood et al., 2019). The digital divide is defined as "the disparity in opportunity between those who have Internet access and those who do not" (Alshehri et al., 2012). Low literacy, a lack of infrastructure, slow adoption of technology, high corruption, massive poverty, and access to modern technology such as the internet, mobile phones, and computers all contribute to it in developing countries (Ajibade et al., 2017 and Sarker, et al., 2019).

Because of a lack of necessary skills, financial resources, or other factors, not all citizens in developing countries have equal access to the internet. As a result, governments should train their citizens and employees in computer basics and internet skills so that they can participate in e-government development applications (Alshehri, et al., 2012). Furthermore, by making internet services available, the gap between those who have access to the internet and data services and those who do not can be bridged (Ajibade et al., 2017). According to a survey conducted by the United Nations (United Nations, 2018), the growing digital divide necessitates an increase in the cost of technical barriers to e-government.

### **4.3.2 Culture**

One of the most significant barriers to e-government implementation is the cultural implications of new technologies (Ajibade et al., 2017). Society, religion, beliefs, language, values, education, characteristics, and behaviors are all examples of cultural principles (Alshehri et al., 2012). As a result, culture influences how policymakers and citizens use new technologies and online systems (Choudrie et al., 2010). Individual culture influences resistance to change and slow adoption of new technologies (Mahmood et al., 2019), which has hampered acceptance and adoption of e-government systems. As a result, changing society's major culture is required for successful e-government.

### **4.4 Financial Barriers**

Because of the high cost of computer system implementation and maintenance, e-government implementation is very expensive, putting many countries in a funding e-government program quandary. The high cost of system software, hardware and maintenance, training, and education are all part of the e-government implementation cost, so money is the most significant barrier to e-government implementation (Alshehri et al., 2012). According to (Brown & Thompson, 2011), the main barrier to e-government in developing countries is a lack of financial support for capital investment in new ICT systems. To overcome financial barriers, public administrations must commit to long-term financial support for e-government.

### **4.5 Human challenges**

In their efforts to develop e-government programs, most developing countries face the challenge of insufficient ICT human resources (Olasina, 2014). Furthermore, many e-government projects have failed in most African countries due to incompatibility between adopted technologies and human skills and capacities to manage them (Asogwa, 2013; Eze et al., 2013). According to Alkhwalidi et al. (2018), "Once people have the infrastructure to go online, they need the awareness, skills, and online content to motivate their access," indicating that a lack of awareness and ICT skills are obstacles to e-government initiatives.

#### **4.5.1 Lack of awareness**

In general, citizens in developing countries are unaware of the benefits of e-government services (Weerakkody et al., 2011). One of the barriers to successful e-government adoption is a lack of awareness (Rana et al., 2013). The term "awareness" refers to "the person's understanding of the activities of others, which yields a context for his own activities" (Alateyah et al., 2013).

The low rates of citizen participation in e-government projects, as well as their failure, are caused by a lack of awareness (Rehman & Esichaikul, 2011). As a result, governments should work to raise citizen awareness by launching appealing awareness campaigns to promote new e-government services and ensure the success of e-government implementation.

#### **4.5.2 ICT Skills**

The required ICT skills to use e-government systems by citizens are Information security literacy and ICT literacy. The lack of these skills, particularly in developing countries is a crucial challenge to e-government initiatives (Odat, 2012). ICT Literacy is defined as "the ability to use information technology tools, communications tools, ICT applications to access, use, integrate, assesses, and create information in order to participate in an Information technology society" (Katz et al., 2009), so it indicates people who are unable to use ICT due to the lack of computer knowledge and education (Almarabeh & AbuAli, 2010). While information security literacy means "the scarcity of basic knowledge about secure online practices" (Furnell & Moore, 2014). So, governments needed to provide security, essential computer, and internet skills to their citizens to improve their participation in e-government.

### **5.0 Prospects of E -government in the Nigerian Public Sector**

Most governments have recently embarked on major projects utilizing modern technologies to improve and develop government activities. Adiele (2017) identified the following advantages of e-government (World Bank, 2016, Transparency International, 2016):

1. Aids in the dissemination and implementation of government programs

2. improves the flow of information from the government to citizens
3. Increases transparency and accountability, resulting in a significant reduction in corruption.
4. Increases efficiency by eliminating bureaucratic bottlenecks in government operations.
5. Contributes significantly to the security of citizens' lives and property.
6. Improves service delivery, particularly through interdepartmental information exchange and the consolidation of related agencies and ministries.
7. Lowers the transaction, manpower, time, and space costs associated with good governance.
8. Improves the government's ability to deliver services and increases citizen participation in governance.
9. Contributes to development, particularly in government operations, by introducing new e-governance concepts.
10. Reduces corruption by promoting transparency, making government data available to the public, automating government processes, limiting officials' discretion, and limiting citizens' interaction with gatekeepers to access key services.

## **6.0 Theoretical Framework**

### **Communication Theory**

This paper reviewed and adopted Communication theory as a theoretical guide. Karl Deutsch developed communication theory in 1963, and it was later expanded by other scholars such as Morton R. Davies, James Charles Worth, Vaughan A. Lewis, David H. Everson, and Joan Papard Paine. The science of communication as the primary source of system control is the foundation of communications theory. Cybernetics is analogous to information machines or tools such as computers and other ICT gadgets that regulate the flow of information in a system. Communication theory is relevant to this paper because it emerged in the quest to build the administrative structures for employee efficiency and effectiveness in the public sector, and the use of Information and Communication Technology is one of the structures that enhances service delivery in public service towards improving performance.

### **7.0 Conclusion**

From the fore-going, it can be understood that E-governance is more than just a government on the website meant to links ministries, departments, parastatals, and regional/local governments but the strategies to enable government effectuates representation and regulation; public Service delivery; or information disseminations as well engage and partner with each other and other stakeholders. The paper situated the Nigeria e-government status at the Internet Stage because of the enormous efforts of government in this area.

### **8.0 Recommendations**

From the foregoing, the following recommendations are essential

- a. There is need for Value Reorientation and Attitudinal Change. There should be first of all value reorientation and change of attitudes of our public servants towards computer system. This is the first and fundamental step to take.
- b. There is an urgent need to develop the rural areas and provide infrastructure like steady power supply for e-government to be functional. This will help to make people have more access to internet.
- c. There is need to ensure that the ministries departments and agencies of Nigeria in both federal or central, state and local government levels maintain functional websites that will accommodate or give the citizens easy access to make their inputs and give feedback concerning the services rendered to them.
- d. Government must be careful in applying uniform e-governance products to all MDAs to avoid industrial disharmony. Government should acknowledge and appreciate the autonomous status of government establishment such as Universities and ensure that their peculiar need is put to consideration.

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# A Systematic Review of Science, Technology, and Innovation Impact of Scientific Diasporas and the role of Foreign Missions

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## Abstract

The quest for international talents contributes to the rise of brain drain, hence, the existence of the scientific diaspora. Skilled immigrants possess the capacity to contribute solutions to national and global crises. This systematic review aims to show the empirical evidence of scientific diaspora impact, indicators to measure impact, the sustainability model(s), and the role of foreign missions and embassies in harnessing the potential of the scientific diaspora. A total of 31 publications retrieved from PubMed, Web of Science, International Bibliography of the Social Sciences (IBSS), ScienceDirect and Scopus were included in the literature review. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses methodology was used in the study. The findings show that the scientific diasporas have made significant contributions to the revolutionizing of STI development in the nations that were able to develop strategic approaches to harnessing their skills. The empirical evidence and the role of the embassies were categorized into five different themes. The formation of the scientific diaspora is bottom-up or top-down which has some deduced implications for their sustainability after analysing it from five different models of government engagement. No established indicator exists in measuring the STI impact delivered by the scientific diaspora.

**Keywords;** Scientific diaspora, embassy, science, technology, innovation, sustainability

## Introduction

Developing nations are severely distressed by challenges that Science, Technology, and Innovation (STI) could directly or indirectly provide solutions to. There is a need to develop STI capability both in terms of human resources and infrastructural development. Unfortunately, about 30 to 50% of those trained in STI-related professions in developing countries immigrate to developed countries (Samet 2013). Many authors have regarded this as a brain drain (Echeverría-King et al. 2022; Samet 2013; Nedelcu 2019; Ciumasu 2010). This class of skilled immigrants constitute the scientific diaspora. It is a network of skilled professionals who are residents abroad with work or study experience, and they seek to connect with their home country to contribute their STI expertise (Seguin et al. 2006). Some other authors have similarly defined the scientific diaspora but with some emphasis on their “self-organized” nature (Barré et al., 2003). Therefore, they are a significant pool of very useful knowledge that could support the STI drive in developing nations (Singh et al. 2020; Yurevich et.al., 2019; Horvat 2005).

There are suggestions as to the strategies that could be adopted in transforming such brain drain into brain gain. Some authors discuss the “return option” which requires the return of skilled professionals to their home country, or the “diaspora option” which enables the diaspora to contribute their expertise without necessarily returning home (Samet 2013). Exploring the diaspora option seems to be more viable since most of the factors that caused immigration from developing countries appear to persist (Anand et.al., 2009; Amagoh and Rahman 2016). Many developing countries are now aware of the potential of the scientific diaspora (Samet 2013; Bonilla et.al, 2022; Pandey et.al., 2022; Bonilla et. al. 2022; Echeverría-King et. al.

2022; Georges-Ivo Ekosse 2011). The African Union has recognized the African Diaspora as a critical mass of skills and expertise that is required for advancing developments in the continent (Georges-Ivo Ekosse 2011). Some other countries from different continents have developed some policies to attract the scientific diaspora. Examples include China, Taiwan, and South Korea (Samet 2013).

The foreign missions of a country can be a strong channel to support and coordinate the activities of the scientific diaspora for national STI development. How foreign missions operate to support the scientific diaspora has not been well researched. Besides, some literature discusses the potential that could be derived from the scientific diaspora without much empirical evidence (Lopez-Verges et. al. 2021; Pandey et.al., 2022; Echeverría-King et. al. 2022). This review aims to contribute to the discourse of harnessing the potential of the scientific diaspora by reviewing the activities and role of the embassies in the host country. It is a systematic review that seeks to answer the following questions: RQ1: What empirical evidence exists of the scientific diasporas' contribution to STI development in their home countries? RQ2: What is the role of the home foreign missions and embassies in the host countries? RQ3: What sustainability model(s) of the activities of the scientific diaspora can be deduced? RQ4: Are there indicators to measure the impact of the scientific diaspora in the development of Science, Technology, and Innovation in their home countries? A study on the answers to these questions is scarce. This review is limited to reviewed papers. Grey literature was not considered. Therefore, there could be the possibility of gathering more evidence and responses to the research questions.

## Methods

The systematic review followed three steps. The first involved the framing of relevant keywords used as search terms for retrieving reviewed articles from five different scientific databases. To address the research questions, the keywords were selected to capture scientific diaspora, evidence of impact, indicators, the sustainability of their activities and the role of their country's foreign missions. In the second stage, the keywords were combined to search for publications in the databases. Table 1 shows the combination of the keywords and the search queries from the five databases: PubMed, Web of Science, International Bibliography of the Social Sciences (IBSS), ScienceDirect and Scopus. The search on the ScienceDirect database was conducted using two strings in conjunction with the primary keyword "scientific diaspora" because the database does not allow more than eight "OR" terms per search under the "Title, abstract or author-specified keywords". The investigation was restricted to reviewed articles published only in English, spanning from the inception of the databases to July 2023, when the review was done.

Table 1. Keywords and search queries from five different scientific databases in the current review.	
PubMed	(contribution OR support OR assist OR science OR technology OR sustainability OR indicators OR "science attaché" OR "science envoy" OR "embassy" OR "foreign mission" OR "foreign affairs") AND ("scientific diaspora")
Web of Science (WoS)	"scientific diasporas" (All Fields) and "contribution" OR "support" OR "assist" OR "science" OR "technology" OR "innovation" OR "engineering" OR "sustainable" OR "sustainability" OR "indicators" OR "science attaché" OR "science envoy" OR "embassy" OR "foreign mission" OR "foreign affairs"
International Bibliography of the Social Sciences (IBSS)	"scientific diasporas" AND ("contribution" OR "support" OR "assist" OR "science" OR "technology" OR "innovation" OR "engineering" OR "sustainable" OR "sustainability" OR "indicators" OR "science attaché" OR "science envoy" OR "embassy" OR "foreign mission" OR "foreign affairs")
ScienceDirect	1 <sup>st</sup> string
	"scientific diaspora" AND "contribution" OR "support" OR "assist" OR "science" OR "technology" OR "innovation" OR "engineering" OR "sustainable" OR "sustainability"
	2 <sup>nd</sup> string
	"scientific diaspora" AND "indicators" OR "science attaché" OR "science envoy" OR "embassy" OR "foreign mission" OR "foreign affairs"
Scopus	(TITLE-ABS-KEY ( "scientific diaspora" ) AND TITLE-ABS-KEY ( "contribution" OR "support" OR "assist" OR "science" OR "technology" OR "innovation" OR "engineering" OR "sustainable" OR "sustainability" OR "indicators" OR "science attach&#233;" OR "science envoy" OR "embassy" OR "foreign mission" OR "foreign affairs" ) )

Finally, the third step deployed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methodology (Moher et al. 2009) for the retrieval and evaluation of reviewed publications. The PRISMA flow chart is shown in Fig. 1. It followed a series of processes of “identification”, “screening”, “eligibility” and “included” stages. Some publications were excluded at every stage with the reasons for exclusion given. The titles and abstracts were initially reviewed for relevance to the current study and some of the publications did not pass this stage. The full-text publications of those that passed were further reviewed and subjected to assessment to ascertain that they meet at least two or more of the eligibility criteria such as evidence of STI-related contributions by the scientific diaspora to their country of origin, the role of their country’s foreign missions, the sustainability strategies, and the indicators to measure the impact of their STI-related activities.

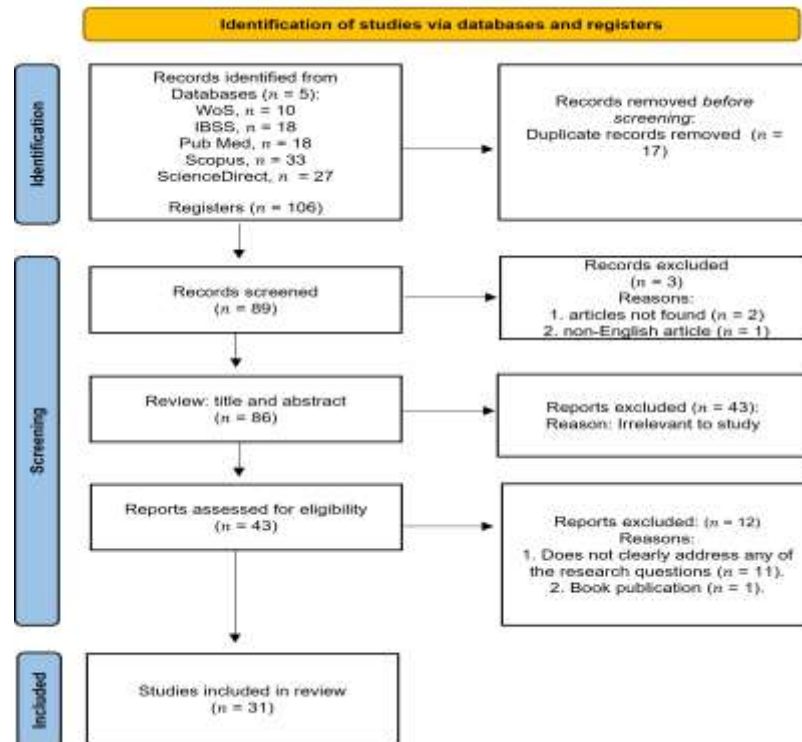


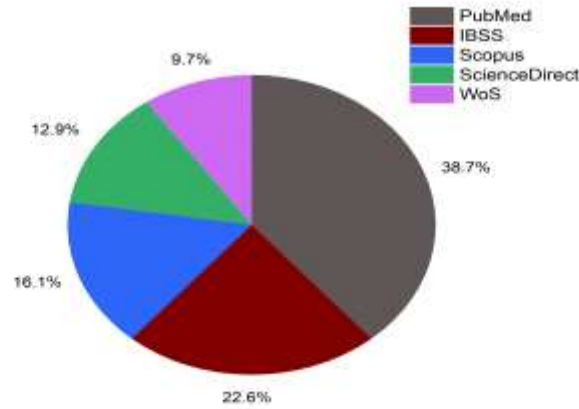
Figure 1. PRISMA (Moher et al. 2009) flow chart from five databases.

## Results

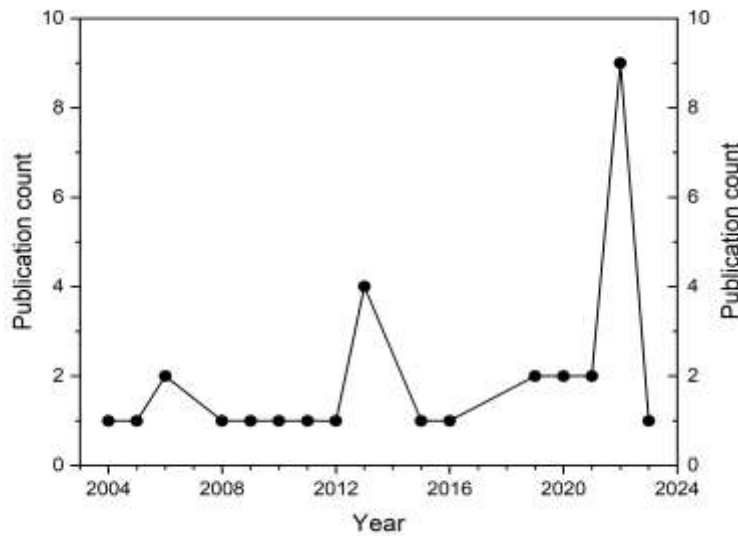
The search queries on the databases retrieved 106 publications. The number of publications decreased to 89 after the removal of 17 duplicates. After a thorough review of the publications through the eligibility criteria, a total of 31 publications were included in the review as shown in Fig. 1. Figure 2 shows the percentage distribution of the included publications as sourced from the five databases. About 39% (12) of the publications that represented the highest in this study were retrieved from the PubMed database followed by the International Bibliography of the Social Sciences (IBSS) database of about 23% (7). Scopus, ScienceDirect, and Web of Science have about 16% (5), 13% (4) and 10% (3) respectively. The reason why more publications were found in the PubMed database could be that most published areas of STI-related interventions of the scientific diaspora are health-related. PubMed is well known to be suitable for health-related scholarly articles (White 2020). More relevant reviewed literature was published in 2022 as shown in Fig. 3 compared to other years except for 2023 which is barely halfway at the time of this review. The increase in the number of publications beginning around 2019-2021 might not be unconnected with the renewed international partnership offered by the scientific diaspora after the COVID-19 pandemic outbreak in 2019 and early 2020. A list of the publications, authors, country of first author’s affiliation and citation is presented in Table 2. Figure 4 shows the number of publications based on the country affiliation of the first authors. Guatemala, the United States, Canada, India, Israel, and Colombia top the results and it



appears they seem to show more scholarly interest in understanding the impact of the scientific diaspora and the involvement of foreign missions in supporting their objectives. This does not, however, suggest a lesser interest in the other countries that have just one related publication.



**Figure 2:** Percentage distribution of the included publications from five databases.

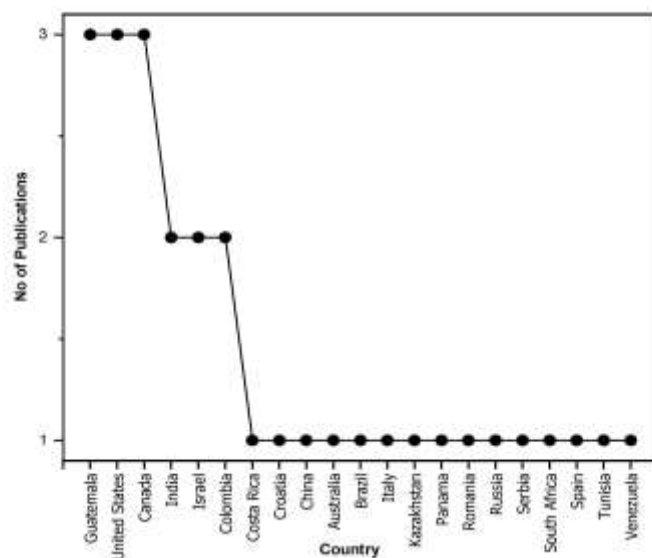


**Figure 3:** Yearly distribution of publications included in the review

Table 2. Title, authors, first author’s country of affiliation, and citations of the included publications.				
SN	Title	Authors	Country	Citation
	Tapping into the Potential of Academic Diaspora for Homeland Development: The Case of Nigeria	Amagoh, Francis;Rahman, Taiabur	Kazakhstan	21
	Skilled flows and selectivity of Chinese scientists at global leading universities between 1998 and 2006	Tian, Fangmeng	China	14
	Recruiting "Super Talent": The New World of Selective Migration Regimes	Shachar, Ayelet;Hirschl, Ran	Canada	80
	Diaspora Engagement Strategies and Policies	Filipovic, Jovan;Devjak, Srecko;Ferfila, Bogomil	Serbia	10

	Turning brain drain into brain networking	Ciomasu, Ioan M	Romania	85
	Higher Education and Global Talent Flows: Brain Drain, Overseas Chinese Intellectuals, and Diasporic Knowledge Networks	Welch, Anthony R;Zhen, Zhang	Australia	161
	Plumbing the brain drain	Nancy Gore Saravia;Miranda, Juan Francisco	Colombia	197
	Scientific diasporas	Seguin, Beatrice; Singer, Peter A.; Daar, Abdallah S.	Canada	29
	Global Experience in Interaction with Compatriot Scientists: Lessons for Russia	Yurevich, M. A.; Malakhov, V. A.; Aushkap, D. S.	Russia	4
	International visibility of Armenian domestic journals: the role of scientific diaspora	Gzoyan, Edita; Mirzoyan, Aram; Sargsyan, Anush; Yeghikyan, Mariam; Maisano, Domenico A.; Sargsyan, Shushanik	Italy	0
	Advances in controlled release pesticide formulations: Prospects to safer integrated pest management and sustainable agriculture	Amrita Singh, Nitesh Dhiman, Aditya Kumar Kar, Divya Singh, Mahaveer Prasad Purohit, Debabrata Ghosh, Satyakam Patnaik	India	226
	Ethology and animal behaviour in Latin America	Klaus Jaffe, Juan Carlos Correa, Zuleyma Tang-Martínez	Venezuela	10
	From nation to profession: Israeli state strategy toward highly-skilled return migration, 1949–2012	Nir Cohen	Israel	26
	Circular Migration between the North and the South: Effects on the Source Southern Economies	Kaies Samet	Tunisia	21
	Engaging the Guatemala Scientific Diaspora: The Power of Networking and Shared Learning	Bonilla K, Romero-Oliva CS, Arrechea S, Ortiz Osejo NY, Mazariegos S, Alonzo M, Orellana-Corrales G, Del Valle AC, Montenegro-Bethancourt G.	Brazil	2
	Emerging Technologies, STI Diaspora and Science Diplomacy in India: Towards a New Approach	Pandey N, Srinivas KR, Deepthi TR.	India	0
	RAICEX: A Successful Story of the Spanish Scientific Diaspora	Ortega-Paino E, Oliver E.	Spain	2
	Organized Scientific Diaspora and Its Contributions to Science Diplomacy in Emerging Economies: The Case of Latin America and the Caribbean	Echeverría-King LF, Camacho Toro R, Figueroa P, Galvis LA, González A, Suárez VR, Torres Atencio I, Widmaier Müller CN.	Colombia	5
	Scientific diasporas and the advancement of science diplomacy: The InFEWS US-China program in the face of confrontational "America First" diplomacy	Prieto J, Scott CA.	United States	1
	Imagining a 'Jewish atom bomb', constructing a scientific diaspora	Rabinowitz O, Abramson Y.	Israel	6
	Developing a Digital Technology System to Address COVID-19 Health Needs in Guatemala: A Scientific Diaspora Case Study	Alvarado JR, Lainfiesta X, Paniagua-Avila A, Asturias G.	Guatemala	0
	Voices of the Costa Rican scientific diaspora: Policy lessons from a decade of	Jarquín-Solis ME, Lin-Shiao E, Guerra M, Calderón Zúñiga K,	Costa Rica	0

	experiences from our scientists abroad	Mora Solórzano D, Gutiérrez JM.		
	Connecting Scientists Residing Abroad: A Review of Convergencia as a Practice to Engage the Guatemalan Scientific Diaspora From 2005-2020	Bonilla K, Arrechea S, Velásquez Pérez LG.	Guatemala	2
	Participation in Communities of Women Scientists in Central America: Implications From the Science Diplomacy Perspective	Bonilla K, Cabrera J, Calles-Minero C, Torres-Atencio I, Aquino K, Renderos D, Alonzo M.	Guatemala	4
	The globalization of health research: harnessing the scientific diaspora	Anand NP, Hofman KJ, Glass RI.	United States	32
	Call to Action: Supporting Latin American Early Career Researchers on the Quest for Sustainable Development in the Region	Lopez-Verges S, Valiente-Echeverría F, Godoy-Faúndez A, Fernandez Rivas D, Urbani B, Berger JJ, Carmona-Mora P.	Panama	10
	Networking of intellectual capital in Southeast Europe: Boosting the transition to meritocratic societies	Vedran Horvat	Croatia	1
	The Romanian scientific e-diaspora: Online mobilization, transnational agency, and globalization of domestic policies	Mihaela Nedelcu		6
	Scientific diasporas as an option for brain drain: Re-circulating knowledge for development	Beatrice Seguin, Leah State, Peter A. Singer and Abdallah S. Daar	Canada	83
	Scientific Diaspora: Stay plans of Indian faculty in the United States	Sabharwal M.; Varma R.	United States	9
	Reflections on Cameroonian scientists in diaspora	Georges-Ivo Ekosse	South Africa	0



**Figure 4.** Number of publications based on first author's country of affiliation.

### Discussion

The study aimed to synthesize empirical evidence of the contribution of the scientific diaspora towards the development of Science, Technology, and Innovation (STI) in their home country, the indicators in measuring this impact, the interventions of foreign missions towards this drive and the sustainability

model(s) of the activities of the scientific diaspora. Therefore, the results are analyzed based on the following research questions:

**RQ1:** What empirical evidence exists of the scientific diasporas' contribution to STI development in their home countries? For simplicity and comprehension, the response to this research question is discussed by organizing the answers into themes. Five major themes were identified:

*Capacity building and education:* This involves the contributions from the scientific diaspora in STEM-innovation-related capacity-building programs and collaborations with home country educational institutions to provide mentorship and to improve research capability and scientific scholarly publications. For example, China's prominence and success in STI-related research enjoyed significant contributions from the scientific diaspora (Shachar and Hirschl 2013). The country moved from the 38<sup>th</sup> to the 5<sup>th</sup> position on the international ranking of academic output between 1979 and 2003 (Welch and Zhen, 2008; Li 2008). It was found that domestic paper citations by diaspora researchers increased tremendously (Pandey, et al., 2022; Xie and Freeman, 2020). Such academic international collaboration for scientific publications by the scientific diaspora and home country researchers was also seen in the InFEWS-US-China program where Chinese scholars led some of the projects in the program (Prieto and Scott 2022). In terms of capacity building in STI, an example was found for some Chinese scientific diaspora based in the United States who collaborate with the Chinese Academy of Science and Shanghai Institute for Biological Science to build capacity for 200 students in molecular and cell biology (Saravia and Miranda, 2004). This program is usually offered for one year in Chinese.

Many countries in Latin America are also benefiting from the STI activities of their scientific diaspora. The Centro Virtual de Altos Estudios de Altas Energías (CEVALE2VE) initiative of the Venezuelan scientific diaspora is strengthening the academic community training in Physics, and this has been extended to include countries like Colombia, Ecuador, and Peru (Echeverría-King et al. 2022). They are now engaged in the Latin American Alliance for Capacity Building in Advanced Physics (LA-CoNGA), which aims at building and enhancing capability and capacity in advanced physics research and development. An example of an individual scientist (Alejandro Alex Kacelnik), a fellow of the Royal Society of London and one that can be considered of the scientific diaspora community, was recorded for Argentina in providing mentorship for Latin American scientists and helping to build international cooperation. He received a national award from Argentina's Ministry of Science, Technology, and Innovation for his contribution to national STI development (Jaffe et.al., 2020).

Other countries found in the study within the theme of capacity building and education for STI-related interventions include Armenia, Spain, Cameroon, Kenya, and Iran. The Armenian diaspora researchers gave international visibility to Armenian domestic journals by academically proliferating the scientific knowledge of their publications. This enlisted the domestic journals in international scientific databases (Gzoyan et al. 2023). The Iran scientific diaspora contributed to improving the scientific publications from domestic scientists from 374 in 2000 to 9000 in 2017 (Yurevich et.al, 2019). The Spanish Network of Associations of Spanish Researchers and Scientists Abroad, RAICEX (Red de Asociaciones de Investigadores y Científicos Españoles en el Exterior) are participating in the EURAXESS Spain program in providing mentorship for scholars interested in careers outside academe (Ortega-Paino and Oliver 2022).

*Building science-based international partnerships:* This includes the initiatives taken by the scientific diaspora in establishing international partnerships or cooperation for STI development. The Spanish scientific diaspora organizes a series of meetings tagged "Bridging European Science". They are also actively involved in cancer research through their collaborations with the Cancer Research Innovation in Science Foundation, CRIS (Ortega-Paino and Oliver 2022). CRIS is an international non-profit organization that invests in cutting-edge research, providing improved treatments for people with cancer. The Foundation provides grants to Spanish researchers who carry out some of their research in Spain for some months. This is perceived as a framework to favour talent attraction. The Network of Chilean Researchers in Germany (Red INVECA e.V.) participated actively in strengthening the scientific

relationships between Chile and Germany. Several annual conferences took place in Germany such as those held in Berlin, 2012; Heidelberg, 2013; Bamberg, 2014; Frankfurt, 2015; Berlin, 2016; Hamburg, 2017; Karlsruhe, 2018; Freiberg, 2019. It was a platform for Chilean Researchers in Germany to brainstorm strategies to address the development of science in Chile, science policies and academic issues. These conferences have helped develop and strengthen state actors' relationships in both countries (Echeverría-King et al. 2022). The Colombian scientific diasporas were also reported to have organized similar conferences on the scientific cooperation between the European Union and Colombia (Samet 2013).

Beyond the organized scientific diaspora initiating science-based international partnerships, there are examples of individual scientific diaspora that initiated STI-related cooperation between host and home institutions. This is the case with an example from Costa Rica where a scientist at the Institut Pasteur in France promoted a cooperation agreement between the University of Costa Rica and the Institut. This has enhanced research in the field of Microbiology at the University. Some other scientists initiated and promoted the internship programs for Costa Rican students, and the development of cooperation agreements, and memorandums of understanding between foreign STI-related institutions and those of the home country (Jarquin-Solis et al. 2022). A similar international collaboration was fostered by an Argentinian scientist in the United Kingdom (Jaffe et al., 2020).

*Technology transfer, STI infrastructure and institutional capacity development:* This theme covers empirical evidence of STI-related contributions of the scientific diaspora in building technological infrastructure and STI capacity either in the public or private sector (Sabharwal and Varma 2015). Evidence shows that the contribution of the scientific diaspora is historic. For example, China's research and development in nuclear and missile technology benefitted from the scientific diaspora. When a political decision was taken to develop a nuclear capability in China in 1955, there was a mobilization of the returnees of Chinese scientists who were well-connected internationally (Rabinowitz and Abramson 2022). In China's private sector example, there is a significant impact on technology development start-ups and established companies. Shanghai hosts more than 1,700 firms that are established by the contribution of the scientific diaspora. Among these companies are health and biotechnology-related firms (Seguin et al. 2006). The revolution in Taiwan's information and communication technology (ICT) sector between the 1980s and 1990s was attributed to the Asian-American scientific diaspora. This group of skilled immigrants linked the economies of Silicon Valley in the United States and Hsinchu Park in Taiwan. By 2000, 113 of the 289 STI-related companies in Hsinchu were launched by the Taiwanese scientific diaspora from the US (Samet 2013). In 1972, the Pakistani scientific diaspora demonstrated a commitment to developing Pakistan's nuclear program. Some scientific diaspora members travelled to Pakistan to join the nuclear program and used personal resources in the development of the program (Rabinowitz and Abramson 2022).

Similarly, India's ICT sector experienced a significant transformation because of the knowledge exchange and technology transfer between the Indian scientific diaspora and the home country (Pandey et al., 2022). The Indian-American scientific diaspora was instrumental in the development and improvement of Indian health sectors such as engaging in sabbatical residencies in Indian hospitals (Seguin et al. 2006). Guatemala's scientific diaspora similarly leverages ICT to contribute to the nation's health sector, especially during the COVID-19 pandemic. They created a digital platform called ALMA (Asistente de Logística Médica Automatizada in Spanish), creating an interactive website that is a free national multilingual call center, associated with an artificial intelligence-based chatbot for improved access to healthcare (Alvarado et al. 2022). Some other countries were found in the study to have benefitted from the scientific diaspora in the industrialization of their economies such as South Korea which engaged in reverse brain drain efforts between the 1960s and 1980s (Yurevich, et al. 2019). In the case of Slovenia, skilled Slovenian engineers and technicians played a major role in technology transfer by establishing a new group of high-technology industries after World War II (Welch and Zhen 2008).

*Science advice:* This is a consideration of the scientific diaspora in their capacity as a transnational body in providing or making input to national STI-related policies. The Spanish Network of Associations of Spanish Researchers and Scientists Abroad, RAICEX was found to be among the few published active scientific

diaspora in this regard. Specifically, RAICEX was actively involved in the Spanish Science Act 14/2011 amendment (Ortega-Paino and Oliver 2022). The Spanish Association for Biotechnology is working with state actors such as the Ministries of Science, Technology, and Innovation, Foreign Affairs, Migrations, and some private stakeholders such as Instituto Cervantes, and the Royal Academy of Sciences in developing STI policies that will attract and retain domestic and international talents in STI (Ortega-Paino and Oliver 2022). The Romanian scientific diaspora in collaboration with the Ministry of Education and Research have contributed to the new procedure for research evaluation in Romania. This policy on Institute for Scientific Information -based classifications of universities and scientists' performance has formed the main criteria of evaluation, even for the domestic general scientific community (Nedelcu 2019). The current study shows that Costa Rica benefits from expert advice from the scientific diaspora. A scientist resident in Europe has provided such expert advice to support the work of a Costa Rican diplomatic delegation at the United Nations Framework Convention on Climate Change (Jarquin-Solis et al. 2022).

*Donation of scientific and related equipment:* This theme covers the work and activities of the scientific diaspora in supporting STI development in their home countries by providing or supporting home institutions with STI-related scholarly articles, equipment, and infrastructure. A case of Colombia was recorded where the Colombian intellectual community in New York sent scientific works and equipment to Colombia (Samet 2013).

**RQ2:** What is the role of the home foreign missions and embassies in the host country? The reviewed findings to this question are also grouped into five main themes:

*Connecting scientific diasporas:* The role of the embassies or foreign missions in supporting the activities of the scientific diaspora in the host country can be discussed in two folds:

- Identification of the scientific diasporas – The embassies of some countries play the role of helping the scientific diasporas in the host country to easily identify themselves and strengthen their network. Also, they play the role of connecting the scientific diaspora with the scientific community of the home country. For example, the Colombian scientific diaspora organization, Red Colombiana de Investigadores en el Exterior (Colombian Network of Researchers Abroad; R-Caldas). R-Caldas depends on Colombian diplomatic missions to help identify and connect with their potential members in the host country (Bonilla et al., 2022). Spanish embassies, for example, recruit knowledgeable scientists with an excellent understanding of the scientific landscapes of the host and home country to coordinate outreach programs and build cooperation between the two communities (Moreno et al., 2017; Pandey et al., 2022). The Israeli Prime Minister through the Ministry of Foreign Affairs in 1955 pushed to establish links with the educated European-born Israeli Jews (Cohen 2013).
- Identification and promotion of STI-related startups and companies – The study revealed evidence of embassies identifying and supporting the internationalization of STI-related startups and companies of home countries by connecting with the scientific diaspora. An example is the Brazilian Consulate General in the United helping to connect with its diaspora for the promotion and internalization of Brazilian startups and companies (Jarquin-Solis et al. 2022).

*Negotiating the return of the scientific diaspora:* Although, many countries have opted for the option of brain circulation instead of the return option, however, the study shows that some countries engage their embassies abroad to negotiate with the scientific diaspora for their return home. Israel has explored the role of their embassies in this regard. Specific examples include the request for Israeli State ambassadors to negotiate with Israeli scientists studying or working in British and American universities. The respective ambassadors from consulates in London and New York were requested to use their immigration database system to carry out contact tracing of the scientific diaspora (Cohen 2013). The case of China was not different when expert knowledge of the scientific diaspora was required. The leadership of China's strategic weapons program contacted the Chinese ambassadors in Europe with a plea to convince the scientific diaspora to return home (Rabinowitz and Abramson 2022).

*Intergovernmental negotiation:* This is a unique role observed at an intergovernmental level between the host and the home country. It presents a case where the government of the home country negotiates with that of the host country to facilitate the return of scientific diasporas who face some forms of discrimination or are under prohibition in the host country. Some Chinese scientific diasporas in the United States featured prominently as an example. The Chinese government asked the Director General of the General Office of the Ministry of Foreign Affairs to rely on the 1954 Geneva Convention to negotiate for the return of this selected group of Chinese scholars. This negotiation was a success as it saw the return of about 100 Chinese to China. The returnees formed a critical mass in the advancement of China's nuclear and missile technology program (Rabinowitz and Abramson 2022).

*Taking initiatives targeted at general and specific STI interventions:* Some studies show that a few countries engage their embassies in harnessing the potentials of their scientific diasporas to drive foreign policies on science, technology, and innovation in line with national STI priorities. Most of the embassies engage in organizing routine discussion forums and it appears to be the easiest objective. An example is the outreach activities organized by Spanish embassies (Pandey et al., 2022). The Uruguay Advisory Councils and the General Directorate of Consular Affairs and Liaison of the Ministry of Foreign Affairs organize the "active citizenship for development" aimed at bringing together the scientific diaspora with the interest in contributing their scientific knowledge for national development, especially in national priority areas like biotechnology, pharmaceuticals, information technologies, energy, food, and forestry (Echeverría-King et al. 2022).

*Engaging the scientific diaspora in an advisory role:* The review study also shows that the embassies could engage the scientific diaspora in profiling developments in the thriving STI ecosystems of the host country to keep the home country abreast of the latest developments. Mexico showed a good example of this when about 25 experts were recruited from the Mexican diaspora by the Consulate General of Mexico in Boston to provide advice on STI development (Jarquin-Solis et al. 2022). Such capacity to optimally gather updated knowledge on STI matters in the host country was a requirement for being appointed as a scientist diplomat at the Spanish embassies to help foster cooperation between the scientific communities from the host and home countries (Moreno et al. 2017; Pandey et.al., 2022).

**RQ3:** What sustainability model(s) of the activities of the scientific diaspora can be deduced? No master model defines the operations of the scientific diaspora or guarantees the sustainability of their activities. However, there are stakeholders' participation and approaches that are believed could help in sustaining the scientific diaspora and their activities depending on the level of engagement. Some identified stakeholders and approaches in the review are as follows:

*A national multi-stakeholder and -project approach:* Some case studies in the review show that adopting a multi-stakeholder and -project approach could help sustain the scientific diaspora and promise a sustainable means of funding. The Columbian Caldas initiative is an example where they lost their relevance, momentum, and funding due to their strict focus on university-based collaborative projects which eventually turned out to be a bad decision (Ciumasu 2010). The Guatemalan scientific diaspora had a slightly wider approach in its contribution to the health sector in Guatemala. They created a digital system called ALMA (Asistente de Logística Médica Automatizada in Spanish) to support health development. Even though their intervention was health-based, they expanded their stakeholder consideration to include students, government institutions, non-profit organizations, indigenous communities, and the media (Alvarado et al. 2022).

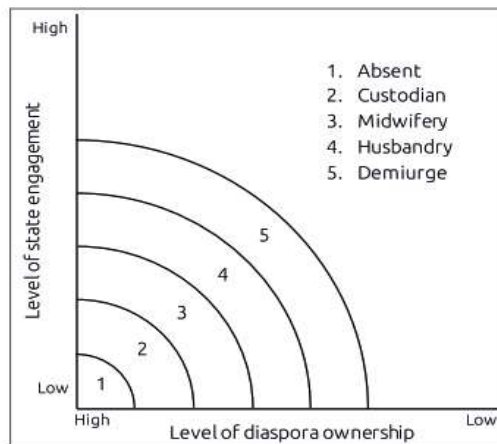
*A strong diaspora policy:* Some authors have argued that the absence of a diaspora network policy does not mean that scientific diaspora organizations cannot succeed (Seguin et al. 2006). However, many other authors have attributed the success of some scientific diaspora to the strong national diaspora policy. China and India are presented as examples of countries with strong diaspora policy which has significantly helped in the self-organizing of the scientific diaspora and sustainability (Prieto and Scott 2022; Seguin et al. 2006).

*Engagement with the scientific communities of host and home countries:* The scientific diaspora community

must see the home country's scientific community as an important stakeholder in sustaining their activities and making an impact. Examples of the suggested approach include frequent visits facilitated by the scientific diaspora to help the local scientific community build global networks and collaborations for strong local rooting, with consideration for the individual interests of members (Tian 2013). Also, building concerted efforts to strengthen the scientific diaspora force of negotiation in the host countries and strengthen their visibility in the home countries. And finally, the use of ICT to support their mode of communication is suggested to be quite effective in sustaining both communities (Nedelcu 2019; Samet 2013). Some other sustainability approaches found in the study include decentralized leadership of the scientific diaspora (Ciumasu 2010), and partnership with international organizations (Seguin et al. 2006).

*Formation and level of government engagement with the scientific diaspora:* The formation of the scientific diaspora organization can be categorized into two: bottom-up and top-down. The bottom-up approach in the formation of the scientific diaspora involves the individualistic and organic constitution of the organization by the scientific diasporas themselves. Examples of this category include the Network of Mexican Talents Abroad which was started in 2000 by individuals, although it later received support from the Mexican Government (Bonilla et al., 2022). The Iranian Academic Association of North America (Yurevich et al., 2019) and the Spanish RAICEX (Ortega-Paino and Oliver 2022) are similar examples of scientific diaspora organizations formed by the bottom-up approach. On the other hand, the top-down approach refers to scientific diaspora organization formation that is initiated by the government. Examples of countries that have used this approach include the Colombian Red Caldas which was established in 1991 with the assistance of the government (Samet 2013), the South African Network of Skills Abroad (SANSA) established by the South African Government (Samet 2013), and the Argentina Programa Raices, a network of Argentine researchers and scientists abroad, designed by the Ministry of Science, Technology, and Productive Innovation in 2003 (Bonilla et al., 2022). Available evidence suggests that SANSA is not as active compared to when the initiative was started (Seguin et al. 2006).

It is not clear which model for scientific formation is more sustainable as there is no detailed empirical research to conclude. Nonetheless, from the review, it appears that the bottom-up has a stronger tendency to be more sustainable (Bonilla et al. 2021; Filipovic et al., 2014). Government ownership of the scientific diaspora could mean more sustainable funding for the organization but could also significantly dampen the interests of the scientific diaspora members as they may not be in control of the policies. Extrapolating an understanding of this from diaspora organizations in general, Fig. 5 defines 5 different levels of state (government) engagement and diaspora ownership (Filipovic et al., 2014). (1.) “Absent” describes a low level of state engagement where ownership is in the hands of the diaspora organization, and the linkage between the home country and the diaspora is left to the market or self-directed social, cultural, and political movements. (2.) “Custodian” is the situation where the state provides guardians, and regulations and sets the policy directions for existing and emerging diaspora networks. The diaspora ownership is slightly lower



**Figure 5.** Different levels of state engagement and diaspora ownership (Filipovic et al., 2014).



compared to the “Absent”. (3.) “Midwifery” is when the state plays the identification role of prospective engagements and potential primary stakeholders while mobilizing and promoting them, yet the ownership still stays strongly with the diaspora. (4.) “Husbandry” is when the state works in partnership with existing diaspora organizations and facilitates their activities. However, the diaspora ownership gradually fades. (5.) “Demiurge”: the state builds and takes control of the diasporic initiatives and networks, letting variable forces subsequently take over. The level of diaspora ownership is significantly reduced.

These five models for the creation and ownership of the diaspora are well applicable in explaining the sustainability concept of the scientific diaspora in different contexts depending on national governance style, culture, and socio-economic conditions. Based on this review, the characteristics of the bottom-up approach could align with the “Absent” model. This type of model may suffer legitimacy and funding challenges. On the other extreme, a top-down approach is observed for the “Demiurge” model, which may enjoy sustained funding but might fail in successfully holding the scientific diaspora together. A better model seems to be Midwifery, which has the potential to combine the positives of both the top-down and bottom-up approaches.

### **Conclusion**

This systematic review aimed to ascertain the empirical evidence of the impact of the scientific diaspora in the development of Science, Technology, and Innovation (STI) in their home countries, and the sustainability models used by the scientific diaspora. It also explores the role played by foreign missions. A total of 31 papers were reviewed and the findings for their STI contributions towards national development were grouped under 5 different themes. Similarly, the role of embassies in working with the scientific diaspora was also summarized in 5 different themes. The sustainability of the scientific diasporas and their activities seems to depend on the formation approach of the organizations. Two approaches were identified: the bottom-up which is organic in nature, and the top-down which is initiated by the government. The level of government involvement and engagement in the formation, ownership and operations of the scientific diaspora were explained based on 5 different models: Absent, Custodian, Midwifery, Husbandry and Demiurge. The Midwifery model is suggested to have a mix of the characteristics of the bottom-up and top-down approach and is recommended to fairly guarantee funding and sustainability of the scientific diaspora activities. No clear and established indicator seems to exist to measure the impact of the STI interventions carried out by the scientific diaspora. More research will be needed for data that will be required for a comprehensive characterization of the indicator. Although the Midwifery model of diaspora ownership is suggested in the review for scientific diaspora formation, an empirical study on the scientific diaspora organizations formed by the bottom-up and top-down approach will be valuable in understanding their sustainability. Evidence from the grey literature will also be valuable.

### **Acknowledgments**

The authors wish to thank the National Centre for Technology Management and University College London.

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## Availability and Accessibility of Digital Record Keeping among University Administrators in Nigeria

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### Abstract

The research work ascertains the availability and accessibility of digital records keeping among university administrators in Nigeria. To accomplish the survey's goal, two research inquiries were put forward, and two corresponding alternative hypotheses were developed to direct the investigation. A survey research approach was employed. The respondents consisted of 498 university administrators. The instrument used for the study was the Availability and Accessibility of Digital Record Keeping among University Administrators Questionnaire (AADRKUAQ). A trial test was carried out on 50 administrative staff at Ebonyi State University that yielded an overall reliability coefficient of 0.85. Mean and standard deviation were used to answer research questions, and the t-test was equally used to test the research hypotheses at the 0.05 level of significance. According to the findings, digital record keeping is widely available and accessible. Whereas the alternate hypothesis revealed no significant difference in the extents of availability and accessibility of digital record keeping among gender, it was strongly recommended, along with many other things, that the school administration should embrace international standards for accessibility and availability of digital record keeping.

**Keywords:** Availability, Accessibility, Digital, and Records keeping

### Introduction

Digital records require access to or reading from relevant machines, such as software and hardware used for computers, such as, datasets, and keyboarding, are included in digital record keeping. "Digital records are digital proof of individual or organizational transactions" (Adekunle, 2006). An information and communication technology (ICT) system is used to generate, handle, communicate, and sustain a digital copy, which is a soft, unquantifiable document. Digital records and online recording are often used interchangeably. It is also known as web-based recording, online data, or distributed recording. Among its many applications were indeed digital mail, online content, worksheets, paintings, computer systems, and prerecorded photos (Adekotia, 2000). Record keeping is a subcategory of the more recent ICT that further includes the use of technological advancement and about their connectivity via an advanced digital strategy.

Adeyemi (2008) defines "digital-recording" as the practice of employing software devices to enhance in digital record management. "Digital recording" is defined by Kaplan as a broad range of procedures that include internet recording, software recording, digital collaborative partnerships, sound and video compilations, and CD-ROMs. He continued by arguing that automated record keeping is a device that enables for more adaptable, captivating, and long-lasting gathering and analyzing of information. Digital record components, according to Atah and Bessong (2019), include more than just intermediate, information, and active engagement. A digital record is data that is created and saved in a database using technological advances (Adekotia, 2000).

The act of utilizing something makes it accessible. The possibility to obtain access to and advantage from a device or institution is described. The network slicing on facilitating people to gain access by taking advantage of assistive devices; however, accessibility development and research advantages everybody else. User experience, which is the measure of the extent to which a product (such as a gadget, service, or surroundings) is capable of enabling individual people to accomplish particular objectives with effectiveness, performance, comfort, and fulfillment in a particular circumstance of use, is distinct from access and availability. Accessibility of digital records keeping closely related to "inclusive design," which refers to the method for developing products that are accessible to learners and educators of all abilities and in a wide range of circumstances. It is about making everything available to everybody, regardless of their disability. Except as otherwise authorized person, digital information resources at the higher education institution, such as computers, are to be used solely for academic, research, and reporting purposes (Atah, Ushie, Chukwurah, Idike and Uchui 2023)

The availability of these digital records may aid in the saving of lives. It has also contributed to reducing worker issues by storing all information gathered during decision-making on digital devices for quick accessibility, enabling for process improvement concerning the organization's success. The hard copies records can be stored in a computer's memory for many years without being damaged, as opposed to records stored in files or human memory, where any eventuality could result in the loss of some, if not all, of the contents of the records. Osakwe (2009) consented that digital records are information digitized documents that are generated and preserved using machine gadgets. Computer equipment and operating system goods are preserved in numerous digital and magnetic devices as record keeping. According to Osakwe, an automated document's structure somehow doesn't alter the reality that it is a record, however its digital signature but instead heavy dependence on automated systems for conception but instead allusion to do change how well these documentations are digested and controlled.

Digital recording keeping is a component of the field of ICT that includes the use of technological advancement for information gathering via digital equipment, according to Igboke (2005). it's an excellent device to enhance algorithms and offering decent information accessibility to the globe. The World Wide Web (WWW), according to Agomuo (2005), is beginning to transform the world into an interconnected community, and documentation, as the stock-in-trade and information cornerstone, must be system and processing in the possible aspect through the handling of digital records. He simply defined digital record keeping as the implementation of all record keeping fundamentals in an digital world, typically backed by highly specialised computer systems, despite the fact that the processes only do as good as the standards and processes used in both automated and traditional recordkeeping.

The primary goal of record keeping oversight is to guarantee that records, irrespective of their form or format, move and through phases of conception, consumption, stockpiling, and decommissioning, or perpetual retention, in an effectual and cost-effective manner. As a direct consequence, proper university record handling is essential in institutions. Academic institutions might very well discover oneself in an uncomfortable spot. due to inadequate systems for maintaining records. The main issue with effective managing records in Nigerian universities is an absence of supervisory strategies.

When it comes to recordkeeping, some academic institutions do not follow record management principles. There has seemed to be an absence of university records handbook, no consolidation and treatment of waste timeframe, professionals ability to handle the documentation appear to be undertrained in recordkeeping, totally inadequate amenities for record conservation and protection, storage, and information extraction, no filling manual, completely inadequate computer systems to handle the quantity of information produced, and the authorities' mindset forward into record keeping and record keeping all contribute to negative issues with record keeping in universities. As a consequence, there has been inappropriate documentary evidence of student and staff employment records, as well as poor handling of academic achievement, inadequate documentation, and information extraction of vital administrative data such as admission and endorsement lists. This is accessible in some Nigerian universities; however the situation in the state of Cross River

universities is unknown. Against this background, this research was aimed at evaluating the availability and accessibility of digital records keeping among administrators.

### Research Objectives

The research objective was to ascertain the availability and accessibility of digital record keeping among university administrators. The study specifically ascertains:

1. Availability of digital record keeping among university administrators.
2. Accessibility of digital record keeping among university administrators

### Research questions

Below research questions guided the investigation:

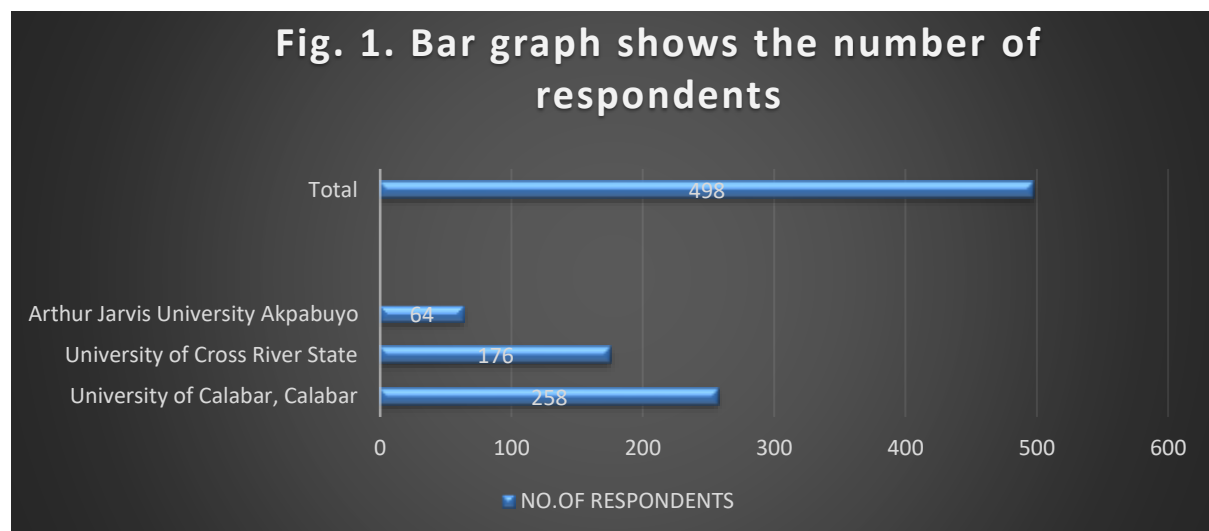
1. How widely is digital record keeping available among university administrators?
2. To what degree do university administrators have access to digital record keeping?

### Research Hypotheses

1. The respondents' perceptions on the availability of digital record keeping do not differ substantially based on university ownership.
2. The respondent decision on the accessibility of digital record keeping does not differ based on gender

### Research Methodology

The study adopted a descriptive survey design. The target audience was 498 administrative staff in universities in the CRS. The entire population of administrative staff was engaged in the study. A questionnaire was used as an instrument for the study, with 26 items. The Instrument Availability and Accessibility of Digital Records Keeping among University Administrators Questionnaire (AADRKUAQ). Three experts determined the measurement tool. The object's reliability was tested using twenty respondents at Ebonyi State University, and the data obtained was analyzed using Cronbach's alpha quantitative techniques. Furthermore, the total internal consistency was 0.85. Using direct administration techniques, the research instrument was given to the study participants and tracked down as needed. To respond to the research inquiries, the standard deviation as well as the mean were used, and the independent t-test was used to verify the hypothesis of the study. At the 0.05 level of significance, the hypotheses were examined. As a decision level, 2.50 were used. Any item with a mean score of 2.50 or higher in the instrument was construed as having a high level of availability and accessibility in digital record keeping, since any item with a score of 2.50 or less was perceived as not being accessible or readily available. At the 0.05 level of significance, the t-test was used to evaluate the null hypothesis. The calculated t-value was then especially in comparison to the t-table; if it is less, the hypothesis is embraced (i.e., significant); if it is higher, the theory is disregarded (i.e., not significant). Figure 1 depicts the survey respondents as a bar graph.





## Findings of the study

### Research question one

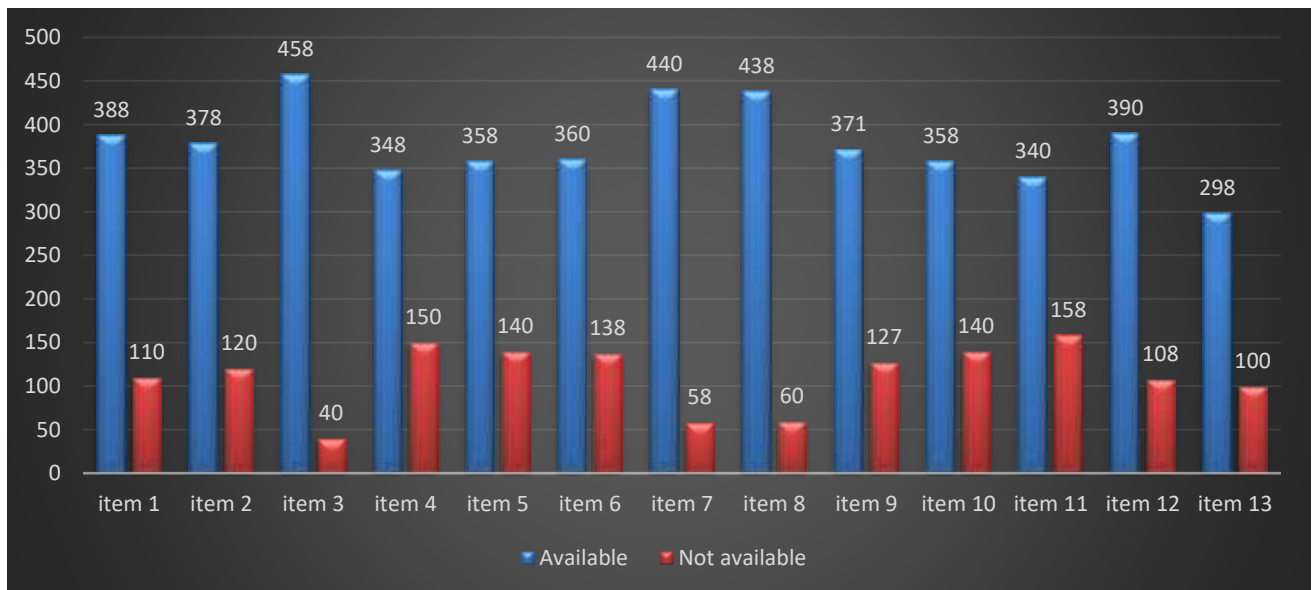
How widely is digital record keeping available among university administrators?

To answer the above research question, table 1 provided the answer

**Table 1: Mean rating of respondents decision on the availability of digital record keeping**

S/No	Item Statement	N	mean	SD	Decision
1	Digital students admission records	498	3.76	0.65	Highly Available
2	Digital academic and non-academic payroll records	498	3.47	0.69	Highly Available
3	Digital academic and non-academic promotion records	498	3.21	0.77	Highly Available
4	Digital students SUG office record	498	3.84	0.58	Highly Available
5	Digital project management record	498	3.66	0.67	Highly Available
6	Digital students health information records	498	3.4	0.70	Highly Available
7	Digital university Security records	498	3.2	0.63	Highly Available
8	Digital Management financial records	498	3.72	0.58	Highly Available
9	Digital academic committees reports records	498	2.62	1.05	Highly Available
10	Digital university management board meeting records	498	3.13	0.96	Highly Available
11	Digital Students discipline record	498	2.68	1.11	Highly Available
12	Digital library record	498	2.57	1.21	Highly Available
13	Digital management stock control record	498	2.63	1.24	Highly Available
	<b>Grand mean</b>		<b>3.21</b>	<b>0.48</b>	<b>Highly Available</b>

Table 1 shows that all thirteen items d-students admission records, d-academic and non-academic payroll records, d-academic and non-academic promotion records, d-students SUG office allocation records, d-management project records, d-students health information records, d-university security records, d-management financial records, d-academic committees reports records, d-university management board meeting records, d-students discipline records, d-library record and d-management stock control record received mean scores greater than 2.50, bunch mark. The overall mean of 3.21 disclosed that digital records are readily available in Nigerian universities. The standard deviations for all components are within the same range, denoting that the survey participants' average scores are ethnically homogeneous. The result is further showed in figure 2 and 3.



*Figure 2 bar graph showing the respondents responses on the level of the availability of digital records keeping*

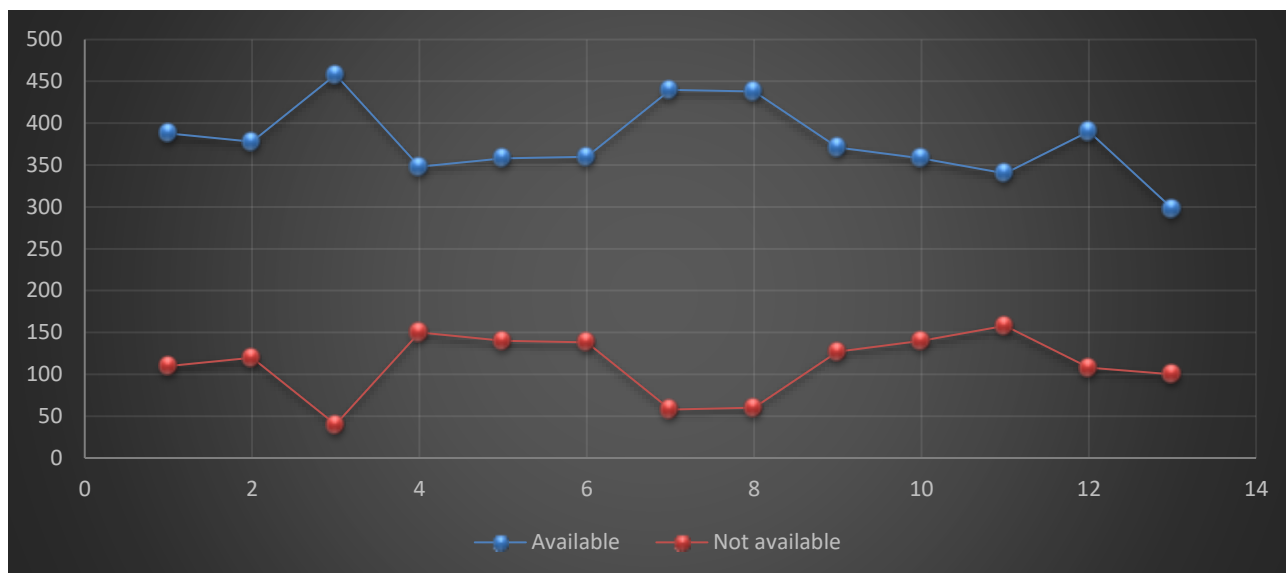


Figure 3 scatter graph showing the respondents decision

### Research question 2

What is the extent of accessibility of digital records keeping?

Data provided answer to the above question is shown in table 2

**Table 2: Mean rating of respondent decision on accessibility of digital record keeping**

S/No.	Item Statement	N	X	S.D	Decision
14	D-Students admission records	498	2.92	1.13	High Extent
15	D-Academic and non-academic payroll records	498	2.55	1.17	High Extent
16	D- Academic and non-academic promotion records	498	2.59	1.12	High Extent
17	D-Students SUG office record	498	2.75	1.28	High Extent
18	D- project management record	498	2.52	1.12	High Extent
19	D-Students medical record	498	2.58	1.13	High Extent
20	D-Management Surveillance record	498	2.52	1.23	High Extent
21	D-management Budgeting record	498	2.68	1.18	High Extent
22	D-Academic advisory boards record	498	2.61	1.11	High Extent
23	D-University management board meeting records	498	2.52	1.02	High Extent
24	D-Students discipline record	498	2.58	1.20	High Extent
25	D-PG library	498	2.76	1.19	High Extent
26	D-Management stock control record	498	2.57	1.04	High Extent
	<b>Grand mean</b>		<b>2.62</b>	<b>0.78</b>	<b>High Extent</b>

Table 2 shows that all 13 items, d-students admission records, d-academic and non-academic payroll records, d-academic and non-academic promotion records, d-students hostel allocation records, d-management project records, d-students SUG office records, d-project records, d-management financial records, d-academic committees reports records, d-university management board meeting records, d-management weekly bulletins records, d- library records and d-management stock control records received mean scores greater than 2.50, the bunch mark. The grand mean of 2.62 indicated that digital records keeping in Nigerian universities are digitally accessible. The standard deviations for all items are within an identical range, denoting that the mean ratings of the participants are homogeneous. The result is further showed in figure 4 and 5.



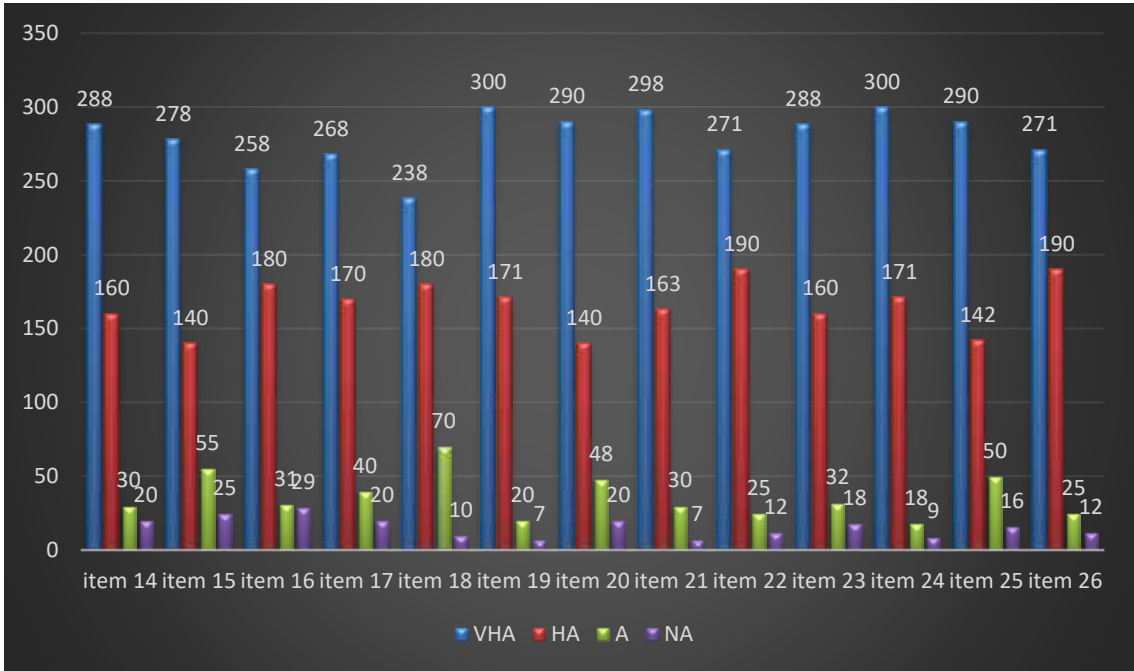


Figure 4 bar graph showing the respondents' decision

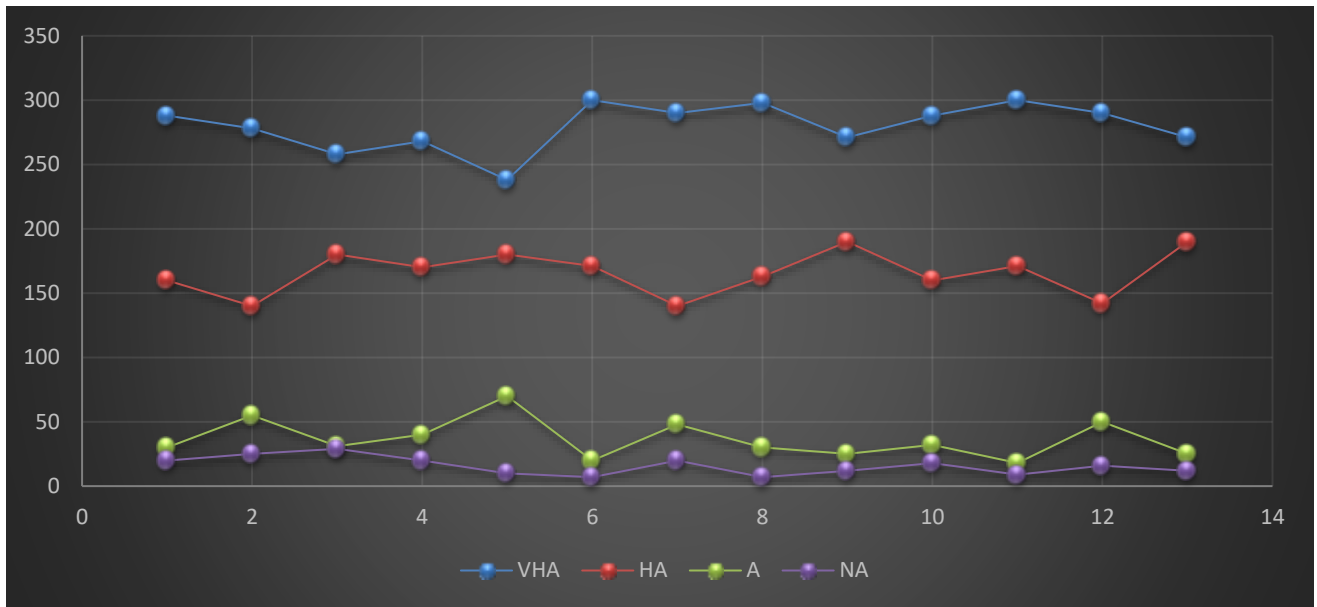


Figure 5 scatter graph showing the respondents decision

**Research Hypothesis One**

The respondents perception on the availability of digital record keeping do not differ substantially based on university ownership

**Table 3: Independent t-test on the mean ratings of respondents' decision on availability of digital records keeping based on university ownership**

items	Private and Public Institutions	N	Mean	SD	t-cal	df	p-val	Decision
1	Private	122	3.71	.704	-.747	496	.456	NS
	Public	376	3.77	.649				
2	Private	122	3.37	.784	-1.474	496	.141	NS
	Public	376	3.49	.668				
3	Private	122	3.20	.819	-1.01	496	.920	NS
	Public	376	3.21	.761				
4	Private	122	3.78	.646	-1.096	496	.274	NS
	Public	376	3.85	.566				
5	Private	122	3.63	.725	-.454	496	.505	NS
	Public	376	3.66	.663				
6	Private	122	3.35	.751	-.668	496	.505	NS
	Public	376	3.41	.697				
7	Private	122	3.14	.607	-.872	496	.384	NS
	Public	376	3.21	.639				
8	Private	122	3.66	.670	-1.160	496	.244	NS
	Public	376	3.74	.558				
9	Private	122	2.57	1.066	-.459	496	.646	NS
	Public	376	2.63	1.057				
10	Private	122	3.09	1.018	-.477	496	.635	NS
	Public	376	3.14	.950				
11	Private	122	2.74	1.143	-.521	496	.602	NS
	Public	376	2.67	1.105				
12	Private	122	2.43	1.097	-.375	496	.708	NS
	Public	376	2.48	1.116				
13	Private	122	2.65	1.251	-.163	496	.900	NS
	Public	376	2.63	1.241				
	<b>Private</b>	<b>122</b>	<b>41.31</b>	<b>6.371</b>	<b>-.781</b>	<b>496</b>	<b>.435</b>	<b>NS</b>
	<b>Public</b>	<b>376</b>	<b>41.88</b>	<b>6.173</b>				

According to the t-test evaluation in Table 3, there is no significant distinction between the mean rating of private and public administrators who responded on the availability of digital records keeping. This is due to the fact that the p-value is higher than 0.05. The null hypothesis that there is no significant difference in the average rating of private and public poll respondents on the degree of digital availability of digital record keeping is supported since this p-values across all items are higher (.05).

### Research Hypothesis Two

The respondents' decision on the accessibility of electron record keeping does differ based gender

**Table 4: independent t-test of mean rating of respondents' decision based on gender on the digital records accessibility**

Items	Gender	N	Mean	SD	t-cal	Df	p-val	Decision
14	Male	228	2.90	1.140	-.250	496	.803	NS
	Female	270	2.93	1.128				
15	Male	228	2.59	1.210	.778	496	.440	NS
	Female	270	2.51	1.148				
16	Male	228	2.64	1.147	.935	496	.350	NS
	Female	270	2.55	1.107				
17	Male	228	2.86	1.264	1.750	496	.081	NS
	Female	270	2.66	1.291				
18	Male	228	2.57	1.153	.938	496	.349	NS
	Female	270	2.48	1.105				

19	Male	228	2.73	1.145	.754	496	.451	NS
	Female	270	2.65	1.132				
20	Male	228	2.84	1.189	1.629	496	.105	NS
	Female	270	2.66	1.272				
21	Male	228	2.68	1.170	1.858	496	.054	NS
	Female	270	2.49	1.197				
22	Male	228	2.64	1.132	.641	496	.522	NS
	Female	270	2.58	1.102				
23	Male	228	2.54	1.035	.420	496	.675	NS
	Female	270	2.51	1.023				
24	Male	228	2.70	1.186	2.123	496	.058	NS
	Female	270	2.47	1.212				
25	Male	228	2.84	1.191	1.390	496	.165	NS
	Female	270	2.69	1.201				
26	Male	228	2.63	1.018	.205	496	.497	NS
	Female	270	2.51	1.064				
	<b>Male</b>	228	<b>35.07</b>	<b>12.629</b>	<b>1.277</b>	<b>496</b>	<b>.202</b>	<b>NS</b>
	<b>Female</b>	270	<b>33.62</b>	<b>12.778</b>				

The t-test analyses shown in Table 4 above divulged no significant variation in the average rating of respondents' gender on the extent of digital records accessibility. This is because of the reality that the p-value in Table 4 is higher than 0.05. Because the p-values for all items are higher than p, the hypothesis that there is no distinction between the average rating of male and female respondents on the broad spectrum of digital record accessibility is retained (.05).

### Discussion of findings

According to the information in Table 1 on the large extent of digital record availability in Nigerian universities, participants' respondents claimed that all items associated with digital records were in the "high extent" category. In addition, the results of the hypotheses evaluated revealed no significant differences in respondents' decision to the availability of digital records kept in universities based on university ownership. The above result contradicts Asogwa's (2018) discovery that school records were not kept effectively. The findings of this study, on the other hand, are in agreement with the result of Modebelu and Onyali (2014), who's found that university digital records are widely available digitally. This finding adds to the work of Igwu (2004), who recognized various criteria of record keeping that school systems must make available in order to provide good academic government and academic prowess. School records, according to Okoli and Onuogbo (2014), include admission requirements records, construction project records, bank documents, payroll data, staff registers, inventory data, cataloguing records, and academic records. The availability of these digital records as demonstrated in academic institutions is critical for the overall administration of educational standards. Igwu (2004) identified that staff in Nigerian higher education institutions appear to have begun to obey education law, so they are trying to handle digital documents. Anticipated records, as well as any other activity records, should be available for enhancing instructional and instructional exercises, which happens to be the central objective of the public education system.

According to the data in Table 2 on the great extent to access university records digitally, participants replied that all the items related to the accessibility of digital records were "high extent" (HE). Moreover, the hypotheses tested revealed no significant difference in the decision based on gender of the respondents as well as no huge disparity in the degree of accessibility to digital record keeping by the respondents. This finding is important because students, staff, and other general users have access to academic digital records. This finding is in accordance with the results of Popoola (2000), who discovered a high level of accessibility of digital recordkeeping for effective management of universities. Nevertheless, Ifedili and Agbaire's (2011) findings contradict the recent evidence. Their findings revealed that the current prestige and use of digital records in universities remains extremely low. This could be why some universities have yet to implement digital record keeping. Considering the opinion of Ukah and Atah (2021), enabling access to digital records in any organization requires internet access to be enabled at various organizations. Tilton

and Rigby (2004) found that the lack of qualified staff to manage digital records and the apparent inadequacy of digital record facilities have led some institutions to still use traditional records systems.

## Conclusion

According to the report's results, the availability and accessibility of digital records keeping in Nigerian universities have greatly improved. A good digital record keeping system in Nigerian universities is extremely efficient. It has the potential to improve both internal efficiency and overall record management. This is due to the fact that having piles of physical documents and files lying around are both distracting and frustrating. As a result, one may be unable to locate the specific record you require at a later date, which may eventually harm the university's reputation. To maintain and support good compliance practices in digital records management, it may be cost-effective; however, having a good digital records management system could improve both internal efficiency and the overall workings of any organization, especially in the university environment. This is the fact that manual document management is time-consuming, and digital records management would be far better served by freeing up internal resources. Digital records management is a critical asset for any university's administrative functions, whether private or public. If there is any institution in the world that does not have or already has a digital records keeping process in place, it is imperative and urgent that one be established as soon as possible.

## Research recommendations

The following recommendations were made:

1. University administration should prepare as well as train up administrators to maximize productivity in digital records management.
2. The administration of universities should ensure a consistent power supply and implement internationally accepted standards for accessibility of digital record keeping.

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## Food Insecurity Resilience Capacity of Rural Households in The Face of Induced-Weather Extremities in Bauchi State of Nigeria

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### Abstract

It is no longer a chasm that human existence is being threatened by induced-weather vagaries. Given the dynamic nature of the weather vagaries, if tacit actions are not taken on continuum basis, soonest, human race will go into extinction because of the steep devastating push effect of climate change. It is in lieu of the foregoing, that the researchers conceptualized a study that assessed rural households' food insecurity resilience capacity in Nigeria's Bauchi state using a resilience index measurement analysis (RIMA II), a novel methodological approach developed by FAO for studying such scenario, as literature review showed no evidence of its application in the study area. Adopting a multi-stage random sampling technique, a total of 322 households were randomly sampled from a sampling frame obtained by a reconnaissance survey. Using a well-structured questionnaire complemented with interview schedule, rural households' survey data were collected in the year 2022. Besides, the collected data were analyzed using both descriptive and inferential statistics. Empirically, it was established that the study area is challenged with food insecurity that owes majorly to poor food utilization and stability. Besides, poor food insecurity resilience capacity majorly due to vulnerable adaptive capacity was unmasked as the push effect behind food insecurity bane in the study area. However, evidence showed that food insecurity resilience capacity has a lasting effect on general well-being of rural households while households' hunger resilience capacity has a transitory effect as it can only contain food crises on the short-term basis. Nevertheless, income and consumption smoothening were the commonest short-term food coping strategies adopted in the study area. To achieve the sustainable development goals of zero hunger by 2030, it becomes imperative on policymakers to sensitize rural households on the need to adopt safe and eco-friendly improved indigenous food technologies so as to address the poor states of food utilization and stability affecting food security of the study area.

**Keywords:** Food security; Resilience; Rural; Sustainability; Nigeria

### Introduction

Rural areas make up 59% of the population in developing nations and are crucial for the provision of food and other raw resources (Beyene *et al.*, 2023), the development of the national economy, the creation of jobs, and the preservation of natural areas (Mkupete *et al.*, 2023). While rural areas are the backbone of the economy and make a sizable contribution to GDP (Sunday *et al.*, 2023; Atara *et al.*, 2020; Lascano Galarza, 2020), the sustainability of rural residents' livelihoods has been threatened by an increase in climatic stressors like droughts and anthropogenic forces, market volatility, and political unrest (Egamberdiev *et al.*, 2023; Meyer, 2020). In many developing nations, this has resulted in unrelenting poverty and insufficient socioeconomic entitlements (d'Errico *et al.*, 2023; Ado *et al.*, 2022; Melketo *et al.*, 2021; Dhraief *et al.*, 2019).

Acute food insecurity has plagued millions of people in sub-Saharan Africa for the past 40 years due to harsh weather circumstances (Ouoba and Sawadogo, 2022; Sadiq *et al.*, 2018a&b). The food system is currently subject to climate-related shocks every two years, which are nearly permanent in some regions

(Bahta, 2022; Myeki and Bahta, 2021; Béné, 2020). These circumstances make it impossible for farmers in these nations or regions to recover from shocks (Merchant *et al.*, 2022; Abebe, 2020; Ansah *et al.*, 2019). This means that in order to more swiftly recover from food shocks, it's necessary to invest in the adaptability of communities and ecosystems. According to the UN, up to 65% of Africa's arable land has been degraded, and 45% of it has been damaged by desertification (Negesse *et al.*, 2022). The World Food Programme (WFP), the United Nations Children's Fund (UNICEF), and the Food and Agriculture Organization of the United Nations (FAO), issued a joint statement at the Network for Food Crisis Prevention in West Africa (RPCA) annual meeting in Lomé in December 2022, sounding the alarm.

If urgent and long-term solutions are not discovered, these organizations warned that by the end of 2023, there will be more than 48 million hungry people in West and Central Africa, including 9 million children (Sadiq and Sani, 2022). African nations are also generally impacted by global economic fluctuations that threaten their food security, such as unstable commodity markets (Haile *et al.*, 2022; Chamdimba *et al.*, 2021), rising energy and fertilizer costs, snags in global trade (Ansah *et al.*, 2023), as well as the ongoing situation in Ukraine. As a result of these shocks, food prices have sharply increased throughout the region, worsening food insecurity as persistent surge in the general price level (inflation) squeezes already-limited household finances and jeopardize social cohesion. All evidence points to the urgent need for sustainable solutions to be discovered in order to guarantee that future generations will have access to arable land that can support their demands.

The North-east of Nigeria consistently struggles with issues like poverty, resource depletion, climate change, and food and nutritional insecurity. Despite the mobilization and intervention of numerous actors to offer food help to the most vulnerable people, the region has experienced the biggest spike in starvation over the last ten years. The livelihoods of its inhabitants are under danger due to an increase in insecurity brought on by escalating conflict situations and millions of internally displaced persons (Agwu, 2023). The idea of resilience is increasingly being applied to development projects meant to increase rural households' and communities' ability to adapt, change, and cope with varieties of shocks and stressors (Calloway *et al.*, 2022; Murendo *et al.*, 2021; Nahid *et al.*, 2021; Alhassan, 2020). However, there are still many obstacles to overcome before integrating the idea of resilience into food and nutrition security regulations and programming. This is mainly due to the fact that the concept can be best understood as being encased within constantly changing and highly specific processes that can be comprehended differently by different parties. Consequently, this has created a vacuum in research *viz.* knowledge, empirical, methodological and population gaps, thus the need for urgent information for policymakers and academic literature. It is in lieu of the foregoing that this research attempts to assess the food insecurity resilience capacity of rural households in the face of induced-weather extremities in Bauchi State of Nigeria. The specific objectives of the study were to determine the food insecurity status of the households; determine the food insecurity resilience capacity of the households; determine the effect of food insecurity resilience on food security and sustainable livelihood in the study area; and, to determine the food security coping strategies adopted by the households in the study area.

### **Research Methodology: Study Area**

The state is situated between longitudes 8°45' and 11°0' East of the Greenwich meridian and latitudes 9°30' and 12°30' North of the equator. According to the 2006 census, Bauchi State had a population of 4,655,073 and was projected to have 7,685,312 inhabitants by 2021 (NPC, 2021). Due to its size and geographical changes, Bauchi State, which is located in northeastern Nigeria, has a wide range of agro-climatic conditions and has a landmass of 49,259km square. The state's location in the Sahel area, which has a semi-arid to sub-humid climate, has a significant impact on the state's climate. Typically, the rainy season starts in May and lasts through September or October. The majority of the state's yearly precipitation falls during this time. The dry season often begins in November and lasts through April. The Harmattan wind from the Sahara desert can blow during this time, bringing dry and dusty conditions along with the hot, dry weather. The climate in Bauchi State is often warm to hot all year round. During the dry season, temperatures are higher, frequently topping 30°C (86°F) during the day and occasionally going over 40°C (104°F) during

the night. The state's vegetation ranges from guinea savannah in the south to savannah grasslands in the north. While Bauchi State's southern regions see comparatively higher rainfall and more intensive agricultural operations, the state's northern regions are more desert. In Bauchi State, agriculture has a vital economic role. The state frequently cultivates crops like millet, sorghum, maize, rice, and groundnuts. Additionally, raising cattle, sheep, and goats is quite important for the economy.

### Sampling Procedure and Sampling Size

Using a multi-stage random sampling technique, a total of 322 respondents out of 113, 330 that constituted the sampling frame were chosen in households survey conducted in the year 2022. Firstly, all the stratified agricultural zones of Bauchi State Agricultural Development Project (BASADP) viz. Zone (A) Western, (B) Central and (C) Northern were selected as food insecurity is a general phenomenon. Subsequently, given the disproportionate distribution of the inherent LGAs across the strata, proportionate sampling technique was used to select the representative LGAs. Thereafter, from each of the selected LGAs, two villages were randomly selected. Based on the sample frame generated through reconnaissance survey (Table 1), Krejcie and Morgan (1970) formula (Equation 1) was used to determine the representative sample size. Thus, a total sample size of 322 households was randomly chosen for the study. A well-structured questionnaire coupled with interview schedule was used to collect the relevant information for the research.

### Analytical Technique

Hunger scale, dietary diversity score, food consumption score and food insecurity index were used to achieve objective I; resilience index measurement and analysis (RIMA II) and confirmatory factor were used to achieve objectives II and III; while IV was achieved using factor analysis. It is worth to mention that principal component analysis was used as a complimentary tool to generate food insecurity and RIMA II indexes.

$$n_p = \frac{N(X)}{X+(N-1)} \dots\dots\dots (1)$$

$$X = \frac{Z^2 \times P(1-P)}{e^2}$$

n = Sample size; N = Population size; e = Acceptable sampling error; X= Finite sample size; and, P = Proportion of the population

**Table 1:** Sampling frame of rural households

Zones	LGAs	Villages	Sampling frame	Sample size
<b>Western</b>	Dass	Kagadama	3,230	9
		Wandi	9,210	26
	Kirfi	Badara	5,767	16
		Beni	5,322	15
	Tabawa-Baleawa	Burga	5,532	16
		Zango	4,127	12
	Toro	Polchi	4,241	12
		Zalau	5,300	15
<b>Central</b>	Ningi	Zidinga	3,403	10
		Tsangayan Dirya	5,350	15
	Darazo	Lanzai	9,120	26
		Yautare	8,423	24
<b>Northern</b>	Katagum	Chinede	5,437	15
		Ragwam	4,216	12
	Gamawa	Wabu	9,326	26
		Lariski	2,671	8
	Giade	Jugudu	3,310	9
		Hardori	3,221	9
	Misau	Akuyam	5,324	15
		Zindi	3,350	10
	Shira	Kilbore	2,320	7
		Yana	5,230	15
<b>Total</b>	<b>11</b>	<b>22</b>	<b>113,330</b>	<b>322</b>

Source: Reconnaissance survey, 2022



**Empirical models**

**1. Dietary diversity score:**

$$DDS = \frac{\sum_{n=1} \text{foods consumed}}{\text{Total household size}} \dots\dots\dots (1)$$

**2. Minimum normalization index**

$$I = \frac{I_i - I_{min}}{I_{max} - I_{min}} \dots\dots\dots (2)$$

Where, 'I' is the indicator index,  $I_i$  is the value of the  $i^{th}$  indicator;  $I_{min}$  is the minimum value of the  $i^{th}$  indicator; and,  $I_{max}$  is the maximum value of the  $i^{th}$  indicator.

**3. Dimension index**

$$D_i = \sum_{i=1}^{n=0} \left( \frac{w_i * I_i + \dots + w_n * I_n}{w_i + \dots + w_n} \right) \dots\dots\dots (3)$$

Where,  $D_i$  is the dimension index of  $i^{th}$  households and  $w$  is the weight of  $i^{th}$  Indicator index.

**4. Food insecurity index**

$$FISI = \frac{(AV^3 + AC^3 + U^3 + S^3)^{1/3}}{4} \dots\dots\dots (4) \text{ (Anand and Sen, 1997)}$$

Where, AV= Availability; AC= Access; U= Utilization; and, S= Stability (Table 2).

**5. RIMA-II**

$$RIMA - II = \frac{ABS + AST + SSN + AC}{W_{ABS} + W_{AST} + W_{SSN} + W_{AC}} \dots\dots\dots (5) \text{ (FAO, 2015 \& 2016; Alinovi et al., 2008)}$$

ABS= Access to basic services; AST= Assets; SSN= Social safety net; and, AC= Adaptive capacity (Table 3).

Table 2: Dimensions and indicators of food insecurity

Dimensions	Indicators	Units
AV	Food expenditure per household	Naira per head
	Farm size	Hectare
	Number of farms	Number
	Land tenure ship	Type (rent, inheritance, etc)
	Food purchased capacity	Naira
	Food stock for over 2-6 months	Naira
	Quantity of food assistance	Naira
	Income from sales of crop	Naira
	Income from sales of Livestock	Naira
	Quantity of purchased food product from the market	Naira
	Quantity obtained from fishing/wild gathering	Naira
	Income diversification	Number
	Availability of wild food	Yes/No
	Monthly purchasing power/ monthly income	Naira
AC	Transport Cost for farm produce & livestock	Naira
	Availability of road market infrastructure	Yes/No
	Distance to market's road	Cost
	Availability of market	Yes/No
	Distance to market	Cost
	Labor exchange for Food	Naira
	Availability of storage facilities	Yes/No
	Capacity of storage facilities	Bag(s)
	Income from women and children	Naira
	Membership of trade association	Number
	Income from off-farm activities	Naira
	Income from farm activities	Naira
	Engagement in Non-Farm Employment	Number
	Engagement in dry season farming	Yes/No
ST	Household's production (output)	Naira
	Number of months of rainfall	Number
	Drought, Erosion, flood	Yes/No
	Political crises/ social unrest	Yes/No
	Price of a major commodity	Naira per month

**Table 2: Continued** .....

Dimensions	Indicators	Units
UT	Disease affliction (diarrhoea, fever, cholera, etc)	Number
	Water supply source(s)	Number
	Number of meals per day	Number
	Number of meal variety per day	Number
	Number of food items consumed	Number
	Food habits	3-likert scale (H to P)
	Number of food preparation practices	Number
	Number of acceptable food preferences & substitutes	Number
	Availability of and access to milling facilities	Yes/No
	Adequate sanitation	4-likert scale (H to VP)
	Access to health services	4-likert scale (H to VP)

Source: Adopted and modified from Sadiq and Sani (2022)

Note: H= High; P= Poor; and, VP= Very poor

**Table 3: Dimensions and indicators of resilience**

Dimension	Indicator	Unit
ABS	Access to telecommunication services	Yes/No
	Cost of transportation to health centre	Naira
	Cost of transportation to pharmacy	Naira
	Cost of transportation to market centre	Naira
	Cost of transportation to agro-service centre	Naira
	Cost of transportation to agro-processing centre	Naira
	Cost of transportation to primary school	Naira
	Cost of transportation to veterinary centre	Naira
AC	Access to credit service	Yes/No
	Income sources possessed	Number
	Numbers of crops cultivated in the last season	Number
	Perception on food security adaptive capacity level	4-likert scale (VH to L)
	Number of food coping strategies adopted	Number
	Household's consumed balance diet in the last three days	3-likert scale (Yes to No)
	Extension services	Yes/No
	Membership of co-operative association	Yes/No
	Dependency ratio	%
	Education level	Years
	Number of household's members that have attended school	Number
SSN	Received food assistance from friends	Yes/No
	Perception on the importance food aid received	5-Likert scale (VI to NI)
	Remittance from family member	Yes/No
	Assistance from government	Yes/No
	Access to children scholarship	Yes/No
AST	Land ownership	Yes/No
	Livestock ownership	TLU
	Wealth	Index
	Agricultural Asset	Index

Source: FAO (2015 & 2016)

Note: VH= Very high; L= Low; TLU= Tropical livestock units; Naira = Nigerian currency

**Table 4:** Weather-induced shocks' indicators

Indicators
Number of parasites attack on crop in the last 10 years
Number of parasites attack on livestock in the last 10 years
Number of livestock lost to pest and diseases in the last 10 years
Number of household's member(s) sick in the last 1 year
Number of flood/drought in the last 10 years
Number of fire outbreak either in the house or farm in the last 10 years

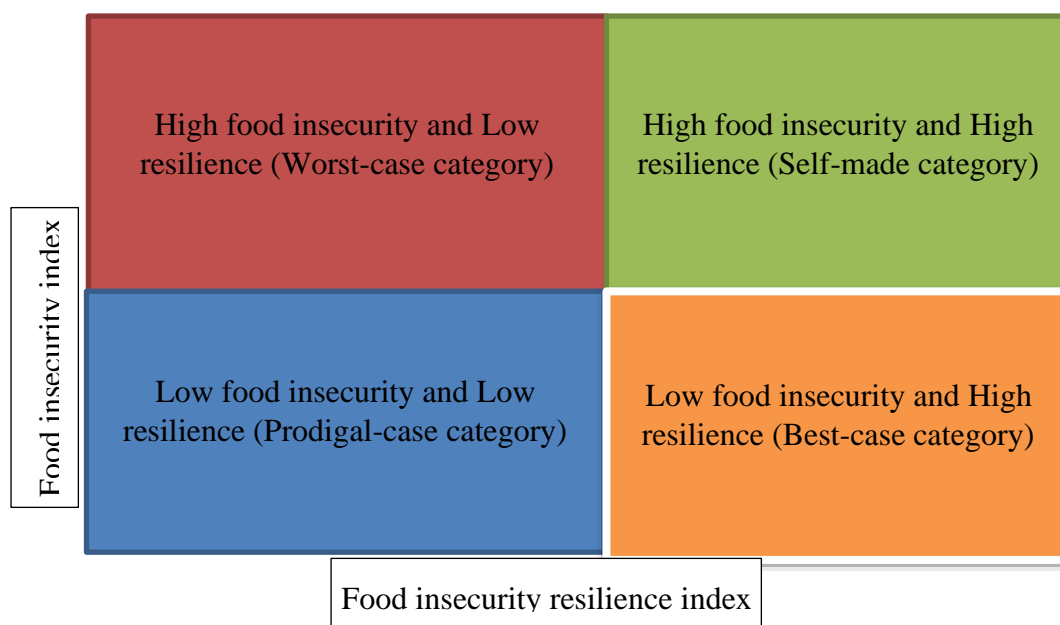
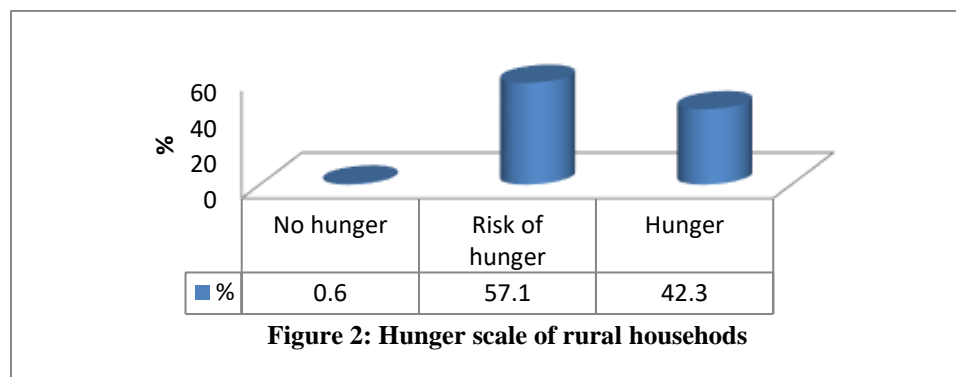


Figure 1: Nexus between food insecurity and resilience index

Source: Ha-Mim *et al.*(2020)

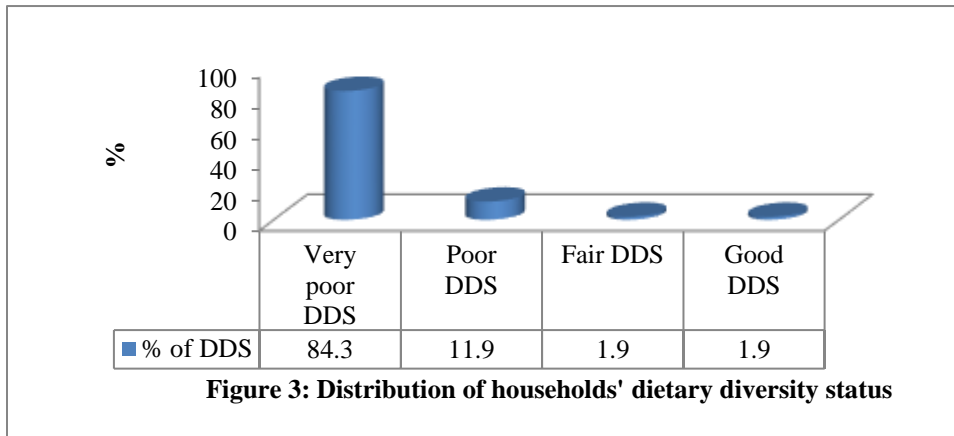
**Results and Discussion**

A cursory review of hunger status, short-term food insecurity, revealed that majority (57.1%) of the rural households is at risk of hunger (Figure 2). Besides, slightly less than half (42.3%) of the sampled households were hungry while insignificant proportion (0.6%) of the rural populace escaped the voracious web of hunger in the study area. Therefore, it can be inferred that the rural populace are challenged with hunger, a short-term food insecurity challenge.



Source: Field survey, 2022

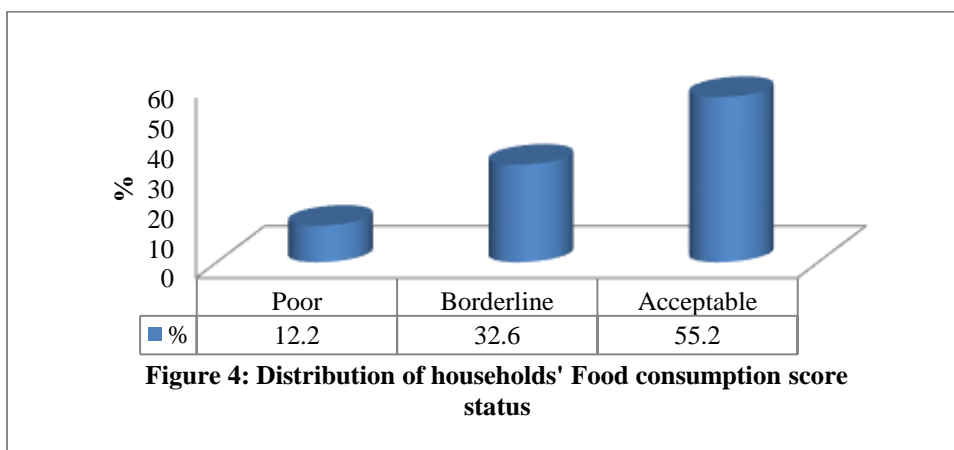
As a rider, the average dietary diversity of households in the study area being 1.4 per head justified the height of hunger in the study area. Nevertheless, at a threshold of 4 meals per head as used by Mathye and Gericke (2019), almost all the rural households have poor dietary diversity vis-à-vis 84.3 and 11.9% respectively are faced with very poor and poor dietary diversities (Figure 3). Fortunately, 1.9% is at the threshold of vulnerability while a similar percent replica had a good dietary diversity per head in the study area. This state of heightened short-term food insecurity is a potential threat to the growth and development of the rural economy as it will not only heighten rural-urban migration that creates state of human nuisance in the state in particular and the country in general but will worsen the state of food security in general as rural economy still remains the pivot of food supply in a country whose economy is subsistence characterized.



**Figure 3: Distribution of households' dietary diversity status**

Source: Field survey, 2022

Contrarily, in the med-term food security, majority of the rural households (55.2%) were off the threshold of food insecurity, i.e. were in acceptable fold of food consumption score (FCS), meaning they had good food consumption score status (Figure 4). However, slightly less than half (32.6%) of the rural households were vulnerable to food insecurity, i.e., were in the borderline fold of FCS classification while a handful of 12% were classified to have poor food consumption score status. Therefore, it can be inferred that in the mid-term, the rural economy is in the comfort zone of food security.

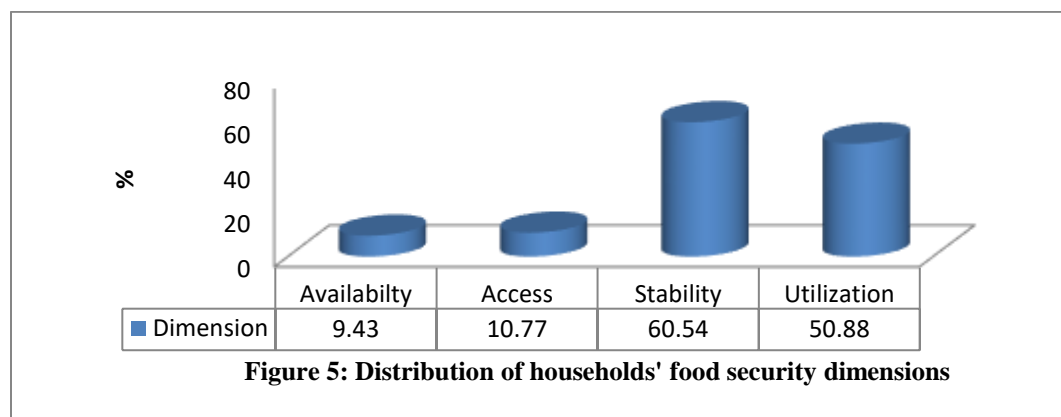


**Figure 4: Distribution of households' Food consumption score status**

Source: Field survey, 2022

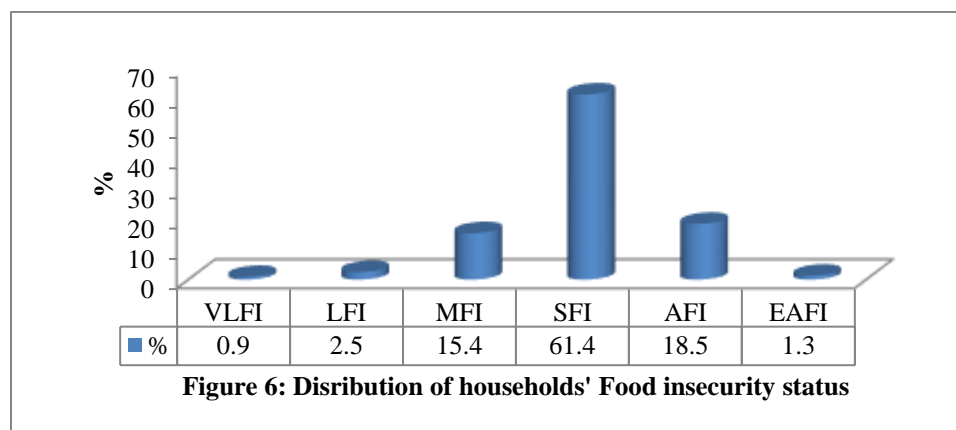
Furthermore, on the average, the frame work of food insecurity in the long-term showed that food stability (60.54%) contributed most to food insecurity, followed by food utilization (50.88%), then food access

(10.77%) and food availability (9.43%)(Figure 5). By implication, there is poor stability and utilization of food in the study area, thus the bane of food security. However, access and availability of food in the study area can be inferred to be fair but food being a precursor of life, more need to be done to make their status to be good. It is worth to mention, that the households should be enlightened on the need to explore the use of good indigenous technology of extend the shelf of food commodities especially the non-perishable ones, thereby ensuring stable and appropriate utilization of food. The poor stability and utilization of food owes to ineffective facilities- conventional and non-conventional value addition and storage technologies which makes rural households to treat most of the available and accessible food commodities as a flow resource rather than as a stock resource. Therefore, onus lies on households and policymakers to devise appropriate measures that will enhance households' food security in the rural economy before it cascade into a state of disaster in the state in particular and the country in general.



Source: Field survey, 2022

Moreover, it was established that majority (61.4%) of the households are in the state of serious food insecurity; 18.5% are in state of alarming food insecurity while 1.3% are challenged with extreme alarming food insecurity (Figure 6). Nevertheless, 15.4% are in the threshold of vulnerable-voracious state of food insecurity, i.e., moderate food insecurity while 2.5 and 0.9% households respectively are in the states of low and very low food insecurity. Generally, it can be inferred that the study area is in a peril condition owing to poor food stability and utilization, thus jeopardize what keeps the body and the soul together. Though the rural economy is not in a marathon race between life and death owing to its fair status in food availability and accessibility but it is obviously in a battle to keep the body and the soul together.

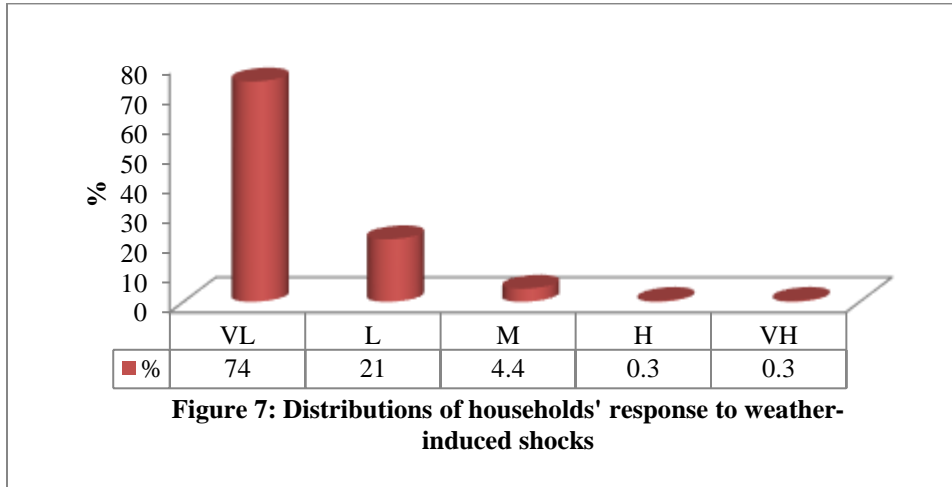


Source: Field survey, 2022

Note: VL= Very low; L=Low; M=Moderate; S=Severely; A=Alarming; EA=Extremely alarming; and, FI= Food insecurity

### Food Insecurity Resilience Capacity of Rural Households

A perusal of weather-induced shocks showed that majority (95%) of the households' had their food security to be affected by low weather-induced shocks vis-à-vis very low (74%) and low (21%)(Figure 7). However, it was observed that a handful of 4.4% had their food security to be affected by moderate weather-induced shocks while 0.6% encountered high weather-induced shocks that affected their food security.



Source: Field survey, 2022

Note: VL= Very low; L=Low; M=Moderate; H=High; and, VH=Very high

Empirically, using a direct approach, a cursory review of food insecurity resilience capacity index (RCI) showed that majority of the households had low food insecurity resilience capacity vis-à-vis 40.1% and 50.8% respectively with very low and low resilience capacity. However, 8.5% of the households had moderate food insecurity resilience capacity while the food insecurity resilience capacity of 0.6% was high (Figure 8). Nevertheless, a detailed view of the resilience structure matrix (RSM) showed adaptive capacity (AC) to be the pillar that contributed most to households' food insecurity resilience capacity in the study area, closely followed by social safety nets (SSN) and assets (AST) and then at distance, access to basic services (ABS) with least contribution (Figure 9a). In other words, on the average, the index contributions' status of all the food insecurity resilience indicators was poor and that of access to basic services being the worst as evident by their respective average index that was less than 13%. Besides, sub-pillar-wise, agricultural asset (AST4) contributed most to food insecurity resilience capacity, then followed by rural advisory services (extension services) (AC7) while the frequency of coping strategy (AC5) contributed least to food insecurity resilience capacity of the rural households in the study area (Figure 9b). Thus, the heightened poor food insecurity resilience capacity among majority of the households in the study area can be attributed to the worsen status of the pillars that determine resilience capacity against long lasting consequence of stresses and shocks on food security in the rural economy of the study area. Generally, it can be inferred that the households' resilience capacity to avoid shocks and stresses that have long lasting effects in the study area is poor, thus the need for a swift intervention before it cascade into a calamitous situation that will be pervaded with hunger, starvation and endangered health epidemics.

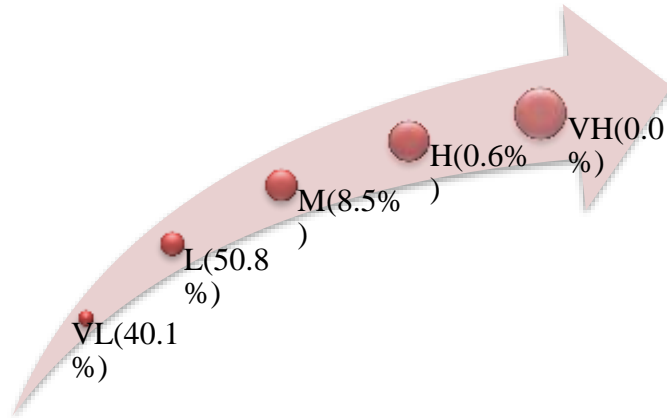


Figure 8: Food insecurity distributions of households  
Source: Field survey, 2022

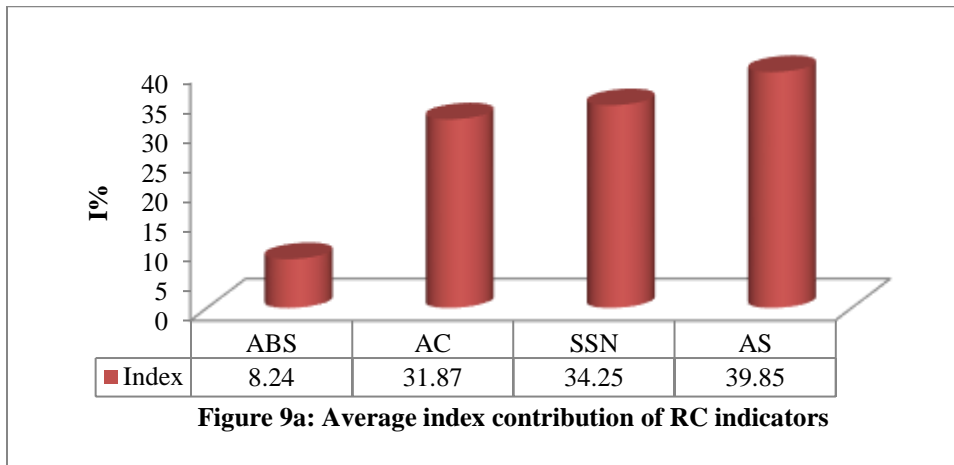


Figure 9a: Average index contribution of RC indicators

Source: Field survey, 2022

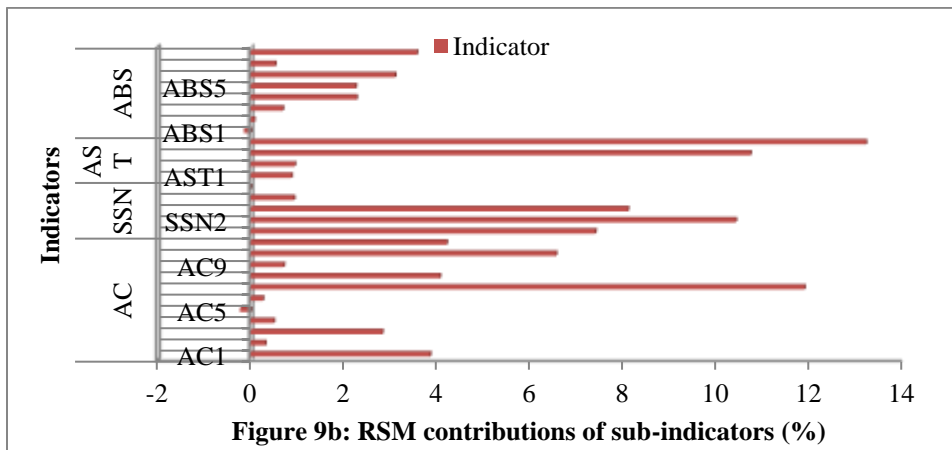


Figure 9b: RSM contributions of sub-indicators (%)

Source: Field survey, 2022

Using the indirect approach, structurally, except asset (AST), all the remain resilience pillars had significant influence on households' food insecurity resilience capacity (FIRC) as evident by their respective estimated coefficients that were different from zero at 10% probability level (Table 5a and Figure 10). Besides, except access to basic services (ABS), the duo of adaptive capacity (AC) and social safety nets (SSN) positively

increased the households' resilience capacity towards food insecurity and this may be attributed to adoption of good contingency plan by the rural households with respect to the former and the support of effective implementation of national social intervention programme in the study area with respect to the latter. Nevertheless, the declining effect of ABS on households' resilience capacity may not be far from weak and ineffective infrastructural facilities in the study area. However, the insignificant influence of AST on households' resilience capacity may be attributed to the resource poor status of rural households given that in agrarian characterized rural settings of Nigeria, unlike social capital, the rural economy is challenged with serious limitation of economic capital. Empirically, any household stands the chance of having its food insecurity resilience capacity to increase by 2.04 and 0.34% respectively if it's AC and SSN increased by 1%. However, their resilience capacity stands to plummet by 1.47% if the state of infrastructural decay increased by 1%. In addition, the influence of weather-induced shocks was insignificant and the possible reasons are because weather vagaries exert mild effect on their food security as evidently established in the previous report on the influence of weather-induced shocks on food security; and, the buffer effects of AC and SSN that absolve the consequence of weather-induced shocks. Noteworthy, contrary to the *a priori* expectation, the positive sign associated with weather-induced shocks exhibit the active readiness of the rural households against any anticipated stress that will have a long term effect on their households' food security in the study area.

Furthermore, it was established that FIRC as a mediation factor significantly influenced short-term, mid-term, long-term food securities and sustainable livelihood (general wellbeing) of the rural households in the study area as evident by their respective estimated coefficients that were different from zero at 10% degree of freedom. Empirically, any given households have the chance of its short, mid, long-term food securities and sustainable livelihood to increase by 0.49, 3.70, 0.06 and 0.15% respectively for any given increase in its FIRC by 1%.

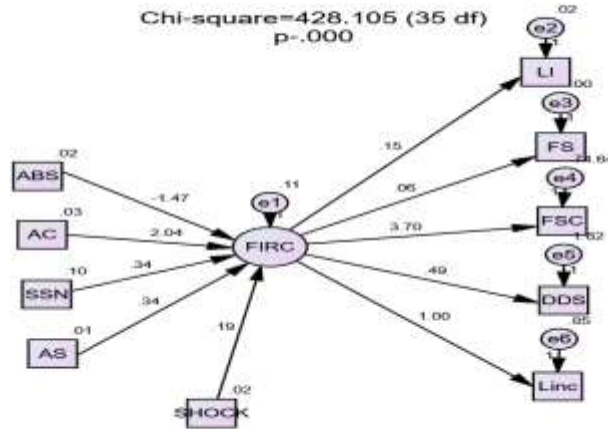
Table 5a: Effects of food insecurity resilience capacity on food security and sustainable livelihood

Variable (→)		Estimate (US)	Estimate (S)	SE	CR	P-value	R <sup>2</sup>
ABS	FIRC	-1.472	-0.373	0.292	-5.044	***	0.626
AC	FIRC	2.043	0.664	0.281	7.268	***	
SSN	FIRC	0.339	0.198	0.115	2.949	0.003**	
AS	FIRC	0.343	0.065	0.342	1.002	0.316 <sup>NS</sup>	
SHOCK	FIRC	0.194	0.047	0.268	0.722	0.470 <sup>NS</sup>	
FIRC	LI	0.153	0.500	0.026	5.980	***	0.250
FIRC	FS	0.057	0.478	0.010	5.816	***	0.228
FIRC	FSC	3.700	0.223	1.151	3.214	0.001**	0.050
FIRC	DDS	0.494	0.192	0.176	2.807	0.005**	0.037
FIRC	Linc	1.000	0.501	-	-	-	0.251
Variance							
ABS	-	0.018	-	0.001	12.610	***	-
AC	-	0.030	-	0.002	12.610	***	-
SSN	-	0.098	-	0.008	12.610	***	-
AS	-	0.010	-	0.001	12.610	***	-
SHOCK	-	0.017	-	0.001	12.610	***	-
e1	-	0.107	-	0.039	2.730	0.006	-
e2	-	0.020	-	0.002	10.784	***	-
e3	-	0.003	-	0.000	11.021	***	-
e4	-	74.639	-	6.038	12.361	***	-
e5		1.821	-	0.147	12.429	***	-
e6		0.855	-	0.079	10.780	***	-

Source: Field survey, 2022



Note: \*\*\*, \*\*, \* & NS mean significant at 1, 5, 10% and non-significant respectively; US= Unstandardized; S= Standardized; SE= Standard error; CR= Critical ratio; P= Probability; R<sup>2</sup>= Squared multiple correlation; → = relationship; e= error term; and, Linc= Logarithm of income



**Figure 10:** Structural modeling of food insecurity resilience capacity  
Source: Field survey, 2022

Noteworthy, the respective total effects of AC, SSN, AST and ABS, the de facto pillars of resilience capacity, on short-term, mid-term, long-term food securities and sustainable livelihood are 1.010, 7.559, 0.116 and 0.313%; 0.168, 1.255, 0.019 and 0.052%; 0.170, 1.270, 0.020 and 0.030%; and, -0.728, -5.447, -0.084 and -0.225% respectively (Table 5b). Besides, weather-induced shocks’ total effects on short-term mid-term, long-term securities and sustainable livelihood are 0.096, 0.717, 0.011 and 0.030% respectively. Nevertheless, the model fit results showed that the structural equation model best fit the specified equation as evident by its respective diagnostic statistics that are within the recommended thresholds (Table 5c).

**Table 5b:** Direct, indirect and total effects of latent and mediating variables on food security and sustainable livelihood

Variable	SHOCK	AS	SSN	AC	ABS	FIRC	SHOCK	AS	SSN	AC	ABS	FIRC
	Unstandardized						Standardized					
<b>Direct effect</b>												
FIRC	0.194	0.343	0.339	2.043	-1.472	0.000	0.047	0.065	0.198	0.664	-0.373	0.000
Linc	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.501
DDS	0.000	0.000	0.000	0.000	0.000	0.494	0.000	0.000	0.000	0.000	0.000	0.192
FSC	0.000	0.000	0.000	0.000	0.000	3.700	0.000	0.000	0.000	0.000	0.000	0.223
FS	0.000	0.000	0.000	0.000	0.000	0.057	0.000	0.000	0.000	0.000	0.000	0.478
LI	0.000	0.000	0.000	0.000	0.000	0.153	0.000	0.000	0.000	0.000	0.000	0.500
<b>Indirect effect</b>												
FIRC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Linc	0.194	0.343	0.339	2.043	-1.472	0.000	0.023	0.033	0.099	0.332	-0.187	0.000
DDS	0.096	0.170	0.168	1.010	-0.728	0.000	0.009	0.012	0.038	0.128	-0.072	0.000
FSC	0.717	1.270	1.255	7.559	-5.447	0.000	0.010	0.014	0.044	0.148	-0.083	0.000
FS	0.011	0.020	0.019	0.116	-0.084	0.000	0.022	0.031	0.095	0.317	-0.179	0.000
LI	0.030	0.053	0.052	0.313	-0.225	0.000	0.023	0.032	0.099	0.332	-0.187	0.000
<b>Total effect</b>												
FIRC	0.194	0.343	0.339	2.043	-1.472	0.000	0.047	0.065	0.198	0.664	-0.373	0.000
Linc	0.194	0.343	0.339	2.043	-1.472	1.000	0.023	0.033	0.099	0.332	-0.187	0.501
DDS	0.096	0.170	0.168	1.010	-0.728	0.494	0.009	0.012	0.038	0.128	-0.072	0.192
FSC	0.717	1.270	1.255	7.559	-5.447	3.700	0.010	0.014	0.044	0.148	-0.083	0.223
FS	0.011	0.020	0.019	0.116	-0.084	0.057	0.022	0.031	0.095	0.317	-0.179	0.478
LI	0.030	0.053	0.052	0.313	-0.225	0.153	0.023	0.032	0.099	0.332	-0.187	0.500

Source: Field survey, 2022

**Table 5c: Model fit summary**

Category name	Index name	Obtained	Recommended
Absolute fit	CMIN	428.105	-
	DF	35	-
	P	0	p<=0.05
	RMSEA	0.078	< 0.08
	RMR	0.012	<0.02
	GFI	0.905	> 0.90
Incremental fit	AGFI	0.994	> 0.90
	NFI	0.96	> 0.90
	RFI	0.977	> 0.90
	TLI	0.99	> 0.90
	CFI	0.97	> 0.90
	IFI	0.98	> 0.90
	PGFI	0.913	> 0.90
	FMIN	0.9346	> 0.90
Parsimonious fit	CMIN/DF	2.232	< 5.0
Others	NPAR	20	-
	PRATIO	0.778	-
	PNFI	0.28	-
	PCFI	0.288	-
	NCP	393.105	-
	AIC	468.105	-
	BCC	469.538	-
	BIC	543.409	-
	CAIC	563.409	-
	ECVI	1.472	-
	MECVI	1.477	-
	HOELTER (0.05)	37	-
	HOELTER (0.01)	43	-

Source: Field survey, 2022

### **Nexus between food insecurity and resilience capacity**

The integrative framework of households' food insecurity and resilience capacity showed that majority of the households fell in the best-case category as evident by the density of the dotted points in second bottom quadrant in Figure 11. Besides, self-made category is the next populated category, followed by prodigal-case category while worst-case category had very few households.

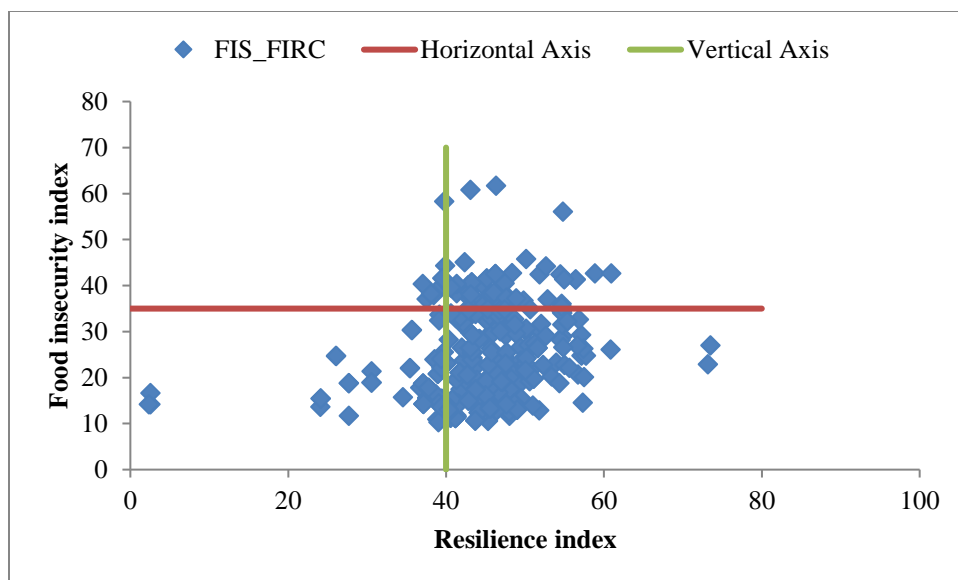


Figure 11: Nexus of food insecurity and resilience capacity  
Source: Field survey, 2022

### Food Coping Strategies Adopted by Households

To identify the common food coping strategies, of the twelve adopted food coping strategy components, the varimax rotation retained only three interpretable components as evident by their respective Eigen value that are greater than unity (Table 6). Besides, these retained factors account for 60.57% of the total variation of the adopted food coping strategies subjected to analysis. Noteworthy, the sampling was established to be adequate as evident by the KMO measure that possessed a good value of 0.870 that is above the satisfactory threshold value of 0.50 recommended by Keiser (1974); Field (2005); Sadiq *et al.*(2017); Sadiq *et al.*(2018c&d). In addition, the rotation matrix (R-matrix) has a common. The R-matrix is not an identity matrix as evident by the plausibility of its Bartlett's sphericity test at less than 1% probability level. Nevertheless, each of these factors had internal consistency in its loadings as indicated by their respective Cronbach's Alpha tests that are above the threshold of 0.70 reported to be satisfactory for social science studies by Nunnally (1978); Nunnally and Bernstein (1994); Prunomo and Lee (2010); Sadiq *et al.*(2017); Sadiq *et al.*(2018c&d).

As rightly done by Bagheri and Fami (2016); Sadiq *et al.*(2017) and Sadiq *et al.*(2018c&d), factor loadings with values less than 0.40 in each of the extracted components were dropped and in labeling a component loaded with only two loadings, only the factor with the highest score is considered. Component 1, labeled "meal skipping (MS)", with 40.07% of total variance and loaded with seven factors showed households concern on income smoothening as a food coping measure. Component 2, labeled "eaten of inferior meals (IM)", with 11.67% of total variance proportion and loaded with three factors showed households concern on meal substitutions, thus smoothening their income. The duo of these components is aimed towards enjoying expanded expenditure on food commodities on continuum basis by the rural households. Component 3, labeled "consumption credit (CC)", loaded with two factors and accounted for 8.83% of the total variance showed households concern on the use of consumption credit as a measure to smoothen their consumption.

**Table 6: Coping strategies adopted by the rural households**

Strategies	F1	F2	F3
Rely on less preferred and less expensive food (C1)		0.690	
Borrow food from a relative or friend (C2)	0.468	0.500	
Purchase food on credit (C3)			0.809
Consume seed stock for next season (C4)			0.638
Gather wild food, hunt, or harvest immature crops (C5)	0.798		
Send children to eat with neighbor/relative (C6)	0.776		
Send members of the household to beg (C7)	0.772		
Reduce the portion size at mealtimes (C8)	0.458	0.527	
Restrict consumption of adult for children to eat (C9)	0.745	0.447	
Reduced the number of meals eaten in a day (C10)	0.601	0.570	
Skip a complete day without eaten (C11)	0.827		
Sell of agricultural equipment/assets (C12)	0.559		
<b>Eigen value</b>	<b>4.808</b>	<b>1.400</b>	<b>1.059</b>
<b>Variance %</b>	<b>40.071</b>	<b>11.667</b>	<b>8.828</b>
<b>Cronbach's Alpha</b>	<b>0.872</b>	<b>0.423</b>	<b>0.388</b>
<b>KMO</b>	<b>0.870</b>		
<b>Bartlett's Test</b>	<b>1481.321(0.00***)</b>		

Source: Field survey, 2022

Note: Measured on four scale continuum basis (frequently; occasionally; rarely & not used)

\*\*\* means significant at 1%

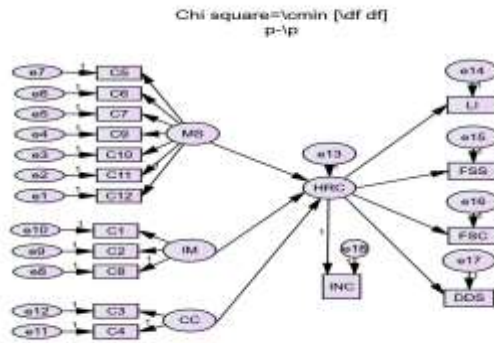
Furthermore, structurally, it was established that IM and CC significantly influenced households' hunger resilience capacity (HRC) as evident by their respective parameter estimates that are plausible within 10% probability level (Table 7a and Figure 12). While CC increases the HRC, IM tends to decrease it and the possible reason may be that the substituted inferior foods are of poor diet quality, thus affecting their labour productivity. However, SM, an income smoothening measure, being insignificant on HRC may be associated to less dependency ratio in the households' composition. Therefore, a unit increase in IM and CC coping strategies will increase and decrease households' HRC by 0.151 and -0.104% respectively. The total effects of CC, IM and SM on HRC were 0.151, -0.104 and 0.062% respectively. Furthermore, HRC, a mediation factor, positively and significantly influenced short-term (dietary diversity-DDS) and mid-term (food consumption score- FSC) food securities but failed to have significant influence on long-term food security (FSS) and sustainable livelihood (LI). Nevertheless, HRC being a transitory situation might be the possible reason why its influence on the duo of long-term food security and sustainable livelihood were insignificant. The total effects of HRC on DDS, FCS, FSS and LI were 5.872, 47.524, 0.055 and 0.118% respectively (Table 7b). The model fit statistics confirmed that the structural model is best fit for the specified equation as indicated by its respective test statistics that are within the acceptable recommended thresholds (Table 7c). Generally, it can be inferred that hunger coping strategy has a transitory effect on the food security of the rural households in the study area.

**Table 7a:** Effects of coping strategy on food security and sustainable livelihood

Variable (→)		Estimate (US)	Estimate (S)	SE	CR	P-value	R <sup>2</sup>
HRC	MS	0.062	0.113	0.044	1.415	0.157 <sup>NS</sup>	0.043
HRC	IM	-0.104	-0.145	0.056	-1.847	0.065*	
HRC	CC	0.151	0.098	0.083	1.814	0.070*	
C12	MS	1.000	0.438	-	-	-	0.192
C11	MS	1.773	0.818	0.229	7.734	***	0.670
C10	MS	2.084	0.678	0.288	7.243	***	0.460
C9	MS	2.804	0.819	0.363	7.736	***	0.671
C7	MS	1.471	0.723	0.198	7.422	***	0.523
C6	MS	1.668	0.757	0.221	7.545	***	0.574
C5	MS	1.738	0.745	0.232	7.500	***	0.554
C8	IM	1.000	0.278	-	-	-	0.077
C2	IM	4.622	1.312	4.379	1.055	0.291 <sup>NS</sup>	1.720
C1	IM	0.467	0.138	0.158	2.952	0.003**	0.019
C4	CC	1.000	0.115	-	-	-	0.013
C3	CC	17.594	2.172	94.815	0.186	0.853 <sup>NS</sup>	4.718
LI	HRC	0.118	0.117	0.079	1.499	0.134 <sup>NS</sup>	0.014
FSS	HRC	0.055	0.117	0.037	1.497	0.135 <sup>NS</sup>	0.014
FSC	HRC	47.524	0.871	20.262	2.345	0.019**	0.758
DDS	HRC	5.872	0.699	2.426	2.421	0.015**	0.489
INC	HRC	1.000	0.152	-	-	-	0.023
Variance							
MS	-	0.092	-	0.023	3.903	***	-
IM	-	0.054	-	0.054	1.000	0.317 <sup>NS</sup>	-
CC	-	0.012	-	0.063	0.184	0.854 <sup>NS</sup>	-
e13	-	0.027	-	0.022	1.217	0.224 <sup>NS</sup>	-
e1	-	0.386	-	0.031	12.271	***	-
e2	-	0.142	-	0.015	9.652	***	-
e3	-	0.467	-	0.041	11.382	***	-
e4	-	0.353	-	0.037	9.636	***	-
e5	-	0.181	-	0.016	11.025	***	-
e6	-	0.189	-	0.018	10.658	***	-
e7	-	0.222	-	0.021	10.806	***	-
e8	-	0.641	-	0.071	9.062	***	-
e9	-	-0.479	-	1.055	-0.454	0.650 <sup>NS</sup>	-
e10	-	0.603	-	0.049	12.344	***	-
e11	-	0.863	-	0.092	9.358	***	-
e12	-	-2.819	-	19.142	-0.147	0.883 <sup>NS</sup>	-
e14	-	0.028	-	0.002	12.567	***	-
e15	-	0.006	-	0.000	12.567	***	-
e16	-	19.932	-	10.569	1.886	0.059*	-
e17	-	0.998	-	0.178	5.593	***	-
e18	-	1.174	-	0.094	12.536	***	-

Source: Field survey, 2022

Note: \*\*\*, \*\*, \* & NS mean significant at 1, 5, 10% and non-significant respectively; US= Unstandardized; S= Standardized; SE= Standard error; CR= Critical ratio; P= Probability; R<sup>2</sup>= Squared multiple correlation; → = relationship; e= error term; and, INC= Income



**Figure 12:** Structural modeling of hunger resilience capacity (HRC)  
Source: Field survey, 2022

**Table 7b:** Direct, indirect and total effects of latent and mediating variables on food security and sustainable livelihood

Variable	CC	IM	MS	HRC	CC	IM	MS	HRC
	Unstandardized				Standardized			
	Direct effect							
HRC	.151	-.104	.062	.000	.098	-.145	.113	.000
INC	.000	.000	.000	1.000	.000	.000	.000	.152
DDS	.000	.000	.000	5.872	.000	.000	.000	.699
FSC	.000	.000	.000	47.524	.000	.000	.000	.871
FSS	.000	.000	.000	.055	.000	.000	.000	.117
LI	.000	.000	.000	.118	.000	.000	.000	.117
C3	17.594	.000	.000	.000	2.172	.000	.000	.000
C4	1.000	.000	.000	.000	.115	.000	.000	.000
C1	.000	.467	.000	.000	.000	.138	.000	.000
C2	.000	4.622	.000	.000	.000	1.312	.000	.000
C8	.000	1.000	.000	.000	.000	.278	.000	.000
C5	.000	.000	1.738	.000	.000	.000	.745	.000
C6	.000	.000	1.668	.000	.000	.000	.757	.000
C7	.000	.000	1.471	.000	.000	.000	.723	.000
C9	.000	.000	2.804	.000	.000	.000	.819	.000
C10	.000	.000	2.084	.000	.000	.000	.678	.000
C11	.000	.000	1.773	.000	.000	.000	.818	.000
C12	.000	.000	1.000	.000	.000	.000	.438	.000
	Indirect effect							
HRC	.000	.000	.000	.000	.000	.000	.000	.000
INC	.151	-.104	.062	.000	.015	-.022	.017	.000
DDS	.888	-.611	.365	.000	.068	-.101	.079	.000
FSC	7.187	-4.945	2.957	.000	.085	-.126	.098	.000
FSS	.008	-.006	.003	.000	.011	-.017	.013	.000
LI	.018	-.012	.007	.000	.011	-.017	.013	.000
C3	.000	.000	.000	.000	.000	.000	.000	.000
C4	.000	.000	.000	.000	.000	.000	.000	.000
C1	.000	.000	.000	.000	.000	.000	.000	.000
C2	.000	.000	.000	.000	.000	.000	.000	.000
C8	.000	.000	.000	.000	.000	.000	.000	.000
C5	.000	.000	.000	.000	.000	.000	.000	.000
C6	.000	.000	.000	.000	.000	.000	.000	.000
C7	.000	.000	.000	.000	.000	.000	.000	.000
C9	.000	.000	.000	.000	.000	.000	.000	.000
C10	.000	.000	.000	.000	.000	.000	.000	.000
C11	.000	.000	.000	.000	.000	.000	.000	.000
C12	.000	.000	.000	.000	.000	.000	.000	.000

Source: Field survey, 2022

**Table 7b: Continued .....**

Variable	CC	IM	MS	HRC	CC	IM	MS	HRC
	Unstandardized				Standardized			
Total effect								
HRC	.151	-.104	.062	.000	.098	-.145	.113	.000
INC	.151	-.104	.062	1.000	.015	-.022	.017	.152
DDS	.888	-.611	.365	5.872	.068	-.101	.079	.699
FSC	7.187	-4.945	2.957	47.524	.085	-.126	.098	.871
FSS	.008	-.006	.003	.055	.011	-.017	.013	.117
LI	.018	-.012	.007	.118	.011	-.017	.013	.117
C3	17.594	.000	.000	.000	2.172	.000	.000	.000
C4	1.000	.000	.000	.000	.115	.000	.000	.000
C1	.000	.467	.000	.000	.000	.138	.000	.000
C2	.000	4.622	.000	.000	.000	1.312	.000	.000
C8	.000	1.000	.000	.000	.000	.278	.000	.000
C5	.000	.000	1.738	.000	.000	.000	.745	.000
C6	.000	.000	1.668	.000	.000	.000	.757	.000
C7	.000	.000	1.471	.000	.000	.000	.723	.000
C9	.000	.000	2.804	.000	.000	.000	.819	.000
C10	.000	.000	2.084	.000	.000	.000	.678	.000
C11	.000	.000	1.773	.000	.000	.000	.818	.000
C12	.000	.000	1.000	.000	.000	.000	.438	.000

Source: Field survey, 2022

**Table 7c: Model fit summary**

Category name	Index name	Obtained	Recommended
Absolute fit	CMIN	603.885	-
	DF	116	-
	P	0.00	p<=0.05
	RMSEA	0.015	< 0.08
	RMR	0.014	<0.02
Incremental fit	GFI	0.924	> 0.90
	AGFI	0.968	> 0.90
	NFI	0.973	> 0.90
	RFI	0.917	> 0.90
	TLI	0.966	> 0.90
	CFI	0.915	> 0.90
	IFI	0.919	> 0.90
	PGFI	0.925	> 0.90
FMIN	1.899	> 0.90	
Parsimonious fit	CMIN/DF	4.206	< 5.0
Others	NPAR	37	-
	PRATIO	0.853	-
	PNFI	0.574	-
	PCFI	0.61	-
	NCP	487.885	-
	AIC	677.885	-
	BCC	682.325	-
	BIC	817.197	-
	CAIC	854.197	-
	ECVI	2.132	-
	MECVI	2.146	-
	HOELTER (0.05)	75	-
HOELTER (0.01)	82	-	

Source: Field survey, 2022

## Conclusion and Recommendations

Empirically, the findings established that the study area is challenged with food insecurity in the short and long terms while it was in the comfort zone of food security in the mid-term. However, poor food utilization and stability were the bane of food insecurity in the long-run. Generally, it was inferred that the rural economy of the study area is obviously in a battle to keep the body and soul together. Furthermore, poor food insecurity resilience capacity of majority of the households due to poor adaptive capacity was unmasked as the prime factor behind the exacerbated state of food insecurity. More so, food insecurity resilience capacity significantly influenced food security across the term periods and sustainable livelihood while households' hunger resilience capacity is only sustainable on short-term food security. Nevertheless, the empirical evidence showed that the rural households adopted income and consumption smoothening as coping strategies for short-term food insecurity. Therefore, to adjust the state of poor food stability and utilization, the study advises the rural households to adopt safe and eco-friendly improved indigenous food technologies that will minimize waste, thereby enhancing food shelf-life and value addition. By so doing, it will go a long way to address the alarming state of food insecurity which is a portend threat to the achievement of sustainable development goals of zero hunger by 2030.

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## Exploring Relationship between Social Media Use and Antisocial Behaviour among Tertiary Institution Students: An Investigative Study of Influencing Factors

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### Abstract

This study explored the relationship between social media use, antisocial behaviour and its impact on tertiary institution students. The influencing factors were examined. The prevalent types of antisocial behaviour on social media platforms among students in tertiary institutions, contributory factors to the development of antisocial behaviour, the average hours spent by students on social media per day, as well as the difference between male and female students in their use of social media to facilitate online harassment in tertiary institutions were identified. A descriptive survey design was used with a structured questionnaire. A total of two hundred and twenty respondents who were students of the University of Ibadan and Polytechnic Ibadan participated in the study and a descriptive data analysis technique was used to present and analyse the data. The questionnaire consisted of questions relating to the types of prevalent antisocial behaviour, contributory factors to antisocial behaviour on social media as well as the relationship between the use of social media and antisocial behaviour among others. While the questionnaires were administered online to respondents in the University of Ibadan, printed questionnaires were administered to respondents at the Polytechnic, Ibadan. The study found that social media has a significant impact on antisocial behaviour among students in tertiary institutions. It also revealed the contributory factors to the development of antisocial behaviour among students in tertiary institutions. It was recommended among others, that campaigns, and workshops should be organized to create awareness on responsible social media usage and the consequences of antisocial behaviour.

**Keywords:** Antisocial Behaviour, Social Media, Students, and Tertiary Institutions

### Introduction

The escalating prevalence of antisocial behavior among tertiary institution students has been extensively investigated by scholars and experts across diverse disciplines, uncovering its intricate and multifaceted characteristics. Antisocial behavior entails a persistent inclination to transgress societal norms, regulations, and the rights of others. It encompasses a spectrum of actions, such as aggression, violence, vandalism, theft, deception, outbursts, substance abuse, and engagement in illicit activities (Allen and Anderson, 2017; Moffitt, 2018; American Psychiatric Association, 2013). When observed in tertiary students, antisocial behavior involves conscious participation in actions with the intent to provoke annoyance, inflict harm, or cause damage to others. This behavioral pattern frequently contributes to the emergence of juvenile delinquency, a multifaceted societal challenge with far-reaching consequences affecting different facets of society and its members. Consequently, it leads to heightened rates of criminal conduct, substance misuse, and mental health issues (Jones and Pierce, 2021; Jones, 2014)

Sociologist Robert Agnew has delineated a number of prevalent elements that play a role in the development of antisocial behavior, encompassing circumstances marked by impoverishment, familial strife, and

exposure to environments characterized by violence (Agnew, 1992). Factors ranging from—biological influences, individual traits, domestic and educational settings, peer dynamics, exposure to media violence, as well as broader community and social factors are potential contributors to the emergence of antisocial behaviors (Hyde et. al., 2018; Mundia, 2006). Although research has extensively probed into the origins of antisocial behaviors in Nigerian children and adolescents, comparatively less attention has been devoted to comprehending the factors that shape antisocial behaviors among students within tertiary institutions.

Individuals enrolled in higher education programs at colleges, polytechnics, universities, or post-secondary educational institutions are commonly referred to as students in tertiary institutions. This cohort typically comprises young adults aged between 18 and 25 years who are transitioning from adolescence to adulthood, a phase known as emerging adulthood according to (Miller, 2017; Arnett, 2000). This developmental stage witnesses profound changes and challenges across diverse life domains. Negotiating intricate social, emotional, and cognitive processes, these students pursue personal growth and academic excellence (Storch et al., 2004).

The transition to higher education involves pivotal milestones like advancing in studies, entering the workforce, establishing independent living arrangements, and forming enduring relationships (Miettinen and Jalovaara, 2020; Arnett, 2000). Within society, these emerging adults play a pivotal role; their actions, thoughts, and aspirations contribute to broader social development and the formulation of social policies (Arnett, 2000). Representing a heterogeneous group, students in tertiary institutions hail from varied backgrounds, each contributing their unique viewpoints, passions, and objectives. It's crucial to acknowledge that the precise age range and attributes of this group may vary, influenced by cultural, geographical, and institutional factors. Statistics Canada (2018) underscores the contextual variability in defining young adults, underscoring the necessity of accounting for diverse age ranges and developmental contexts while studying this population.

Acknowledging the pivotal role that students in tertiary institutions hold within our society, they warrant our dedicated consideration. Their social engagements and thoughts are not only integral but also paramount in shaping broader social development and the crafting of social policies. Various platforms offer avenues for students in tertiary institutions to participate in and exhibit their social interactions, and social media, in particular, has recently emerged as a significant platform garnering substantial engagement from this demographic.

In theory, social media encompasses an array of socially constructive viewpoints and practices exhibited by a multitude of global users (Bhimani et. al. 2019; Greenhow, 2011). These platforms have seamlessly integrated into modern society, reshaping communication, interaction, and information access. Providing channels for social connection, self-expression, and information dissemination, they hold specific appeal for tertiary students. However, concerns have arisen regarding the potential adverse effects of social media on individuals' social conduct, especially concerning antisocial behavior among this student cohort.

For a period of ten years now, the social media platforms such as Facebook, Instagram, Twitter, and Snapchat have witnessed an exponential surge in popularity and utilization, fundamentally altering the dynamics of interpersonal interaction, communication, and information sharing. These platforms extend diverse opportunities for students in tertiary institutions to connect socially, express themselves, and participate in online communities. Nonetheless, apprehensions have surfaced surrounding the possible detrimental influences of social media, particularly in relation to the prevalence of antisocial behavior among these students.

Increasingly, numerous students in tertiary institutions are drawn into antisocial and aggressive activities through their involvement with social media. Scholars like Jewkes and Yar (2010), Lemoine, Hackett, and Richardson (2016), and Abbasi (2016) contend that this phenomenon can be attributed to the excessive utilization of social media by these students and their exposure to unethical and unlawful content prevailing on these platforms. Thus, addressing the adverse impact of social media on the conduct and well-being of tertiary students becomes an imperative endeavor.

Antisocial conduct has held society's focus for an extended period due to its imposition of significant hurdles on various societal facets (Pascual-Ferrá et al., 2021; Chingtham, 2015). The ramifications can be severe for individuals, their families, and the broader society, precipitating escalated rates of criminal behavior, substance misuse, and mental health dilemmas. Such repercussions have the potential to disrupt the usual operations of societies and their members, exerting substantial strain on social assistance programs. Thus, it enjoys widespread recognition as a societal challenge. It entails actions that diverge from established social norms, disregarding the rights and well-being of others. The engagement of students in tertiary institutions in such behavior incurs noteworthy costs, both in economic terms and concerning healthcare. These ramifications ripple not only to the individuals themselves and their families but also to the larger community.

On a global scale, the prevalence of antisocial behavior among youth stands at 30.5% (Biswas et al., 2020), and the financial and health burdens linked to such behavior during the phases of youth and adolescence have been extensively documented. The financial burden endured by young individuals and their families is intrinsically linked to the hurdles of accessing resources, instituting preventive measures, and delivering sustainable and effective treatment (McGorry et al., 2022; Bastiaens, 2006).

Current research indicates an intricate link between the utilisation of social media and antisocial behaviour among students in tertiary institutions. Multiple studies have provided evidence of a positive correlation between excessive engagement with social media and an elevated propensity for participating in antisocial acts. The pervasive nature of social media, frequently accompanied by prolonged periods of platform usage, can result in a displacement of genuine interpersonal interactions and diminish opportunities for in-person communication, empathy, and emotional bonding (Fritz et al., 2023). There is need to investigate such negative influences of social media to understand how students in tertiary institutions become inclined to shape their perceptions and develop their antisocial intentions, which can lead them to adopt violent means in their lives. This examination will shed light on the factors that may prompt them to resort to violent means in their lives.

Antisocial behavior exhibited by students in tertiary institutions encompasses an array of undesirable actions that detrimentally affect mental well-being, interpersonal relationships, academic performance, and community cohesion. Establishing a secure environment for students is pivotal for their holistic welfare. Prior research has illuminated the notable participation of students from tertiary institutions in antisocial conduct (Isife, 2017; Asumah and Aghedo, 2011). The availability of social media everywhere has profoundly influenced their interactions and conduct. Yet, apprehensions have arisen concerning social media's potential influence on antisocial behavior within this student cohort. While prevailing studies have predominantly spotlighted cyberbullying, there is an imperative to probe into broader manifestations of antisocial actions, such as vandalism and substance misuse.

The exploration of the mechanisms through which social media shapes such behaviors bears paramount significance. Factors such as peer influence and exposure to violent content might wield substantial influence over students' actions. Unearthing insights into these intricate dynamics promises a more comprehensive comprehension of the underlying processes. Addressing these gaps in research is pivotal for devising interventions, policies, and educational endeavors that foster positive online conduct among tertiary students.

The pivotal objective of this study is to scrutinize the relationship between the surge in antisocial behavior among students in tertiary institutions and the influence of social media. This examination assumes paramount importance, with the findings holding the potential to inform the development of effective measures that mitigate negative online behaviors and cultivate a healthier digital environment for students in higher education.

#### **Objectives of the study to**

- a. identify the types of antisocial behaviours that are prevalent on social media platforms among students in tertiary institutions.

- b. examine the factors that contribute to the development of antisocial behaviour in the context of social media use among students in tertiary institutions.
- c. find out the average hour students in tertiary institutions spend on social media per day.
- d. assess the relationship between the use of social media and antisocial behaviour among students in tertiary institutions.
- e. assess the difference between male and female students in their use of social media platforms to facilitate online harassment in tertiary institutions.

### **Research Questions**

- a) What types of antisocial behaviours are prevalent on social media platforms among students in tertiary institutions?
- b) What are the contributory factors to the development of antisocial behaviour in the context of social media use among students in tertiary institutions?
- c) What is the average hour students spent on social media per day?

### **Hypotheses**

H<sub>1</sub>: There is no significant relationship between the use of social media and antisocial behaviour among students in tertiary institutions.

H<sub>2</sub>: There is no significant difference between male and female students in their use of social media platforms to facilitate online harassment in tertiary institutions.

### **Methodology**

This study utilised a descriptive survey research design. This helped to gather data on the impact of social media on antisocial behaviour among young adults. A population of two hundred and twenty students were drawn from the undergraduate students of the University of Ibadan and the Polytechnic of Ibadan. These included both male and female students. The purposive sampling technique was used to select University of Ibadan undergraduate students and Polytechnic of Ibadan students for the study. In all a total of 220 students were drawn from the population. In comparison to their international contemporaries, students at the Polytechnic and University of Ibadan, like other young people in Nigeria, have a high level of social media usage. This gives them the perfect cohort to research the relationship between social media use and antisocial conduct. In addition, having a university and a polytechnic included enables a thorough knowledge of antisocial behaviour and social media use across various higher institution types. A set of structured questionnaires was used as the instrument for data collection in this study. They are the types of prevalent antisocial behaviour among students in tertiary institutions, contributory factors to antisocial behaviour on social media and the average hour students used in navigating social media each day. The Cronbach alpha reliability technique was employed to assess the consistency of the investigation regarding the common antisocial behaviour of students in tertiary institutions, the factors contributing to antisocial behavior on social media, and the daily average time spent by students on social media. The results indicated reliability coefficients of 0.83, 0.76, and 0.70 respectively. Two hypotheses were tested with Pearson product moment correlation at 0.05 and with Pearson product moment correlation and T-test at 0.05 level of significance.

### **Results**

RQ 1: What types of antisocial behaviours are prevalent on social media platforms among students in tertiary institutions?

**Table 1: Prevalent Antisocial Behaviours on Social Media Platforms among Students in Tertiary Institutions**

Antisocial Behaviours	Very Extent	Great Extent	Great Extent	Low Extent	Very Extent	Low	Mean	Std. Dev
Aggression	2 0.9%	11 5.0%	46 20.9%	161 73.2%	1.37	0.707		
Violence	157 71.4%	48 21.8%	10 4.5%	5 2.3%	3.62	0.815		
Bullying	51 23.2%	127 57.7%	7 3.2%	35 15.9%	2.88	0.943		
Cyberbullying	10 4.5%	13 5.9%	64 29.1%	133 60.5%	1.58	0.864		
Harassment	61 27.7%	114 51.8%	12 5.5%	33 15.0%	2.92	0.964		
Spread of misinformation	116 52.7%	52 23.6%	41 18.6%	11 5.0%	3.24	0.707		
Discrimination	10 4.5%	13 5.9%	64 29.1%	133 60.5%	1.58	0.864		
Academic dishonesty	61 27.7%	114 51.8%	12 5.5%	33 15.0%	2.92	0.964		
Doxing	4 1.8%	16 7.3%	34 15.5%	166 75.4%	1.39	0.777		
Impersonation	44 20.0%	97 44.1%	29 13.2%	50 22.7%	2.61	0.847		
Theft	77 35.0%	103 46.8%	33 15.0%	7 3.2%	1.99	0.941		
Vandalism	2 0.9%	11 5.0%	46 20.9%	161 73.2%	1.37	0.707		
Reckless driving	2 0.9%	6 2.7%	36 16.4%	176 80.0%	1.25	0.544		
Hazing	10 4.5%	13 5.9%	64 29.1%	133 60.5%	1.58	0.864		
Sexual misconduct	112 50.9%	69 31.4%	35 15.9%	4 1.8%	3.31	0.986		
Deception	47 21.4%	138 62.7%	8 3.6%	27 12.3%	2.93	0.860		
Substance abuse	134 60.9%	59 26.4%	7 3.2%	20 9.1%	3.38	0.815		
Impulsivity	49 22.3%	110 50.0%	16 7.3%	45 20.5%	2.74	0.705		
Lack of Empathy	44 20.0%	97 44.1%	29 13.2%	50 22.7%	2.61	0.847		
Disregard for rules and norms	61 27.7%	114 51.8%	12 5.5%	33 15.0%	2.92	0.964		
Persistence violation of others' right	10 4.5%	13 5.9%	64 29.1%	133 60.5%	1.58	0.864		
Disruptive behaviour in class	61 27.7%	114 51.8%	12 5.5%	33 15.0%	2.92	0.964		
Noise disturbances	2 0.9%	11 5.0%	46 20.9%	161 73.2%	1.37	0.707		
<b>N = 220: Weighted Mean = 2.35</b>								

Descriptive statistics from the survey on the most common anti-social Behaviours on Social Media Platforms among Students in Tertiary Institutions. The implication of the information on the table revealed that the respondents submitted that the following antisocial behaviours on social media are prevalent among

students of tertiary institutions: violence, bullying, harassment, spread of misinformation, academic dishonesty, impersonation, sexual misconduct, deception, substance abuse, impulsivity, lack of empathy, disregards for rules and norms and disruptive behaviour in class.

RQ 2: What are the contributory factors to the development of antisocial behaviour in the context of social media use among students in tertiary institutions?

**Table 2: Contributory Factors to Antisocial Behaviour on Social Media**

Items	SA	A	D	SD	Mean	Std. Dev
Anonymity on social media	44 20.0%	97 44.1%	29 13.2%	50 22.7%	2.61	0.847
Influence of peers and social circles	59 26.8%	134 60.9%	7 3.2%	20 9.1%	3.05	0.815
Exposure to online hate speech or aggression	47 21.4%	138 62.7%	8 3.6%	27 12.3%	2.93	0.860
Unrealistic expectations and pressures on social media	57 25.9%	125 56.8%	5 2.3%	33 15.0%	2.94	0.939
Lack of awareness about the consequences of antisocial behaviour	52 23.6%	116 52.7%	11 5.0%	41 18.6%	2.81	0.707
Lack of strict regulation on social media platforms	49 22.3%	110 50.0%	16 7.3%	45 20.5%	2.74	0.705
Inadequate parental or guardian supervision	69 31.4%	112 50.9%	4 1.8%	35 15.9%	2.98	0.986
Type of family background	61 27.7%	114 51.8%	12 5.5%	33 15.0%	2.92	0.964
Individual characteristics	51 23.2%	127 57.7%	7 3.2%	35 15.9%	2.88	0.943
Stressful academic endeavour	30 13.6%	91 41.4%	20 9.1%	79 35.9%	2.33	0.781
<b>N = 220; Weighted Mean = 2.82</b>						

Descriptive statistics on the survey on Contributory Factors to Antisocial Behaviour on Social Media ?????? The weighted mean of the table is given as 2.82, which implies that contributory factors to the development of antisocial behaviour in the context of social media use among students in tertiary institutions are high.

RQ 3: What are the average hours students spend on social media per day?

**Table 3: Students' Average Hour Spent on Social Media Per Day**

Items	Less than 1 Hour	1 – 5 Hours	6 – 10 Hours	11 – 15 Hours	Above 16 Hours	Mean	Std. Dev
Facebook	176 80.0%	36 16.4%	6 2.7%	2 0.9%	– 0.0%	1.25	0.544
Twitter	131 59.5%	64 29.1%	13 5.9%	10 4.5%	2 0.9%	1.58	0.864
Instagram	92 41.8%	74 33.6%	42 19.1%	6 2.7%	6 2.7%	1.91	0.980
WhatsApp	16 7.3%	80 36.4%	57 25.9%	33 15.0%	34 15.5%	2.95	0.763
Snapchat	164 74.5%	34 15.5%	16 7.3%	4 1.8%	2 0.9%	1.39	0.777
Tiktok	147 66.8%	36 16.4%	21 9.5%	10 4.5%	6 2.7%	1.60	0.740
YouTube	70 31.8%	103 46.8%	33 15.0%	7 3.2%	7 3.2%	1.99	0.941
LinkedIn	159 72.3%	46 20.9%	11 5.0%	2 0.9%	2 0.9%	1.37	0.707
<b>N = 220; Weighted Mean = 1.76</b>							



Descriptive statistics from the survey on the average hour spent on social media by Students in Tertiary Institutions. This shows that students spend more time using WhatsApp than any other social media platform. This is followed by YouTube, Instagram, TikTok, Twitter, Snapchat, LinkedIn and then Facebook.

### Hypotheses Testing

H<sub>01</sub>: There is no significant relationship between the use of social media and antisocial behaviour among students in tertiary institutions.

**Table 4: Relationship between the Use of Social Media and Antisocial Behaviour among Students in Tertiary Institutions**

Variable	Mean	Std. Dev.	N	R	P Value	Remark
Use of Social Media	16.44	4.48	220	0.482	0.004	Sig.
Antisocial Behaviour	22.29	5.49				

*Significant at 0.05*

The result of hypothesis 1 on the relationship between the use of social media and antisocial behaviour among students in tertiary institutions is presented in table 4. The result revealed a significant relationship between the two variables i.e. use of social media and antisocial behaviour ( $r = 0.482$ ;  $P < 0.05$ ), the hypothesis is therefore rejected at 0.05 level of significance. This implies the use of social media has a relationship with antisocial behaviour among students in tertiary institutions in Oyo State. The mean value of use of social media was given as 16.44, and the mean of antisocial behaviour was 22.29 while the standard deviation values of the two variables are 4.48 and 5.49 respectively.

H<sub>02</sub>: There is no significant difference between male and female students in their use of social media platforms to facilitate online harassment in tertiary institutions.

**Table 5: T-Test Difference between Male and Female Students in Social Media Usage**

Variable	N	Mean	SD	t	df	P	Rmk
Male	74	2.61	1.108	0.572	218	0.321	Not Sig
Female	146	2.62	1.019				

Table 5 presents the analysis of hypothesis 2 testing the difference between male and female students in their use of social media platforms to facilitate online harassment in tertiary institutions. The table shows that there is no significant difference between male and female students in social media usage to facilitate online harassment in tertiary institutions ( $t = 0.572$ ;  $df = 218$ ;  $P > 0.05$ ). Therefore, the hypothesis is accepted at a 0.05 level of significance. The implication of this is that the use of social media platforms to facilitate online harassment in tertiary institutions is not determined by gender.

### Discussion

This study explored the relationship between social media use and antisocial behavior among tertiary institution students. It investigated the influencing Factors. The student revealed that the most prevalent antisocial behaviours on social media among students of tertiary institutions are violence, sexual misconduct, the spread of misinformation, and substance abuse, followed by deception, academic dishonesty, harassment, disregard for rules and norms, disruptive behaviour in class, bullying, impulsivity, lack of empathy, and impersonation. Furthermore, the major contributory factors to the development of antisocial behaviour as researched by this work include: the influence of peers and social circles, inadequate parental or guardian supervision, unrealistic expressions and pressures on social media, exposure to online hate speech or aggression, type of family background, individual characteristics. This is in agreement with the findings of Li et al., (2018) which states that students may be influenced by their peers' attitudes and behaviours, leading to the adoption of aggressive or antisocial behaviours. It also agrees with Kircaburun et al. (2019) who believe that individual characteristics, such as low self-esteem, impulsivity, and a tendency towards aggression can lead to the development of antisocial behaviour in the context of social media use.

This research also discovered that the majority of students in tertiary institutions spend at least 1 to 5 hours daily on WhatsApp, Instagram and YouTube. This agrees with the findings of Ravid et al., (2020) and Pew Research Center (2021). This study also reveals, in agreement with Lee and Kim (2021), that there is a significant relationship between the use of social media and antisocial behaviour among students in tertiary institutions.

Lastly, the results of this study show that there is no discernible difference in how male and female students use social media platforms to enable online harassment in higher education. Dredge et al. (2019) also states that antisocial behaviours, like cyberbullying among college students were equally reported. This opposes the findings of O'Donnell, Stueve, and Wilson (2019) who state that male college students are more likely to report in forms of antisocial behaviours online.

## **Conclusion**

This research has delved into the intricate relationship between social media usage and antisocial behaviour among students in tertiary institutions. The findings presented in this study shed light on the significant impact that social media has on the behaviours and interactions of students. One of the key observations of this research is the prevalence of antisocial behaviour among students attributed to excessive social media use. The increased screen time and constant exposure to online platforms have been linked to various antisocial tendencies, including violence, sexual harassment, substance abuse, and aggression. Such behaviours not only affect the individuals directly involved but also have broader implications for the campus community's overall well-being and academic environment. In conclusion, understanding the impact of social media on antisocial behaviour among students in tertiary institutions is crucial for educators, policymakers, and parents alike. By acknowledging the potential risks and benefits of social media, we can create a balanced approach to help students harness its advantages while mitigating the negative consequences, ultimately fostering a healthier and more conducive learning environment.

According to the Media Effects Theory, the extended exposure to media content plays a pivotal role in shaping individuals' beliefs, attitudes, and behaviour. Additionally, this theory posits that individuals develop their beliefs through the observation of models presented in both media and society. The outcomes of this study provide empirical evidence supporting the aforementioned theory, demonstrating that prolonged engagement with social media platforms fosters antisocial behaviour among students enrolled in tertiary institutions.

## **Acknowledgments**

Special appreciation goes to the undergraduate students of the University and the Polytechnic of Ibadan who participated as respondents in the research for their honesty in giving the true picture of events in their domain. The research assistants are also appreciated for their diligence and tenacity in the study. Our regards also goes to our colleagues researchers for their constructive criticism of the study.

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## Relationship Between Corporate Social Responsibility (CSR) and Enterprise Performance: Evidences from Kwara State

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### Abstract

Corporate Social Responsibility (CSR) implementation is not supported by the profit maximization objectives of most businesses because it frequently involves substantial expenditures with little to no direct revenue generation. There is no consensus among scholars on the relationship between CSR and enterprise performance. This study, therefore, adds to the body of knowledge by distributing 450 structured questionnaires to elicit information on the connection between CSR and enterprise success. The relationship between CSR and business performance was evaluated using Spearman correlation analysis, while the hypotheses were tested using the Kruskal-Wallis-H-test. The confirmatory tests revealed that the gathered data had no reliability or validity issues. The study found a positive correlation between CSR and enterprise performance using profitability ratios (ROTA, ROE) and liquidity (current ratio) metrics. However, ROS and efficiency ratio (inventory turnover) indicated a negative relationship between CSR and performance. Therefore, the results revealed that businesses can combine doing well with doing good. Hence, enterprises are advised to align their CSR initiatives with their business plans. Similarly, time-series data might be used to extend the frontiers of research on the association between CSR and business performance. Additionally, the study area could be expanded to include more geopolitical areas of Nigeria. Six keywords were used in the study.

**Keywords:** Corporate Social Responsibility (CSR), Profit-Maximization.

### Background of the Study

The primary aim of most enterprises is profit maximization (Marin & Jarrel 2010; cited by Solanke et al. 2022; Oluoyemi & Banjo (2019) and Okolie & Igbini (2020). Hence, enterprises often attempt to increase revenue generation while also reducing costs, or at the very least, keep costs constant if revenue cannot increase significantly. In other words, enterprises often incur costs that cannot generate an appropriate increase in revenue. Therefore, the more profit an enterprise makes, the better or better it is. However, in the process of operations, enterprises come into contact with other stakeholders such as customers, employees, the community, society, suppliers, and the government, whose interests are capable of increasing the cost burden of the enterprise without an appreciable increase in revenue generation. In other words, the interests of non-shareholder stakeholders are mostly referred to as corporate Social Responsibility (CSR) or corporate Social Performance (CSP). Indeed, CSR most often refers to enterprises' efforts that go beyond what may be required by regulators or environmental protection groups. CSR is not tokenism (giving as a public relations stance), philanthropy (Charitable organizations to cause related marketing or fund-raising), or compliance (doing what is expected). Therefore, the more CSR activities an enterprise has, the more non-shareholder stakeholders will perceive them as good.

CSR is an additional burden for the enterprise. However, it is also a way of addressing the effects of the enterprises on society. No doubt, enterprises have limited CSR carrying capacity. Attempts to go beyond capacity will render the enterprise ineffective and inefficient. However, CSR has the capacity to enhance enterprise effectiveness, and productivity. Similarly, inappropriate CSR would not be effective for the enterprise or the society or community. In other words, the lower the capacity or inappropriateness of CSR, the lower its ability to enhance enterprises' effectiveness and productivity. Consequent on the above, the CSR undertaken by an enterprise must not be overwhelming. Hence, CSR must be reasonable for it to achieve the desired objectives. Therefore, striving to achieve the primary goal(s) of the enterprise should be the main focus of the enterprise. Hence, CSR should be considered and treated as a secondary responsibility. CSR, most often enhances the corporate image of the enterprise. Perhaps it should be stated that enterprises are not only concerned about profitability and growth but also paying attention to concerns of non-shareholder-stakeholders (employees, suppliers, communities, civil society etc.)

CSR is often viewed and recorded as an expense in the financial books, and there is no immediate revenue associated with the expenditure of CSR funds. However, CSR is usually embarked upon with the motive that it will generate returns not necessarily in the immediate but in the long run directly or indirectly, by creating an appropriate enabling-environment for the enterprise.

It is often observed that the establishment of business enterprises often comes with some accompanying undesirable effects, such as environmental degradation (pollution of water, air, land, forests, and other natural resources), which significantly contributes to the reduction of human, animal, and plant life. Examples of environmental pollution include, oil spillage in the Nigerian oil producing region, with the attendant destruction of aquatic and terrestrial creatures. These most often lead to youth agitations and restiveness, as could be observed in the Niger Delta of Nigeria. It also leads to undue pressures on government facilities such as roads, power, and water supplies, as well as security challenges and other vices such as kidnapping, robbery, prostitution, social unrest, etc. Sometimes it leads to the preponderance of some diseases. The above-mentioned degradation and vices, result in low productivity of man, land, and water, as well as poor general well-being of the people and society. To ensure that the enterprise does not pose any significant threat to the effective functioning of society and the ecosystem, governments, communities, and other stakeholders often request that enterprises mitigate these effects. It is this mitigation that is often referred to as corporate social responsibility (CSR). There is currently a rising pressure on enterprises to behave sociably by mitigating the effects of environmental degradation. Hence, enterprises are often called upon to give some relief to the community, government, employees, customers, service providers (suppliers), or any combination of the groups. Current attempts are to make enterprises look beyond profitability to commitment to sustaining the environment and indeed society. CSR is an essential activity to maintain the ecosystem for sustainable development and a conducive environment for all stakeholders, including customers, employees, the community, and indeed society at large. CSR is largely voluntary; however, in some cases, it is not a voluntary activity but mandated by supervisory agencies or the government. In addition, CSR has capacity to assist in customer and employee satisfaction and therefore engender favorable attitude from the society as a whole (Kaylar, et al 2013 and Kim 2020).

CSR has occupied the central stage of discussion among academics, economists, sociologists, governments, non-governmental organizations, and development partners because it represents a serious challenge confronting enterprise. Karagiorgo & Diavastis (2019) and Blindheim & Langhelle (2010) identified three CSP models as principles of corporate social responsibility, processes, and outcomes of corporate behavior. Tiep Le Thanh et al. (2021) measure the variables of CSR through the beneficiaries of the project or service. Therefore, the study identified six variables, community, employees, customers, environment or ecosystem, government, and stakeholders. The intermediate variables between CSR and corporate performance are corporate reputation and customer purchasing intention. However, firm performance is measured by financial and non-financial metrics, which include revenue growth, market share, return on equity, employee cohesion index, and improved competitive position in the market.

In addition, Basuony et al. (2014 and Waddock & Graves (1997) identified the following as organizational performance variables: Return on Assets (ROA), Return on Sales (ROS), Return on Equity (RoE), and sales growth. On the other hand, Basuony et al. (2014) and Brik et al. (2011) recognized the following variables for measurement: firm size, number of employees, and age, which is determined by either old or new.

Most CSR activities involve heavy capital outlays. This, no doubt, will erode the profit and liquidity of the enterprise. Studies adopted different analytical techniques and surrogates to measure the different variables. The results of studies on the relationship between CSR and corporate performance are not consistent. Apart from the inconsistencies in the research reports on CSR, most of the researches are from developed countries (Tilt, 2016 and Lee & Yang 2022). In addition, not many of such studies have been conducted in Kwara State or indeed Nigeria. This study will assist us in gaining a deeper understanding of the relationship between CSR and corporate performance in Kwara State in particular and in Nigeria as a whole.

Studies from several countries, including Uwuigbe and Egbide (2012), as well as Marin & Jarel (Nigeria), Malik and Kanwal (2016) (Pakistan), Ratmono et al. 2021 (Indonesia), and Saleh et al. (2008) in Kuala Lumpur, observed a positive relationship between CSR on the one hand and return on assets (ROA) as well as return on equity (ROE) on the other. In the same vein, studies on different industries such as supermarkets (Moore and Robision 2002), the banking industry (Simpson and Kohers 2002), Pharmaceutical companies (Malik and Kanwal 2016), hospital industries (Kang et al. 2010), and quoted companies (Saleh et al. 2008) also reported a positive relationship between companies' CSR and their performances.

Some authors, such as Simpson et al. (2002, and Preston & Bannon 1997 reported a negative relationship between CSR and companies' performances. This observation can be explained by the fact that companies use their funds mainly for-profit maximization. Inductively, the profit maximization objectives of the companies are adversely affected by their CSR activities. Companies with limited resources are more likely to face their traditional competitive advantage than CSR.

Most of the studies on the issue of the relationship between enterprise performance and CSR used different types of correlation analysis to determine the relative direction of movement of the independent and dependent variables. A major issue with the statistical techniques adopted is that they are not the most suited to the data collected. In most cases, non-parametric data were collected, and the techniques adopted are most suitable for parametric data.

Empirical results on the relationship between CSR and profitability are not consistent. Studies such as Belkaoui and Karpik (1989) suggest positive relationships, while Brammer and Pavelin (2008) show a negative relationship. Management knowledge or understanding of CSR is often responsible for the positive relationship between CSR and profitability.

Fernandez-Sauche & Sotorrio (2007) observed that the relationship between CSR and enterprise performance may be influenced by the choice of econometric models, variables, types of functions, methods of data collection, and analytical techniques. For instance, Soana (2009) observed that 55% of studies reviewed applied content analysis. These studies reported that CSR and enterprise performance have a positive relationship. On the other hand, 40% of studies that used questionnaires reported positive relationships. In the same vein, 84.8% of studies adopting unidimensional indicators and 75% of those applying multidimensional indicators reported positive relationships. Similarly, 76% of studies that adopted reputational measures found a positive relationship.

The literature showed an inconsistent relationship between CSR and financial performance. However, a significant number of studies indicate a positive relationship between CSR and financial performance. For instance, Margolis & Walsh (2001) observed that 108 (85.8%) of 127 studies treated corporate performance as an independent variable, while 18 (14%) treated it as a dependent variable. Nellning & Webb (2009), who used ROA and Stock returns as dependent variables, found a positive and significant relationship. The positive relationship between CSR and enterprise performance is explained by the value addition that CSR has for enterprises. In addition, CSR costs are often counterbalanced by reductions in other costs (Bird et



al. 2007). On the other hand, the negative relationship is explained by the fact that enterprises use resources meant for profit maximization for CSR. Similarly, costs incurred on CSR constitute financial disadvantages for enterprises. On the other hand, firms that are excessively generous may not record positive relationships (Bird et al. 2007), Sorroca et al. (2010), Prado-Lorenzo & Gallego-Alvarez (2008), explained the negative relationship between CSR and enterprise performance with a neoclassical economic model (CSR affects performance negatively because of costs). In the same vein, the moral philosophy model believes that CSR is a moral rather than economic issue. Hence, it aims at social welfare and not profit maximization. Therefore, CSR is implemented to gain stakeholders satisfaction, through which financial advantages could be gained. The neutral relationship, on the other hand, explains how stakeholders and customers perceived CSR as a pure marketing strategy (Jahmyath & Elbanna 2022).

One area of inconsistency among researchers is the use of CSR as independent or dependent variable. Another source of difference in results from research on CSR and enterprise performance is the econometric model adopted (linear or non-linear model). Similarly, the measures or surrogates of CSR and performance adopted influence the results of the research. The type of data collected also has an influence on the results of the studies. For instance, primary data collected with questionnaires will produce different results from the data collected from documents (Singh & Mistra 2021 and Rettab et al 2008).

Following from above, this study examines the relationship between CSR and Enterprise performance with a view to gaining a deeper knowledge and understanding of the relationship between CSR and performance in enterprises. The research question that can be derived from this study is Can doing well be match-merged in the Nigerian business environment?

## **Literature Review**

Enterprise objectives include, among others, profit maximization, which is highly related to cost minimization, wealth maximization, welfare maximization, etc. In spite of the enterprise objective, there are pressures on enterprises from the government, community, employees, and customers, to commit their resources to CSR, which are sometimes avoidable. No doubt this has the effect of reducing the enterprise's objectives of profit maximization. There are several studies on the relationships between CSR and enterprise performance. The results of these studies are inconsistent. These studies used different surrogate items to measure the various variables of CSR and enterprise performance. In the same vein, different analytical techniques, including various types of correlation and regression analysis, were used. This study attempts to adopt robust techniques to measure the association or relationship that exists between CSR and enterprise performance in Kwara State.

## **Performance Measurement**

Enterprise performance measures are classified into; accounting/financial and non-financial-based measures. The non-financial measures include; customer growth and loyalty, employee/workforce cohesion, and market share indices. However, accounting, or financial basis, is more prominently used by researchers and scientists due to its simplicity, ease of measurement, and availability of reliable data. Accounting and financial-based variables are further classified into liquidity, activity, and profitability metrics. This study measured performance with the following financial indices; Liquidity (current ratio), profitability indices (ROTA, ROE, and ROS), as well as an activity index (inventory turnover).

Liquidity measures the extent to which current assets can offset currently maturing obligations or liabilities. The indexes are the current asset ratio and the quick ratio. Liquidity is computed by dividing current assets with current liabilities. This ratio determines the ability of the enterprise to meet its current obligations. Indeed, it measures the level of liquidity of the enterprise. Current ratio is adopted because of the ease at which the required data could be collected and computed, coupled with its accuracy in measuring the liquidity of enterprises.

Activity/asset utilization measures how effectively an enterprise utilizes resources such as inventory, receivables, cash, fixed assets, total assets, and current assets at its disposal. Activity indexes include inventory turnover, account receivable turnover, average receivable collection period, fixed asset turnover,

and current asset turnover. Inventory turnover, which measures the number of times the inventory is turned over or repeated, was chosen for this study because of its ability to measure more accurately the utilization of enterprise assets.

Profitability refers to a company's capacity to produce short- and long-term profits on a sustainable basis. It therefore, measures the financial health of an enterprise and how well it has been managed with a view to earning a satisfactory profit. Profitability indices include gross profit margin, returns on sales (ROS), return on total assets or investment (ROTA or ROI),

**Return on Total Assets (ROTA)** is computed by dividing the earnings before interest and tax (EBIT) by the average total Assets. This ratio measures the amount of profit made by every Naira put into the assets of the company. ROTA is widely used as an accounting measure of enterprise performance in the literature, including Lee et al. (2009) and Hull & Rothenberg (2008), and Aras et al. (2010 because it considers the total resources that are available to enterprises.

Return on equity (ROE) or **Return on Investment (ROI)** is computed by dividing EBIT with total investment. This ratio measures the profit made on every Naira invested in the enterprise. **Return on Equity (ROE)** is computed by dividing EBIT by average total equity. This ratio measures the profit made on every Naira that is put on equity.

On the other hand, **Return on Sales (ROS)** is computed by dividing EBIT by average total Sales. This ratio measures the amount of profit made on every Naira sale. ROS as an accounting measure of enterprise performance is commonly used in the literature, such as Lee et al. (2009 and Aras et al. (2010 to measure the level of gain on every naira sold in the enterprise.

**Returns on capital employed (ROCE)** are computed by dividing EBIT with either total assets minus total current liabilities or shareholders equity plus long-term liabilities. This ratio measures the profit that is made on every Naira in the capital employed. times the interest earned and dividend per share. Out of these indices, ROTA is applied in this study because of the ease and accuracy with which it measures the financial health of an enterprise.

#### **Financial Ratios often Used in Researches**

Most Studies on the relationship between CSR and performance adopted ROTA, ROE, and ROS to measure the financial performance of enterprises. For instance, Neving & Webb (2009) and Elsayed & Paton (2005) adopted only ROTA for their studies. On the other hand, Kang et al. (1997) and Waddock & Graves (1997) used ROTA and ROE. Callan & Thomas (2009) used ROTA, ROE, and ROS.

#### **Review of Empirical Studies**

Sumanaviciene et al. (2017) identify four levels of CSR. This includes economic and legal responsibilities that are required for the enterprise to survive and fulfill its mission. They also identified ethical responsibilities, which are expectations by society from the enterprise. The final level is philanthropic responsibilities, which are desired levels of behaviors and actions by the enterprise.

Economic responsibility refers to creating an enabling environment for profitability. This includes employee job satisfaction, customer orientation, and enterprise control systems, which form the basis of CSR in any enterprise to improve economic performance. Tran Duc Tai (2022) and Pino et al. (2016) identified profit maximization, cost control, and improved economic performance as variables for economic responsibility. Basuony et al. (2014) recognized the following as variables: economic responsibility, quality products, customers' satisfaction, profit maximization, cost minimization, and employees' productivity.

Legal responsibility implies obedience to the law. Specifically, it includes industrial protection and safety standards, including working hours, payment of employee terminal benefits, taxes, and regular compensations. It involves the maintenance of minimum product standards. Economic and legal responsibilities assist in gaining employee and customer trust. Tran Duc Tai (2022) and Pino et al. (2016) identified employee acts and standards, meeting contractual obligations, and the regulatory system as

variables for legal responsibilities. Similarly, Basuony et al. (2014) recognized the following as variables for legal responsibility: compliance with environmental laws, meeting code of conduct standards, meeting contractual obligations, compliance with labor laws, and compliance with the code of conduct.

Ethical responsibility refers to commitment to ethical approaches in all activities of the enterprise. It involves making the community and indeed society better off, or at least not worse off. Hence, it places ethical principles over economic performance. It avoids compromising ethical standards to achieve corporate goals. Tran Duc Tai (2020) and Pino et al. (2016) identified ethical concerns as ethical principles over economic performance, commitment to ethical principles, or non-compromising of ethical standards to achieve corporate goals. Basuony et al. (2014) recognized the following as variables: ethical responsibility, community and consumers' trust in the enterprise, provision of detailed and accurate information to customers, payment of a remunerative salary, support education, and on-the-job-training.

Philanthropic responsibility, which Maingnan and Ferrell (2000) described as discretionary, implies being a good corporate citizen. This involves engaging in non-statutory activities to engender sustainable economic development as well as improve the quality of life for stakeholders, including employees, customers, communities, and society at large. These activities involve the allocation of economic resources to solve social problems, the management of public affairs, and indeed, playing roles that go beyond profit-making. Tran Duc Tai 2022 and Pino et al (2016). identified management of public affairs, allocation of enterprise funds to philanthropic activities, and roles beyond the generation of profit. In the same vein, Busuony et al (2014) recognized the following as variables for philanthropic responsibility, direct involvement in community projects, generous product warranties, championing environmental and social change, as well as sponsoring people for certificates and post experience training.

On the other hand, Basuony et al. (2014 and Waddock & Graves (1997) identified the following as organization performance variables, Return on Assets (ROA), Return on Sales (ROS), Return on Equity (RoE), and sales growth.

Carroll (2006) and Tran Doc Tai (2022) identified a pyramidal relationship among the four components of CSR, namely economic, legal, ethical, and philanthropic responsibilities. The economic responsibilities represent the base, the largest, and the primary component. This is followed by legal and, subsequently, ethical responsibilities in sequence. The philanthropic and discretionary responsibilities form the apex, the pinnacle, and the smallest of the components of CSR.

There are inconsistent research reports on the relationship between CSR and enterprise performance. For instance, Margolis & Walsh 2001 observed that about 50% of the 109 studies that they reviewed reported positive relationships, while only 6.4% reported negative relationships, and the rest reported mixed relationships (i.e., partially positive or negative as well as neutral). However, Hull & Rothenberg (2008), and Rettab et al. (2009 found positive relationships in their studies.

As stated above, most studies reveal a positive relationship between CSR and enterprise performance. On the other hand, financial performance is found to precede, CSR. Scholtens (2008) observed that an increase in financial performance often led to improved CSR. Subsequently, improved CSR leads to better financial performance. Conversely, the neoclassical economic model showed that CSR has a negative impact on financial performance because of costs (Surroca et al. 2010). This shows that the market does not recognize the effects of CSR on performance. Another school of thought believed that CSR had neutral effects on performance because it was a welfare package. Also, there is a school that believes that CSR increases stakeholders' satisfaction.

Cummings & Patel 2009, Nelling & Webb 2009, and Waddock & Graves 1997 Bird, Mommente, and Reggian (2007) reported a significant relationship between CSR and performance. However, Makni et al. (2008), and Vance (1975) reported a negative relationship. Griffin & Mahon's 1997 study of enterprises between 1972 and 1997 reported that the majority of the studies reported positive relationships, while the

rest reported negative relationships. Margolis and Walsh (2003) reported that 25.6% of the studies reviewed had a non-significant relationship.

Balabans et al. 1998 observed that firms with relative previous financial performance easily carry out CSR activities. Schottens (2008) opined that financial performance precedes CSR activities, except in product responsibility. Waddock & Graves (1997) observed that better performance results in improved CSR, which in turn leads to better financial performance. Firms with high CSR activities are usually rewarded in the market, while the market evaluate enterprises with low CSR activities.

### **Theoretical Framework**

The relationship between CSR and enterprise performance could be analyzed, explained, and interpreted in terms of two theories, namely the neoclassical economic theory and the moral development theory.

The Neoclassical economic theory was first introduced by Robert Solow and Trevor Swan in 1956, as reported by Cherry & Susman (2022) through their neoclassical growth theory. It was a formidable school of thought in the 19<sup>th</sup> century. It identified demand and supply forces as a major fulcrum on which production, pricing, consumption of goods and services rotate. The theory rests majorly on production, pricing, consumption of goods and services rotate. The theory rests majorly on human (consumers and producers) rationality, which is often referred to as the price mechanism. Principles often utilized by this school of thought are profit and utility maximization, cost minimization, and market equilibrium. In the process of determining the relationship between CSR and enterprise performance, the profit maximization principle is the most relevant. This is because the goal of private enterprises is profit maximization (i.e., the ability to make maximum profit). In other words, enterprises aim at cost reduction, revenue maximization, or either of the two. CSR constitutes a major cost outlay that does not directly generate corresponding revenue for most enterprises. Profit maximization assists in guaranteeing corporate economic existence, a measure of corporate performance, and the economic and social wellbeing of both the enterprise and the employees. Maximization of revenue can be represented by linear equations as follows.

$$T_R = P.Q$$

Where:  $T_R$  = Total Revenue,  $P$  = Selling Price per unit,  $Q$  = Quantity Sold,  $dT_R/dQ = M_R$  = Marginal Revenue  
Minimization of cost can be represented in a linear equation below.

$$T_C = C.Q$$

Where  $T_C$  = Total Cost,  $C$  = Cost price per unit and  $Q$  = Quantity produced,  $dT_C/dQ = M_C$  = Marginal cost  
Profit =  $M_R - M_C = 0$  and Maximum profit =  $M_R - M_C = 0$ .

From the above, enterprises are most likely going to be reluctant to embark on CSR activities because they reduce their ability to make profit. On the other hand, CSR activities often lead to better enterprise performance via improved reputation and image (Waddock and Graves 1997). This is because the profit maximization objectives of an enterprise are achieved through increasing sales revenue and cost reduction. Increasing sales revenue involves the adoption of efficient and effective marketing strategies. This includes, product quality improvement, diversification strategies, improving existing customer retention, and increasing new customers. Another way to increase sales revenue is through the adoption of better pricing strategies. In addition, sales revenue could increase through proper motivation of employees and good performance appraisals, which have the effect of increasing employees' productivity.

Awareness creation and education of existing and potential customers through advertisement and publicity can also go a long way toward boosting sales revenue. Therefore, CSR that enhances advertisement and publicity will no doubt assist in boosting sales revenue through improved image laundering and motivations for the stakeholders.

The cost reduction dimension of an enterprise is achieved by proper analysis of expenditures in different segments and sectors with a view to negotiating for cheaper prices or buying in large quantities. In addition, cost reduction objectives are often achieved through the reduction of waste through the application of high-

level technologies in the management of enterprise resources (man, material, and money). Sometimes cost reductions are achieved by outsourcing some services to more efficient individuals or enterprises.

In spite of the aforementioned discussion on profit maximization in enterprises, it is often criticized because of the vagueness of the concept of profit. In other words, Profit refers to many things, including, earnings per share (EPS), gross profit, net profit, or different enterprise performance ratios. The profit maximization principle also does not consider the time value of money. This made the concept of profitability inadequate in practical applications. In addition, the concept does not include elements of risk factors and product quality in its analysis. No doubt, non-consideration of risk and product quality greatly reduces the value of the profit maximization concept. In spite of the inadequacies of profit maximization theory, it is still mostly applied in private sector enterprises.

On the other hand, the theory of moral development assists in explaining why enterprises embark on CSR in spite of its ability to increase costs without a corresponding increase in revenue. An American psychologist, Lawrence Kohlberg, elongated Piage's theory of moral development into three levels (preconventional, conventional, and postconventional). The three levels are subdivided into six stages. The theory looks at children's morality (right and wrong) and moral reasoning that seeks to maintain social justice in society. Each of the levels of moral development is subdivided into two. For instance, level one (preconventional morality) is subdivided into obedience and punishment as well as individualism and exchange. On the other hand, level two (conventional morality) is divided into developing good interpersonal relationships and maintaining social order. Level three (post conventional morality) is subdivided into social contracts, individual rights, and universal principles (Ma 2013).

From the above, stages three and four, which make up level 2, are the most applicable to CSR. Stage three (developing good human relations) is often referred to as good boys and good girls' orientation, which is essentially living up to the expectations of society. Stage four—maintaining social order considers society as a whole, including respecting law and order as well as authority.

The relevance of levels one and three to CSR is seriously in doubt because it is often believed that only between 10-15 percent of people that can get to level three (post conventional morality). On the other hand, level one pre-conventional morality refers to an informal state of life. Based on their analysis of moral development, authors such as Hardin (1977) arranged human relationships in hierarchical order in terms of altruistic acts as follows:

$R_1$ = First kin or close relatives;  $R_2$ = Best friends or intimates;  $R_3$ = Strangers who are very weak, including blind people or young children;  $R_4$ = common strangers; and  $R_5$ = someone you dislike or enemies.

For instance, sociobiologists Ma (1993) and Hardin (1977) opined that there is a direct relationship between genetic relationships, or coefficients of relationships, and altruistic acts. In other words, altruistic acts depend on the level of relatedness or identical genes in two actors, which shows the level of relatedness. For instance, the gene between a person and their parents, children, and siblings is half ( $\frac{1}{2}$ ) while that between people's grandparents, uncles, aunts, nephews, nieces, and first cousins is one quarter ( $\frac{1}{4}$ ). Generally, the larger the coefficient of relationship, the more altruistic acts will likely exist. People would ordinarily place importance on the categories of human relationships in the order of  $R_1$  to  $R_5$ . In other words, the probability of altruism for a person reduces from  $R_1$  to  $R_5$  and vice versa. Hence, altruistic acts towards another person can be represented by  $R_i > R_j$ .

Another categorization of human relations other than sociobiological arrangements is that of people who are not biologically related but who develop affection and love for each other. Such relationships encourage people to develop altruistic acts towards one another. However, such acts will be reduced in the following order; spouse, lover, best friends, acquaintances, strangers, and enemies. Ma (1993) observed that the altruistic acts of anybody at any level of moral judgment are greater in a closer relationship than a distant relationship. In the same vein, a person at a higher level of moral judgment will likely make higher sacrifices than a person at a lower level of moral judgment. A person at a higher level of moral judgment will likely

give up rescuing a stranger for rescuing a relative or best friend, or help a close relative by covering their crime, than a person at a lower level of moral judgment.

In addition, studies in both London and Hong Kong, Ma (1985) confirmed the importance of cross-cultural differences in human relationship. A correlation between altruistic acts and human relationships can be represented as follows:

$$R_{(ij)} = R_i R_j = R_{(ij)} = (R_i, R_j)$$

Therefore, if  $R_{(ij)} < R_{(ik)}$

$$R_{(ik)} > R_{(ij)}$$

Hence,  $R_{ij}$  increases toward the diagonal of the correlation matrix, or  $R_{ij}$  decreases away from the diagonal of the correlation matrix.

The theory has been seriously criticized. For instance, the theory is said to have equated moral reasoning to moral behaviors. Similarly, it overemphasizes justice. In addition, there is cultural, age, and gender bias. In spite of the criticism, the theory still assists in explaining or interpreting moral behavior in society to a large extent. This study relies on neo-economic/profit maximization theory and moral development theory in analyzing enterprise performance and CSR, respectively.

Perhaps at this juncture, it must be mentioned that moral development theory refers to human-beings. However, it has applications to enterprises behaviors because enterprises are operated by humans. In addition, the law gives enterprises status akin to that of human beings.

### **Proposed Hypotheses**

CSR has no positive association with enterprise ROTA

CSR has no positive association with ROE.

CSR has no positive association with Inventory Turnover

CSR has no positive association with liquidity

CSR has no positive association with ROS.

### **Methodology**

#### **Research Design and sampling frame**

The study adopts a cross-sectional survey method to collect data from respondents in order to gain a new understanding of the relationship between CSR and enterprise performance. The organizations sampled include micro, small, medium, and large-scale enterprises.

#### **Area of study**

**Kwara State is one of the five states in the North Central geopolitical zones of Nigeria. The state is one of the first set of states created in 1967.** SMEDAN & NBC's (2017) survey of enterprises in Nigeria indicates that there are 802,418 micro enterprises, 1398 small enterprises, and 18 medium enterprises, in Kwara State. The state is also rated as the best legal status compliant state in Nigeria.

#### **Sampling Techniques and Sample Size**

To ensure that the data is representative of the population, a multi-staged sampling technique is adopted due to the heterogeneity of the data. Respondents were chosen from micro, small, medium, and large enterprises in ten out of the sixteen Local Government Areas (LGAs) of Kwara State. The LGAs selected were five urban and five rural. However, the selected organizations were randomly selected in each of the LGAs. Four hundred and fifty (450) questionnaires were distributed when the Taro Yamane model prescribed a four hundred (400) sample size as adequate. However, only four hundred and thirty-three were correctly filled out and returned. (Saunders et al 2007) The data used for CSR lags one year behind that of enterprise performance data. This is because the literature suggests that it will take at least one year before the effects of CSR can be felt on performance (Lee et al 2009). Therefore, the data for CSR is 2021, while that for performance is 2022. Structured questionnaires were used to elicit information on biodata and the different issues of CSR and enterprise performance. Information elicited includes; issues relating to different types of CSR (economic, legal, ethical, and philanthropic) as well as enterprise performance

measures such as profitability, liquidity, and efficiency. Furthermore, questionnaires on CSR and enterprise performance were structured in a five-point Likert scale format, with the least being one (1) and the highest being five (5) (Hair et al 2015 and Blumberg et al 2008).

### **Validity and reliability of the data**

The questionnaires and interview checklist were pretested in micro, small, medium, and large- scale enterprises in Ilorin-West (urban LGA) and Baruten (rural LGA) of the State. In all fifty organizations were pretested. Other experts were involved in the review and updating the questionnaires and the interview checklist to ensure that they were capable and adequate in collecting a realistic information that is required. In addition, Cronbach's alpha, composite reliability, and average variance extracted (AVE) tests were carried out (Saunders et al 2007 and Hair et al 2015).

### **Method of Data Analysis**

Spearman correlation is then used to measure the level of association between performance and CSR. Additionally, the Kruskal-Wallis-H-Test is used to test the hypotheses proposed. These techniques were adopted because the data is ordinal and categorical in nature. Furthermore, a five (5) percent level of confidence or significance is adopted (Gujarati, 2013) The statistical analysis is carried out with IBM Statistical Package for Social Sciences (SPSS) version 26.0 (Aldrich & Cunningham, 2016).

### **Ethical Concern**

Ethical issues are built into the study right from the design and administration of questionnaires and interview processes. For instance, questions on sensitive personal issues are avoided. However, unavoidable personal issues are ranged or averaged to avoid specificity. In addition, respondents are informed of the purpose of the information collected. They were also assured of the anonymity and confidentiality of their information. Similarly, respondents were given time to read through the questions, after which they volunteered information.

### **Analysis and Discussion**

This section is subdivided into four main sub-sections: confirmatory tests, Correlation Analysis, hypotheses testing and discussion of findings.

### **Variables Specification**

**The dependent variables for the study are the enterprise performance indices namely, profitability ratios (ROTA, ROE and ROS), efficiency ratio (inventory turnover) and liquidity ratio (current ratio). On the other hand, the independent variables are the different types of CSRs including economic (creating enabling environment for profit-making), legal (obedience to the law of the land), ethical (making the community and society better) and philanthropic (non-statutory, non-profit producing activities that engenders growth and development).**

### **Confirmatory Tests**

The data collected for this study are ordinal, categorical, and heterogeneous in nature. Hence, a test to confirm the reliability and validity of the data is carried out with, Cronbach's alpha, composite reliability, and average variance extracted (AVE) tests. From Table 1, the Cronbach coefficient ranges from 0.757 to 0.849, while the composite reliability ranges from 0.671 to 0.819. On the other hand, the average variance extracted (AVE) ranges from 0.650 to 0.810. This revealed that the data collected was free from reliability and validity issues. The confirmatory test assists in identifying realistic independent and dependent variables. Hence, the results of further analysis of the data are reliable and valid. This ensures a meaningful generalization of the results of the study.

**Table 1: Convergent Validity Indices**

<b>Constructs</b>	<b>Cronbach's Alpha (<math>\alpha</math>)</b>	<b>Composite Reliability (CR)</b>	<b>Average Variance Extracted (AVE)</b>
<b>Economic Responsibility</b>	0.757	0.719	0.650
<b>Legal Responsibility</b>	0.789	0.703	0.718
<b>Ethical Responsibility</b>	0.802	0.671	0.751
<b>Philanthropic Responsibility</b>	0.837	0.711	0.714
<b>ROTA</b>	0.849	0.681	0.664
<b>ROE</b>	0.769	0.731	0.724
<b>ROS</b>	0.767	0.819	0.762
<b>Liquidity</b>	0.817	0.758	0.729
<b>Inventory Turnover</b>	0.779	0.792	0.810

Source: Authors' Estimation from Analysis of data collected from the field in 2021-2022

### Correlation analysis

Spearman correlation analysis is used to measure the direction and strength of the relationship, between CSR and organizational performance. The interpretation of the results of the Correlation Analysis follows the thresholds prescribed by Dancey & Reidy (2004), D'Andrea & Wooten (2017), and Levy (2018). Their prescriptions are as follows: >0.70 very strong, 0.4–0.69 strong, 0.3–0.39 moderate, 0.20–0.29 weak, and 0.01–0.29 none or negligible relationships.

Table 2 shows the results of the Spearman correlation analysis. From the table, the correlation between the different categories of CSRs and ROTA ranges from -0.55 (legal) to 0.75 (Philanthropic) responsibilities, while the relationship between the aggregate of CSRs and ROTA is 0.375. This indicates that, generally, there is a moderately positive relationship between ROTA and CSR categories. In other words, enterprises that engage in CSR activities also make higher profits.

On the other hand, the correlation between the different categories of CSRs and ROE ranges from -0.56 (ethical) to 0.76 (Philanthropic) responsibilities. However, the correlation between aggregate CSR and ROE is 0.405. There is therefore a fairly strong and positive relationship between ROE and CSR. In other words, when ROE increases, CSR also increases. In the same vein, the correlation between different CSRs and ROS ranges from -0.47 (legal) to 0.85 (economic). However, the correlation of aggregate CSR and ROS is 0.388. Hence, there is a moderately positive relationship between ROS and CSR.

The correlation between the various CSRs and liquidity ranges between 0.69 (ethical) and 0.85 (Philanthropic) responsibilities. The correlation between aggregate CSR and liquidity is 0.79. Therefore, there is a very strong positive relationship between liquidity and CSR. This means that whenever liquidity increases, CSR will also increase commensurably.

Similarly, the correlation between the different categories of CSRs and inventory turnover ranges between -0.54 (economic) and 0.77 (legal) responsibilities. On the other hand, the aggregate CSR and inventory turnover is 0.353. Therefore, there is a moderately positive relationship between inventory turnover and CSR. This means that when inventory turnover increases, the CSR will increase moderately.

The results above showed that virtually all the performance indices including ROTA, ROE, ROS and current ratio are positively correlated with CSR. Hence, this study agrees with Schottens (2009) that improved CSR in one year is preceded by improved financial performance of the previous year.



**Table 2: Results of Spearman Correlation Analysis**

Independent Variables	Corporate Social Responsibilities				Aggregate CSR
	Economic Responsibility	Legal Responsibility	Ethical Responsibility	Philanthropic Responsibility	
ROTA	0.67*	-0.55*	0.63	0.75	0.375*
ROE	0.68*	0.74*	-0.56	0.76*	0.405*
ROS	0.85*	-0.47	0.45*	0.72	0.388
Liquidity	0.83	0.79*	0.69*	0.85*	0.785*
Inventory Turnover	-0.54	0.77	0.49*	0.69	0.353

\*Significant at 5% level

Source: Authors' Estimation from Analysis of data collected from the field in 2021-2022

### Hypotheses Testing

Table 3 shows the null hypotheses of the study. The hypotheses are based on five (5) enterprises' performance measures, namely ROTA, ROE, inventory turnover, liquidity, and ROS. Each of the performance measures has four (4) sub-categories or variables: economic, legal, ethical, and philanthropic responsibilities. In the same vein, the aggregate of the different sub-variables/components is also considered.

#### CSR Has no positive Association with ROTA.

From Table 3, the study accepted the null hypothesis (CSR has no positive association with ROTA), for H<sub>03</sub>. However, it accepted the alternative hypotheses for H<sub>01</sub>, H<sub>02</sub>, H<sub>04</sub> and H<sub>0a</sub>. They are also significant at 5%. This means ROTA has a significant positive association with the CSRs.

#### CSR Has no positive Association with ROE.

This study accepted the null hypotheses (CSR has no positive association with ROE) for H<sub>06</sub>. On the other hand, it accepted alternative hypotheses for H<sub>05</sub>, H<sub>07</sub>, H<sub>08</sub>, H<sub>09</sub> and H<sub>0b</sub>. These hypotheses are also significant at 5%. This implies that when CSR increases, ROEs also increase progressively. The finding agrees with the findings of Challan and Thomas (2009), Kang et al. (2010), and Waddock & Graves (1997).

#### CSR Has no positive Association with Inventory Turnover

Table 3 shows that the study accepted null hypotheses (CSR has no positive association with Inventory turnover) for H<sub>011</sub>, H<sub>012</sub> and H<sub>0c</sub>. On the other hand, it accepted the alternative hypothesis that CSR has a positive association with inventory turnover) for H<sub>09</sub> and H<sub>012</sub>. On the whole, this indicates that inventory turnover does not have a positive relationship with CSRs. It is, however, not significant at 5% level.

#### CSR Has no positive Association with liquidity.

Table 3 indicates that the study accepted the alternative hypotheses (CSR has a positive association with liquidity) for H<sub>013</sub>, H<sub>014</sub>, H<sub>015</sub> and H<sub>0d</sub>. They are significant at 5%. This implies that as the liquidity is increasing, the CSRs are also increasing progressively. This study disagrees with Nguyen et al. (2021).

#### CSR Has no positive Association with ROS.

The study accepted the null hypothesis that CSR has no positive association with ROS for H<sub>017</sub>, H<sub>018</sub>, H<sub>019</sub>, and H<sub>0e</sub>. However, the alternative hypothesis is accepted for H<sub>020</sub>. In general, therefore, the study showed that the CSR does not have a direct association with the ROS. It is, however, not significant at the 5% level. This finding agrees with Challan and Thomas 2009

### Discussion of Findings

In summary, two profitability ratios (ROTA and ROE) and a liquidity ratio indicate that when CSR increases, the enterprises' performance also increases. On the other hand, one profitability ratio (ROS) and one efficiency ratio (Inventory Turnover) show that there is no positive association between CSR and enterprise performance. This indicates that CSR may not have reasonable effects on the efficiency of an enterprise. One can therefore, say that, to a very large extent, CSR has a significant positive association

with profitability and liquidity. The study also, confirmed that CSR precedes enterprise performance. It can also be said that CSR is a hygiene factor that enhances enterprise performance. However, the inventory turnover (efficiency ratio) that has a negative relationship with enterprise performance could be said to have no significant effect on the efficiency of a firm. This could be explained by the fact that efficiency is more of the internal affairs of firms. Therefore, it could be concluded that enterprises can match-merge doing good with doing well.

**Table 3: Results of Krustal Wallis H Test**

S/N	Null Hypothesis	H- Value	P-Value	Significance	Decisions
H <sub>01</sub>	Economic responsibility has no positive association with enterprise ROTA	7.694	0.006	Significant	Reject Null
H <sub>02</sub>	Legal responsibility has no positive association with ROTA	6.857	0.041	Significant	Reject Null
H <sub>03</sub>	Ethical responsibility has no positive association with ROTA	8.458	0.721	Not Significant	Accept Null
H <sub>04</sub>	Philanthropic responsibility has no positive association with ROTA	7.489	0,025	Significant	Reject Null
<b>H<sub>0a</sub></b>	<b>Aggregate CSR has no positive association with ROTA</b>	<b>7.625</b>	<b>0.037</b>	<b>Significant</b>	<b>Reject Null</b>
H <sub>05</sub>	Economic responsibility has no positive association with ROE	5.379	0.029	Significant	Reject Null
H <sub>06</sub>	Legal responsibility has no positive association with ROE	10.567	0,086	Not Significant	Accept Null
H <sub>07</sub>	Philanthropic responsibility has no positive association with ROE	3.879	0.037	Significant	Reject Null
H <sub>08</sub>	Ethical responsibility has no positive association with ROE	9.234	0.038	Significant	Reject Null
<b>H<sub>0b</sub></b>	<b>Aggregate CSR has no positive association with ROE</b>	<b>7.265</b>	<b>0.002</b>	<b>Significant</b>	<b>Reject Null</b>
H <sub>09</sub>	Economic responsibility has no positive association with Inventory Turnover	11.357	0.046	Significant	Reject Null
H <sub>010</sub>	Legal responsibility has no positive association with Inventory Turnover	8.632	0.861	Not Significant	Accept Null
H <sub>011</sub>	Ethical responsibility has no positive association with Inventory Turnover	7.961	0.820	Not Significant	Accept Null
H <sub>012</sub>	Philanthropic responsibility has no positive association with Inventory Turnover	8.674	0.038	Significant	Reject Null
<b>H<sub>0c</sub></b>	<b>Aggregate CSR has no positive association with inventory turnover</b>	<b>9.156</b>	<b>0.094</b>	<b>Not Significant</b>	<b>Accept Null</b>
H <sub>013</sub>	Ethical responsibility has no positive association with liquidity	11.216	0.009	Significant	Reject Null
H <sub>014</sub>	Economic responsibility has no positive association with liquidity	8.574	0.036	Significant	Reject Null
H <sub>015</sub>	Legal responsibility has no positive association with liquidity	10.973	0.008	Significant	Reject Null
H <sub>016</sub>	Philanthropic responsibility has no positive association with liquidity	7.943	0.000	Significant	Reject Null
<b>H<sub>0d</sub></b>	<b>Aggregate CSR has no positive association with Liquidity</b>	<b>9.677</b>	<b>0.010</b>	<b>Significant</b>	<b>Reject Null</b>
H <sub>017</sub>	Economic responsibility has no positive association with ROS	5.859	0.046	Significant	Reject Null
H <sub>018</sub>	Legal responsibility has no positive association with ROS	7.993	0.096	Not Significant	Accept Null
H <sub>019</sub>	Ethical responsibility has no positive association with ROS	6.889	0.821	Not Significant	Accept Null
H <sub>020</sub>	Philanthropic responsibility has no positive association with ROS	7.496	0.039	Significant	Reject Null
<b>H<sub>0e</sub></b>	<b>Aggregate CSR has no positive association with ROS</b>	<b>7.059</b>	<b>0.508</b>	<b>Not Significant</b>	<b>Accept Null</b>

Source: Authors' Estimation from Analysis of data collected from the field in 2021-2022

### Conclusion and Recommendations

From all indications, the study showed that enterprises' performance increased as CSR activities are increasing. Therefore, the study concluded that enterprise performance can be match-merge with increasing CSR activities in Kwara State. Enterprises could therefore, improve their performance by deliberately channeling resources to CSR targeting; employees, customers, societies and environments. Conclusively,

the study deepens understanding of the relationship between CSR and enterprises' performance by including evidence from Kwara State in the literature.

The study therefore recommends that for enterprises to make maximum returns on their CSR activities, their CSR activities should be tailored towards their overall business strategies at each stage of the enterprise life cycle. Similarly, CSR activities should be well focused, streamlined with enterprise objectives, and targeted at specific stakeholders. In the same vein, enterprises should have a holistic CSR framework, including collaborative CSR activities with other enterprises. To arrive at a reasonable and appropriate CSR, the conception, planning, and implementation of the idea should be participatory, involving management as well as representatives of all the stakeholders. It is also advisable that regulatory agencies sharpen their policies to ensure that enterprises can embark on meaningful CSR for their stakeholders. CSR should not be seen as an expense but as a strategic initiative adapted to enhance performance.

### **Limitations and Future Research Directions**

The study has been exposed to some limitations due to inadequate time, funds and technical issues. Firstly, the study focused on only one state in the North Central geopolitical zone. However, more insights on the relationship between CSR and enterprise performance could be gained if more states and geopolitical zones were covered in the study. Secondly, cross-sectional data was used for the study. However, it will be beneficial if time-series data can be used. Thirdly, the study combined all the different sizes (micro, Small, medium, and large) of enterprises as the population. On the other hand, additional insight could be added if each of the components were studied. Finally, the study did not give much consideration to the effects of cultures, values, norms, and management style on the subject matter. Hence, inclusion of cultural dimension would be interesting.

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## Coffee Farmers' Satisfaction and Intention to leave Kivu Coffee Production Cooperatives

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### Abstract

Coffee is undoubtedly the second most traded and consumed commodity in the world after oil and water. Among the organizations that explain this economic boom, coffee production cooperatives are in pole position. In the DRC, coffee production cooperatives are no longer unanimous. They are gradually losing the confidence of their members, who were initially carried away by their presence. It is in this context that the study pursued a double objective. On the one hand, after measuring the current level of satisfaction of coffee farmers with the services received from their cooperatives and their initial intention, to test the relationship. On the other hand, verify whether this relationship is affected by the farmer's agricultural potential. The results indicate that the current level of satisfaction of farmer-members of coffee production cooperatives is 54%. Meanwhile, their intention to leave is also 60%. Similarly, there is a negative relationship between member satisfaction and their intention to leave coffee production cooperatives. This relationship decreases with the increase in the quantity delivered annually to the cooperatives by the members. In the conclusion, responsibilities are shared according to the actors involved in the sector, contributions and limitations are pinpointed as well as openings for future research.

**Keywords.** Cooperative, Coffees, Satisfaction, farmers, potential.

### Introduction

Agriculture is undoubtedly a pillar of development for many countries around the world. Source of employment, at least  $\frac{3}{4}$  of the population depends on it (Mutwiri and Wafula, 2018). This reality is not lost on Africa (Delaney *et al.*, 2011; Turmel, 2012) and even less so on the Democratic Republic of Congo (DRC). In the DRC, nearly 80% of the population lives from agriculture (Angélique *et al.*, 2022). Around the world, agricultural production and marketing are, for the most part, carried out by production cooperatives (Defourny and Develtere, 1999; Downie, 2018). Cooperation provides several benefits (Bravo-Monroy *et al.*, 2016; Wedig, 2019). It facilitates the lives of approximately three hundred million individuals providing just over one hundred million jobs (Hando *et al.*, 2022). As such, it plays an important role in the socio-economic development of the planet (Mergoum and Hinti, 2016). Members have the opportunity to move from self-sufficiency agriculture to market production (Koopmans, 2006), negotiate better contractual terms, and access agricultural inputs and equipment (Eckart *et al.*, 2018). In an era of climate disruption, its citizen actions also contribute to environmental protection. These place it in pole position in sustainable development issues (Roukoz, 2008; Omrane and Fayolle, 2010). From this perspective, social entrepreneurship is emerging as a key component of private initiatives around the world and its influence is attracting increasing attention (Yu, 2016).

Among the agricultural activities, the coffee industry is best represented. According to the latest statistics published by the World Coffee Organization (WCO), coffee production cooperatives, together with private washing stations, supervise a population of more than 25 million coffee farmers. They have delivered, during the year 2021, more than 167 million bags of coffee. To this end, more than 2.6 billion cups of coffee



were tasted daily. The same estimates indicate that this demand may double by 2026. Therefore, after gasoline, coffee is the second most traded commodity on the planet, and occupies the same rank in terms of beverage behind water.

In view of this situation, the study has two objectives. Firstly, to test the relationship between the satisfaction of coffee farmer-members of coffee production cooperatives and their intention to leave them. Secondly, to verify whether this intention is influenced by the quantity of coffee-cherries delivered annually. In addition, to get a complete picture of the issue, the stakeholder approach was favored. As the issue of cooperation is complex, it is recommended that its analysis be part of a partnership logic (Goff, 2006; Kolk and Lenfant, 2015; Raouf, 2018). This approach is justified by the fact that the functioning and success of a cooperative depends on several actors (Eckart *et al.*, 2018; Grashuis and Su, 2019b). The above means that stakeholders must make collaborative decisions (Muller and Tanguy, 2019).

There are three reasons for the interest in this study. First, in the agricultural sector, the coffee spinneret is the most structured in DRC. Several evidences state that this sector brings more than a billion dollars in annual revenue for producers. The majority of these producers are located in the Kivu region (Kalala *et al.*, 2020). In 2016, the DRC produced 8,000 tons of coffee with a score of over 80 points (Downie, 2018). This production is largely controlled by certain farmers who own large tracts of land. Indeed, at most only 3% of congolese farmers share more than 17% of arable land (Delaney *et al.*, 2011). These statistics mean that, from nearly 4% of the land exploited in DRC (Kalala *et al.*, 2020), the peasant mass occupies at most 83% of the land. At the same time, marketing abroad has, for some years, been carried out by coffee production cooperatives and private micro-washing stations.

Secondly, for the past decade, there has been an infatuation of several actors in the region in coffee growing. For example, from 2008 to 2022, the rate of growth of cooperatives and private washing stations in Kivu was of 175%. This growth observed in DRC, was in Ethiopia since 1990 (Sebhatu *et al.*, 2021) and in Morocco for the past 15 years (Zahour and Rachidi, 2021). In some East African countries (Uganda, Rwanda, Burundi), the share of coffee revenue in exports exceeds 10% (Nsabimana and Tirkaso, 2020). This makes coffee production one of the providers of financial resources and employability in low-income countries (Winarno *et al.*, 2018). Although marginally (Kalala *et al.*, 2020), apart from the mining sector which accounts for the bulk of exports, coffee and cocoa are among the agricultural products that make DRC proud internationally (Angélique *et al.*, 2022).

Finally, despite this impressive physical presence of coffee production cooperatives, the misery of members has not changed (Downie, 2018). For example, in 2014, the net profitability of the Coop14 was only of 1, 83% (or \$1275) for more than 1000 members (GAMF Report, 2014). Seven years later, the gross profit of this cooperative was estimated at \$45,753 for 2468 coffee farmers (Internal Report, 2022). Yet, thanks to the multiplicity of actors who share costs, this sector is said to be the least risky (Livingston *et al.*, 2011). This paradox has led to the prediction that of the countries facing a food crisis, more than 33% are located in coffee producing countries (Shumeta and D'Haese, 2018). In fact, while the coffee farmer produces and delivers his crop, at enormous sacrifice, chiefs of boards of the cooperatives live in opulence. As in Ethiopia (Awoke, 2021), and soon ten years in the French grain sector (Barraud-Didier *et al.*, 2014), the commitment of coffee farmer-members of Kivu coffee production cooperatives is also declining. Virtually six out of ten coffee farmers are willing to leave their cooperatives. In the face of this situation, many specialists fear that the coffee production cooperatives, through a contagion effect, will plunge into the same crisis as their financial counterparts in the 2010s. The causes of this misery are closely linked to the conditions in which the African agricultural entrepreneur operates in general (Vlassenroot, 2005; Pérez-Perdomo *et al.*, 2016; Sekabira *et al.*, 2021) and in Kivu in particular (Jackson, 2006; Bremner, 2012; Rushigira, 2017; Downie, 2018; Chuma *et al.*, 2022).

It is worth remembering that in any organization, there is a strong link between the intention to leave a company and the gains made (Kanyurhi, 2015). Indeed, it has been shown that individuals are tempted to abandon their activities, and therefore, to leave their structures when there is a gap between the expectations



hoped for and the results obtained (Chan Yin-Fah *et al*, 2010). Conversely, satisfaction not only builds member loyalty (Sousa-Poza Al and Sousa-Poza An, 2007), motivates action (Kanyurhi, 2015), but also benefits the organization and all stakeholders (Kanyurhi, 2015). Despite the scarcity of empirical work dedicated to this issue in the third sector, it is clear that farmers are tempted to leave their organizations when they feel that they are working to enrich a category of actors. The situation would be more extreme in contexts where members, traditionally in solidarity, realize that their socio-economic situation is deteriorating further to the benefit of a predatory oligarchy. This intention to leave would be even more pronounced according to the quantity of coffee-cherries provided to the cooperatives. The more it is higher, the more the farmer considers himself the "big loser" in the transactions and would be tempted, at all costs, to regain his independence.

This study makes three contributions. Firstly, in the coffee sector, it is one of the few studies that focuses on the factors that can explain the failure of coffee production cooperatives. Through the analysis, it shows the variables that justify the dissatisfaction of coffee farmers, and therefore, capable of pushing them towards disengagement. At the same time, it offers the factors that push towards satisfaction, and capable of maintaining them. The above is relevant as the issue of the associative movement remains under-explored in the Congolese context (Sentime, 2019). As coffee production cooperatives in Kivu are at the end of their tether, the results of this study serve as an alarm bell for actors involved in coffee promotion. The latter are in a position to adopt managerial practices that reduce bankruptcy and maximize the chances of success of coffee production cooperatives in Kivu.

Second, through a mixed design, it contributes to the understanding of the theories of the classical firm in a hybrid sector. Indeed, through the contracts that bind farmer-cooperators and cooperatives, but also the latter to other partners in the sector, it offers a holistic view of the agency problems that arise in social and solidarity entrepreneurship. In a context of extreme poverty, lack of resources and regulation, and high information asymmetry, the study shows how some social actors 'easily' make a living under the guise of social and solidarity action. At the same time, the fact that the development of coffee production cooperatives is the result of several actors, it contributes to the enrichment of the "stakeholders theory" in the third sector. To this end, the study highlights the responsibility of the stakeholders involved in the promotion of the agricultural sector in developing countries.

Finally, the results obtained empirically verify the theoretical prescriptions that contributed to the birth of the cooperative movement in the world. By analysing the behaviour of coffee farmers according to the size of their fields, and therefore the quantity of their regular supplies, it provides a better understanding of group dynamics and the future of solidarity economies in Kivu. Thus, the fact that large-scale producers are pushed towards abandonment more than small-scale farmers confirms that the existence of coffee production cooperatives is inseparable from the living conditions of the 'breadwinners'. This situation sheds light on the risks incurred by coffee production cooperatives, which for the most part exist thanks to the permanent deliveries of these large farmers.

In the first section, the literature review on social entrepreneurship in the coffee sector and coffee farmers' satisfaction is presented. Based on the theoretical and empirical prescriptions, the hypotheses are discussed and constituted. The second section provides the methodology adopted to produce the knowledge sought. The third section presents, analyzes and discusses the results. In the conclusion, contributions are made, limitations are pinpointed and openings for future enrichment are proposed.

## **1. Literature Review**

This section contains two parts. On the one hand, a brief historical overview of agricultural cooperatives (and the Kivu coffee production cooperatives) is presented. On the other hand, based on theoretical and empirical studies, hypotheses are discussed and formulated.

### **1.1. Agricultural Cooperatives and Kivu Coffee Production Cooperatives**

Apart from the primitive forms of cooperatives that existed in antiquity, the birth of the cooperative movement, and its current evolution, are closely linked with Western political ideology and the expansion

of machinism, particularly the industrial revolution, which dominated the Western world in the early 19th century (Kickul and Thomas, 2012). If the materialization of the cooperative movement was the work of the English, historically pragmatic, the operationalization was the work of the French, naturally theoretical. In fact, all began in 1831 when the French socialist, BUCHEZ, set up a set of rules for the creation and management of a workers' production cooperative. Three years later, in 1834, Parisian workers tested the idea by officially creating the first production cooperative. However, the growth of the cooperative movement began with the success of the consumer cooperative set up in 1844 by 28 Rochdale weavers. Initially confined to food and household activities, its scope became national and global.

Without offending the merits of the Raiffeisienne credit cooperative of 1864 in the town of Heddensdorf in Germany and the dairy cooperative of the town of Hjelling in Denmark in 1882, it is above all the French production and English consumer cooperatives, all born spontaneously from disadvantaged individuals (workers, executives, peasants), that inspired the whole world until they penetrated the financial sector, with in particular savings and credit cooperatives, and later, microfinance. This pioneering attribute justifies the fact that more than 60% of the world's largest production cooperatives are located in Europe (Eckart *et al.*, 2018). Defined as an autonomous association of individuals voluntarily joined together to satisfy their aspirations and needs through an enterprise, cooperatives enable the socioeconomic inclusion of marginalized people (De Guibert and Froti e, 2000) and participate in social innovation (Muller and Tanguy, 2019).

In the DRC, the recognition of agricultural cooperatives dates back to the colonial era. It is from the decree of 23 March 1921 regulating essentially agricultural cooperatives that they came into being (Sentime, 2019). On the ground, the Congolese social economy is dominated by agricultural cooperatives, far ahead of financial cooperatives. Similarly, among the population of agricultural cooperatives, coffee structures are currently gaining ground. These date from the same colonial era, but their legitimacy was attested after independence, and from 2015, their rise in the Eastern part is unequivocal. If paradoxically the average Congolese consume less coffee, in the world on the other hand, two out of three inhabitants and 90% of adults drink coffee. Long underestimated, its health benefits are nowadays valued.

The advent of coffee cooperatives in Kivu is recent. Thirty years ago, there were fewer than five cooperatives among the peasantry. The latest estimates, collected in 2022, show that the territories of Kalehe, Masisi, Idjwi, Rutshuru and Kabare were home to around 46 cooperatives, compared with just ten or so more than ten years ago. This impressive growth has had a positive effect on production in the area. Data published in 2021 by the Central Bank of Congo shows that national production was 12,683 tonnes of coffee, compared with 13,963 tonnes in 2020 for 11,000 registered producers. The Kivu region accounts for more than 80%. By 2022, South Kivu province had produced 7,000 tonnes, compared with 3,000 tonnes in 2016. Meanwhile, the neighbouring province of North Kivu also grew from 800 tonnes to 3,400 tonnes between 2011 and 2016. The results of this study show that the average area cultivated per coffee grower is 4.87 hectares for 1,200 kilos produced. The presence of cooperatives, themselves supported by international development organisations, contributes to the training of agricultural instructors for the benefit of cooperatives, whose role is to provide local support to coffee growers. The same organisations provide cooperatives with business advisers to help them increase and improve their members' agricultural skills. The combination of all these efforts, although insufficient, has given new impetus to the coffee cooperative movement in Kivu. Nevertheless, the contribution of the cooperatives remains marginal in relation to the expectations of the members. Their aim in joining was to increase their production, and hence their income. The latter has been slow to materialise, however, as the cost of the cooperatives is exorbitant and the share that goes to the farmer is insignificant. In return, despite the services they receive, coffee growers are not loyal to their cooperatives. This situation is reflected in the fact that members deliver their produce to the highest bidder, forgetting the contract that binds them to their structures.

There are three main reasons for the abandonment of co-operators. Firstly, management is opaque. The democratically elected directors act like businessmen. They are less accountable to the members and are

virtually uncontrolled by them. As a result, their activity reports are irregular and even full of fraud and errors. They live in opulence at the expense of the farmers they represent. Secondly, their living conditions have deteriorated more than before they joined. One coffee grower said he had nothing to offer visitors since joining the cooperative. He can no longer afford a beer, let alone look after his family. For him, the cooperatives are one of the reasons for his impoverishment. Finally, ignorance. The fact that most coffee growers do not have a high level of education predisposes them not to see the ageing of their fields (lower harvests), the deterioration in the quality of their products and the lack of distinction between the personal wealth of the manager and the income of the cooperatives. They attribute everything to cooperative membership.

## 1.2 Previous Studies and Hypotheses

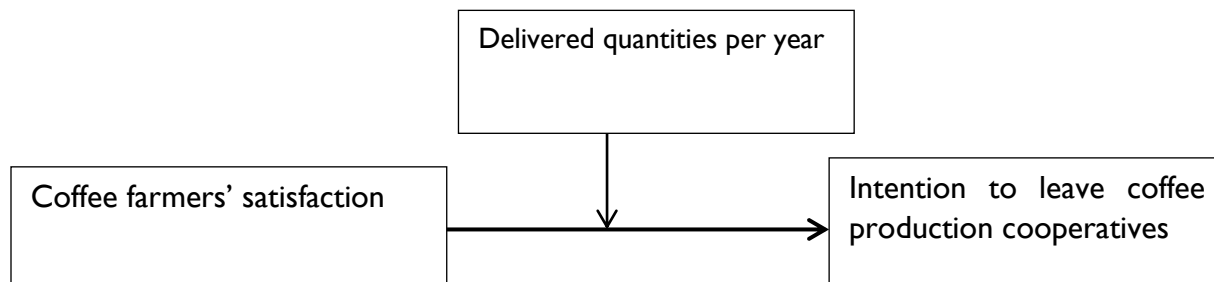
Based on the theoretical and empirical studies, the theoretical model is presented and the hypotheses are formulated.

### 1.2.1. Theorization

Among the most studied concepts in management science, satisfaction is in pole position (Kanyurhi, 2015). Satisfaction results from the fulfillment of members' needs and desires vis-à-vis their organizations (Asmelash and Umeta, 2017). It involves several aspects: price improvement, product quality, access to raw materials, and other variables (Grashuis and Su, 2019), such as governance. For these different issues, it is assessed in terms of the level of gap between members' expectations and the performance of the achievements (Tilahun, 2007). Moreover, it is not simply a perceived impact over a period of time (t) but also predicts member behavior at some future time (t+1; Grashuis and Su, 2019). This posture means that satisfaction takes into account members' future attachment to the cooperative and remains closely tied to its attributes (Manousakis *et al.*, 2021).

At the same time, the intention to stay/leave is nothing more than the desire to maintain or not maintain a relationship over the long term; the desire or not to develop an attachment (Makaoui *et al.*, 2014). Without satisfied members, production cooperatives approve difficulty in sourcing (Henninger and Barraud-Didier, 2013). Therefore, their success is inextricably linked to the satisfaction of cooperators (Higuchi *et al.*, 2020). This satisfaction, in turn, conditions the loyalty of members (Côté, 2007), and thus, the intention to stay. The literature states that certain variables related to the individual or the organization also influence the intention to leave a structure (Kanyurhi, 2015). In the context of coffee production cooperatives, the quantities produced regularly by a member can significantly impact the relationship between satisfaction and intention to leave depending on whether a farmer feels exploited or not.

**Figure 1. Theoretical model**



The above suggests that farmer attachment (versus abandonment) is a complex issue. Its analysis is the result of institutional, organizational and service relationship dimensions (Villemaine, 2018). These elements refer to faithful adherence to cooperative values and principles, the provision of a diversified service and technical-commercial support to members. In addition to the technical issues of auditing and empowerment (Kamdem, 2010), these indicators evoke a governance dimension (Barraud-Didier *et al.*, 2014; Mergoum and Hinti, 2016). In this regard, Saïssset (2016) states that cooperative governance results from a complex combination of three complementary dimensions: disciplinary, partnership, and cognitive.

The above means that cooperatives are forced to emerge towards the adoption of new managerial functions distinct from the principles of the Rochdale pioneers (Koulytchizky and Maugey, 2003; Guerraou and EL Amili, 2020). Therefore, the satisfaction of the members of a cooperative is not neutral to the quality of governance in place (Zahour and Rachidi, 2021). This governance must revolve around loyalty (Côté, 2009), communication and the quality of information provided (Goff, 2006; Manousakis *et al.*, 2021). The underlying argument is that the cooperative, far from being a simple association of individuals, is rather a business (Henninger and Barraud-Didier, 2013). However, when facilitators behave like businessmen, the cooperative ceases to exist (Mergoum and Hinti, 2016).

### 1.2.2. Hypotheses

In the social and solidarity economy, studies devoted to the relationship between member satisfaction and their intention to leave coffee production cooperatives are rare. Some work has attempted to link member satisfaction to other variables other than leaving (Ahmedin, 2008; Figueiredo and Franco, 2018; Mutwiri and Wafula, 2018; Yu and Nilsson, 2021). Previous studies provide evidence that trust and support for the mission pursued by U.S. production cooperatives provide better opportunities for satisfaction building (Grashuis and Su, 2019). Similarly in Kenya, results from a study show that 77% of coffee farmers are happy to be part of cooperatives (Chemiat, 2014). This same analysis attests to the existence of a significant link between the pre-financing obtained and the satisfaction of Kenyan coffee farmers. A similar situation exists in Cameroon, where 75% of members report satisfaction with the services offered by production cooperatives (Tumenta *et al.*, 2021). The situation in Kivu shows that coffee growers are not benefiting fully from the advantages available to cooperative members. They do not have access to pre-financing and their farming activities suffer enormously as a result. In this respect, cooperative membership in no way solves the problem of access to agricultural credit.

Other studies assess the impact of production cooperatives on members' well-being (Shumeta and D'Haese, 2018; Manirakiza, 2021). In Ethiopia, for example, membership was found to be positively associated with household income and assets. Economically, members are better living compared to non-members. And non-members would be economically better than members if they joined cooperatives (Mojo *et al.*, 2017). Again in the context of this study, coffee, which used to be a source of household income, no longer brings the same joie de vivre to coffee growers in Kivu.

Finally, other studies analyze issues pertaining to member engagement in the agricultural sector. To this end, an impact of cooperatives on member trust, satisfaction, and commitment was found in Ethiopia (Mojo *et al.*, 2015). In the same environment, several factors have been found to explain member engagement in Ethiopian production cooperatives (Awoke, 2021). As such, psychological, economic, and satisfaction factors explain loyalty to production cooperatives (Côté, 2009) and enhance the level of cooperative participation (Hando *et al.*, 2022). These results imply that willingness to stay in a production cooperative is a consequence of several variables. The absence of these factors leads to dissatisfaction, and consequently, indifference and dislike. In essence, member loyalty, trust, involvement, or commitment must be actively sought in production cooperatives because of their complementarity (Henninger and Barraud-Didier, 2013). Coffee growers in Kivu are psychologically weakened and their initial enthusiasm is fading. This drop in morale has a negative impact on their intention to remain members of coffee cooperatives.

Unlike other countries where agriculture significantly improves the living conditions of farmers (Niyonzima, 2010; Holmgren, 2012; Verhofstadt *et al.*, 2013; Verhofstadt *et al.*, 2014; Mojo *et al.*, 2017; Maniriho, 2021), the evidence shows that Congolese agriculture brings almost nothing to the farmer (Rocha, 2017). On average, the farmer in Kalehe has a return on agricultural investment of \$488 per year or about \$40 per month (Angélique *et al.*, 2022). This marginalization is even more pronounced in coffee production cooperatives where the distributable surplus hardly reaches the equivalent in Congolese Francs of \$2 per year (Internal Report, 2022). This situation may also be due to poor cooperative profitability (Delaney *et al.*, 2011).

In this case, (economic) performance is irrevocable for agricultural production cooperatives to achieve their goals (Couret, 2011; Beuchelt and Zeller, 2013; Benos *et al.*, 2018; Boujarfaoui and M'barka, 2021). Although it is the essential dimension of satisfaction, other non-financial indicators must be taken into account (Maurel and Tensaout, 2014; Saïssset, 2016). Participation in the decision-making process is among the solutions considered (Barraud-Didier *et al.*, 2015). Due to the hybrid nature of agricultural production cooperatives, it is evident that when members are financially healthy and their strategic goals are met, satisfaction is evident, and the intention to leave narrows (Cheriet and Guillaumin, 2013). Not long ago in Brazil, a study found a triple association between member satisfaction, value created by cooperatives, and long-term temporary horizon (Ferraz *et al.*, 2018).

Regardless of legal form, the functioning of congolese production cooperatives differs drastically from theoretical prescriptions. There is a clear difference between the theoretical realities and the facts. The leaders of these structures are truly businessmen and their governance resembles a private commercial enterprise. Because of unemployment and the fact that the managers come from the directors, they are malleable and strongly depend on the latter. Similarly, the voluntary nature of the managers' services also makes them increasingly predatory to the detriment of the interests of the members they represent. In essence, the coalition between the managers and the board of directors with the blessing of the supervisory committee, in the presence of an under-informed population, makes these organizations uncooperative. This situation, which leaves members in the last position, creates frustration and discontent. As a result, dissatisfaction sets in, trust fades, and the intent to leave increases. Hence the position:

H (1). There would be a negative (positive) relationship between members' satisfaction (dissatisfaction) and their intention to leave coffee production cooperatives.

While it is obvious that it is difficult to satisfy everyone in a classic organization where certain extra-organizational considerations can interact, three factors can amplify the departures of coffee cooperators in Kivu. First, the excessive enrichment of managers and directors. Coffee farmers would be less willing to accept that they serve as shields for classical entrepreneurs falsely disguised as cooperative entrepreneurs. Secondly, they would resent that members and independent suppliers are treated in almost the same way without taking into account the initial efforts made. Finally, the lack of professionalism in operations, coupled with the invisibility of community development actions. These elements are not without consequences for the commitment of members to their cooperatives.

Therefore, if small producers, for lack of other alternatives, would be forced to stay, members with large landholdings, or producers of large quantities would be the most affected. Psychologically, they would consider themselves marginalized and exploited in favor of a hierarchy living in opulence. The solution would be to regain their independence, failing to find the "highest bidders". The above means that the intention to leave the coffee production cooperatives goes hand in hand with an increase in agricultural production. Hence the proposition:

H (2). The quantities supplied annually negatively influence the relationship between coffee farmers' satisfaction and their intention to leave the coffee production cooperatives.

## **2. Methodological Approaches**

Three elements are presented: data collection, measurement of variables, and data processing and analysis.

### **2.1. Data Collection**

This study focuses on the Kivu region. This vast area contains 14 territories spread across the provinces of North Kivu (6) and South Kivu (8). Coffee is grown in 6 of these areas, 3 in each province. Due to insecurity, the study only targeted the territories of Kalehe and Idjwi (South Kivu) and Masisi (North Kivu). These three areas make a major contribution to coffee production and marketing in Kivu. They are also areas where several coffee production cooperatives exist. Data were collected through exploration, pre-testing and quantification. The exploratory survey of 30 members had a dual purpose. On the one hand, to discover the attributes of satisfaction valued by coffee farmers. As the coffee farmers had enough information, the

members of Kalehe and Idjwi regions were involved in this phase. On the other hand, it was a question of discussing with all the stakeholders who work for the promotion of coffee in Kivu. The aim was to discuss with them the difficulties of the sector, the responsibilities and the efforts to be made to make Congolese coffee attractive and competitive on a global scale. For coffee farmers, the interviews took place in the fields and at their homes, without an appointment. For other stakeholders, an appointment was requested. Discussions took place in the offices with the heads of the structures. On average, the conversations lasted 35 minutes and the transcriptions were manual.

The pre-test was used to clarify the quantitative questionnaire. To do this, 45 coffee farmers from Masisi zone were solicited as well as 2 experts in the coffee sector in south Kivu. Their intervention allowed for necessary adjustments, the abandonment of certain questions and the introduction of other clarifications. In conjunction with the theoretical part, the results of the exploration and the pre-test were used to design the final quantitative questionnaire. Having the information on the overall population of members in the three territories, the formula  $n = \frac{N}{1 + N e^2}$  was applied (Hando *et al.*, 2022). Compilation of various reports suggests a population of approximately 21150 members. Opting for a margin of error of 4%, the sample size is 641 members. By member, the study means any coffee farmer who regularly delivers cherries to a cooperative. These individuals, like some cooperatives, take on the characteristic of members. After this fieldwork stage, and on the basis of the in-depth analysis of shares and the fact that they were not members of several cooperatives at the same time, only the sample of farmers who had paid up all or part of their shares was considered in the final analysis. At this level, 255 effective members were retained; the rest being independent suppliers. Proportional stratification was used. Zones with enough coffee farmers were better represented in the survey. Subsequently, individuals were randomly selected from the zones of Masisi, Kalehe and Idjwi. For some, the contact took place directly in the fields. For others, contact was made at their homes on the basis of an appointment. To be part of the sample, it was necessary to show proof of membership in a cooperative. During seven days in the first two weeks of July 2022, the three territories were surveyed concurrently.

Sixteen interviewers were deployed to administer the quantitative questionnaire in the three zones up-mentioned. Initially designed in French, the administration was translated into local languages depending on whether the farmer was educated or not. The interviewers were trained in fieldwork, the spirit of the study, and ethical considerations. To save time and reduce the rate of non-response, the questionnaire was digitized. Indeed, the data were collected directly on tablets using the KoBo Collect application. This tool allows the constitution of the database at the same time as the data collection. A supervisor was responsible for monitoring the process online and providing technical assistance if necessary. Towards the end, the leaders of the cooperatives, the heads of NGOs that support the agricultural sector, banks, state structures, international clients and bank managers were contacted to provide some details on coffee production and marketing in Kivu. The information gathered was used as a basis for discussion of the findings.

## **2.2. Measuring the Variables**

According to their positions, three variables are operationalized: member satisfaction, intention to leave and productive potential. In addition to these, the confounding variables are also taken into account.

### **2.2.1. Coffee Farmer Satisfaction**

With reference to several authors (Holmgren, 2012; Figueiredo and Franco, 2018; Grashuis and Su, 2019; Higuchi *et al.*, 2020; Sebhatu *et al.*, 2021) and based on exploratory interviews, the questionnaire on member satisfaction was designed. On a seven-point scale (ranging from Strongly Disagree to Strongly Agree), members were asked to give their ratings on several attributes of satisfaction. Initially, the questionnaire was composed of 73 items divided into twelve dimensions: information flow, internal democracy, social cohesion among members, training and development of members, compliance with procedures, financial rewards, material and technical rewards, crisis management and anticipation, financial audit, local development, cooperative policy and recognition.

The scale was then subjected to exploratory factor analysis for purification and to reduce the number of indicators. The extraction method chosen was principal components with a Vari-max rotation. To do this, some criteria were used as a basis (commonalities ( $\geq .6$ ), structural coefficients ( $\geq .6$ ), eigenvalue ( $> 1$ ) and percentage of shared variance ( $\geq 60\%$ )) to have an optimal solution (Evrard *et al.*, 2009; Davidsson *and al.*, 2017). Long before, some tests (KMO, Bartlett) were performed to ensure that the data admitted the analysis. The results matched the KMO test (.941) and Bartlett's sphericity ( $p < .01$ ) attest that the data admit the factor analysis. The results of the exploratory factor analysis indicate that member satisfaction is a 28-indicator construct divided into 6 dimensions: internal democracy, community and environmental development, recognition of cooperative policy, social cohesion among members, member development, and procedural compliance. These 6 dimensions explain 70% of the total variance. The results exhibit a commonality  $\leq .60$  meaning that the share of variance shared by each item with the others is large. Similarly, all structural coefficients are  $\leq .60$ ; justifying that each item is highly correlated with its dimension. Finally, the retention of dimensions that exhibit eigenvalues  $< 1$  means that the retained factors are better than one item. The internal consistency test ( $\alpha: .92$ ) is satisfactory. The retained items were reduced to scores to serve as an overall measure of the independent variable.

### **2.2.2. Intention to Leave**

This variable was captured by five items inspired by previous work (Makaoui *et al.*, 2014; Kanyurhi, 2015) adapted to coffee farming cooperatives. These include "Whatever happens, I will change cooperative because I do not appreciate its collaboration; Despite the difficulties that a break-up would generate, I must not continue to deal with this cooperative; I do not think I could spend my entire career with this cooperative; If the situation does not change soon, I will be forced to process my coffees at home; I consider that I could not continue to deal with my cooperative in the next five years." On the same scale (ranging from Not at all in agreement to Totally in agreement), coffee farmers who are members of coffee production cooperatives gave their assessments. The results of the internal consistency analysis indicate that the 5 items ( $\alpha=.95$ ) reinforce each other in defining the construct. These items were reduced to scores to serve as a measure of the dependent variable.

### **2.2.3. Production**

Production was captured by the overall annual quantities (short and long seasons) produced by a member for delivery to the cooperative. A numerical variable, it was measured through the number of kilos of coffee cherries. To reduce variations, it was transformed into a logarithm.

### **2.2.4. Control Variables**

Four variables were taken into consideration: the age of the farmer, the seniority in the cooperative, the renewal of the governing bodies and the level of education of the member. The first three variables were measured by the number of years while the last variable was nominally captured. Several previous studies (Ahmedin, 2008; Mujawamariya *et al.*, 2013; Mojo *et al.*, 2017; Mondo *et al.*, 2019) argue that these factors explain coffee farmers' behaviors.

## **2.3. Data Processing and Analysis**

The qualitative data was manually processed. The verbatims illustrate the arguments that relate to the responsibilities of each actor involved. For ethical reasons, the identities of the respondents were not noted. However, to test the hypotheses, hierarchical regression was used. Two complementary models were tested. The first model introduces the satisfaction and moderation variable linked to the intention to leave. The second model, in addition to the above, introduces the interaction term. In each case, the models were controlled. The independent and moderator variables were centred at their means (Yang *et al.*, 2019) to avoid multicollinearity between predictors and interaction terms.

$$Y = \alpha + \beta_1 X \quad (1)$$

$$Y = \alpha + \beta_1 X + \beta_2 X * M \quad (2)$$

Finally, Fisher's F was used to make a judgment about the overall qualities of two models. In addition, R<sup>2</sup> was used to assess the fit of the models. T-value and the associated probabilities were used as a basis for the analysis of the significance of each variable. SPSS vs 20.0 software was used.

### 3. Results

Descriptive statistics are presented, and then the regression results are analyzed and discussed.

#### 3.1. Descriptive Statistics

This table is the result of the comparison of means tests (t-test and ANOVA) and the simple regression between some characteristics and the variable of interest. It also presents some information on the distribution of the sample.

**Table N°1 : Descriptive statistics**

Features	Modality	Number and Mean	Frequencyan d St.dev	Intention to leave F/T	Satisfaction F/T
<b>Education</b>	Illiterate	22	9	1.683	2.167*
	Primary	104	41		
	Secondary	86	33		
	University	43	17		
<b>Localisation</b>	Kalehe	101	40	0.206	0.84
	Masisi	46	18		
	Idjwi	108	42		
<b>Sexe</b>	Man	191	75	0.016	0.925
	Woman	64	25		
<b>Production</b>	High	113	44	0.482	0.554
	Low	142	56		
<b>Seniority</b>		6	3.56	1.170	-3.143***
<b>Average age of coffee grower</b>		45	8.31	-0.613	1.291
<b>Average CBD duration</b>		4.82	7.95	2.229**	-6.114***
<b>Dimensions of satisfaction: Average scores versus levels</b>					
<b>Satisfaction</b>		4.2021	54	Medium level	
<b>Internal democracy</b>		4.0863	53	Medium level	
<b>Community and Environmental Development</b>		3.5129	40	Low level	
<b>Recognition of the cooperative policy</b>		4.3399	53	Medium level	
<b>Social cohesion</b>		4.9235	71	Very high level	
<b>Members' development</b>		4.7882	68	High level	
<b>Respect of the procedures</b>		4.0039	44	Low level	
<b>Intention to leave</b>		4.6392	60	High level	

Source : Extracts from SPSS 20.0. With \*p ≤ .10. \*\*p ≤ .05. \*\*\*p ≤ .01.

With regard to frequencies, the results indicate that more than 40% of coffee farmers in the territories of Kalehe, Masisi and Idjwi have a primary level of education. Only 9% have no education level. Curiously, Idjwi provides the largest number of final respondents (42%), and consequently, this territory seems to have a large number of coffee farmers who have partially or fully delivered their shares. The majority of farmers are men (75%) and a good proportion (56%) harvest and sell less than one ton of coffee-cherries per year. The respondents have been members of the cooperative for an average of 6 years, with a high value of 19 years. Similarly, 45 years is the average age of coffee farmers. Finally, there is every indication that the chairmen of the boards of directors (CBD) do not leave their posts. On average, they have been in office for 5 years, and 22% of them have been in office for at least 11 years. Of this percentage, 15% of coffee farmers say that they do not remember when their CBDs were in fonction because of the number of years. However, many (71%) have been in business for two years or less, a situation that is also consistent with the age of these cooperatives (mostly young).



As for the tests for comparison of means, the results do not show any significant difference in the level of satisfaction of coffee farmers according to geographical area. The Duncan's complementary test indicates that, on average, all three territories show scores of around 4.00. This situation is also evident in the intention to leave, where scores are slightly above 4.60 for all three territories. On the other hand, the level of satisfaction varies according to the level of education ( $p < .10$ ). Complementary tests show that coffee farmers with a secondary level of education are the most satisfied (4.49), while university students are the least satisfied (3.92). Despite variations in scores according to level (ranging from 4.00 for illiterates to 5.00 for academics), there is no significant difference in the intention to leave between the subgroups.

In contrast, the regression results indicate a statistically significant relationship between seniority ( $t = -3.143$ ,  $p < .01$ ) and satisfaction level. These results mean that the level of satisfaction is a decreasing function of the number of years spent in the cooperative. The more years pass, the more dissatisfaction sets in. This same dissatisfaction is not neutral to the length of the CBD's tenure in management ( $t = -6.114$ ,  $p < .01$ ). Thus, an additional year of CBD tenure reduces member satisfaction by .06 units.

Finally, while the level of satisfaction of coffee farmers can be described as medium (54%), their intention to leave is high (60%). This same result was found when studying the situation of all coffee farmers delivering their products to the cooperatives (46% versus 50%). More interestingly, some variables justify this dissatisfaction/satisfaction rate. On the positive side, the social cohesion created by the cooperation (71%) and the development of members (68%), especially the training and advice received regularly to improve their crops, are in pole position. To a lesser extent, the recognition that coffee farmers have of the cooperative policy (53%) and internal democracy (53%). This collaboration and ongoing training of members has been cited as one of the success factors of the Congolese coffee-cocoa sector (Downie, 2018). They promote access to innovative technologies for farmers (Eckart *et al.*, 2018). However, these social innovations must be an expression of the social actors themselves to fulfill a need, provide a solution, or take advantage of an opportunity for action (Lévesque, 2008). In Ethiopia, trust, participation and information sharing are positively associated with member satisfaction (Asmelash and Umeta, 2017). Similarly, the sustainability of U.S. agricultural production cooperatives depends on the usefulness of members. Therefore, trust and support for the mission being pursued provide better opportunities for satisfaction building (Grashuis and Cook, 2019).

Negatively, the lack of community development actions (40%) and the no respect for the rules (44%) decrease their satisfaction. This lack of attention to community development issues may also be closely related to the lack of regulation in this sector. In Europe, it was also found that the lack of a local development process contributed significantly to the absence of the cooperative in the integral development of its community (De Freitas, 1998). In the DRC, sustainable development issues are underestimated (Sekabira *et al.*, 2021). However, the existence of a national policy for the promotion of cooperatives, accompanied by an appropriate legal and institutional framework, is the essential environmental condition for the emergence of a national cooperative movement capable of contributing to economic recovery in Africa (Kamdem, 2010). Thus, taking societal issues into account allows for a better involvement of members (Mangin, 2001). As in Portugal (Figueiredo and Franco, 2018), financial variables do not define the satisfaction of Congolese coffee farmers who are members of coffee production cooperatives.

### **3.2. Discussion**

The information on the goodness of fit of the models informs that the explanatory power increases from nearly 19% to 20% as the predictive variables are introduced. Similarly, the Fisher statistic remains significant at the 1% level. This situation makes the second model the most optimal. The tolerance (greater than 0.3) and the VIF (less than 2) contain satisfactory thresholds, which means that the explanation of the unobserved variables is perfect, and the low correlation between the independent variables avoids information redundancy. These results, obtained within the framework of a relatively "satisfactory" distribution of residuals, suggest that the variables selected amply explain the observed variation in the intention to leave of coffee farmers.

**Table N°2: Results of the hierarchical regression**

<b>Exogenous variables</b>	<b>Model 1</b>	<b>Model 2</b>
Constant	5.328 (.582) ***	5.432 (.578) ***
Age of the coffee farmer	-.001 (.009)	-.002(.009)
Seniority of the coffee farmer	.016 (.028)	.019 (.028)
Duration of the CBD	.044(.013) **	.042(.013) **
Level of study	.309(.119) **	.314(.118) **
Quantity	000 (.000)	000 (.000)
Satisfaction	<b>-.391 (.078) ***</b>	<b>-.404 (.077) ***</b>
Satisfaction * Quantity		<b>-.0145 (.059) **</b>
<b>F-Fisher</b>	10.73***	10.25***
<b>R<sup>2</sup></b>	.187	.203

**Source :** Extracts from SPSS 20.00, with \*p ≤ .10. \*\*p ≤ .05. \*\*\*p ≤ .01. () Standard error.

The results indicate the existence of a negative relationship between members' satisfaction and their intention to leave coffee production cooperatives in Kivu ( $t=-5.25$ ,  $p<.01$ ). These results confirm our hypothesis (H1) and imply that dissatisfaction positively explains abandonment. Similar results had also been found in the microfinance sector in DRC (Kanyurhi, 2015). The latter found evidence of a negative relationship between employee satisfaction and intention to leave. These results prove that satisfaction is an antecedent of loyalty (Côté, 2009). The more satisfied people are, the less likely they are to leave. The context of this study shows that the level of satisfaction of coffee farmers is average (54%) while the intention to leave is high (60%). These results are evident from the fact that the descriptive statistics indicate that of the surveyed members of coffee production cooperatives, nearly 30% deliver their products to more than one coffee production cooperative. This practice justifies the existence of a malaise (leaving intention) due to the fact that commercial infidelity is now the rule. On the other hand, when touring the villages, it was noted that some coffee farmers are returning to their traditional methods of agricultural production, and the cooperatives are complaining about their underperformance; most of them have not been able to reach their purchase forecasts in 2022. More alarmingly, there has been a role reversal in the field for some time. It is now the cooperatives that go around the villages looking for cherries from the coffee growers. Faced with these difficulties, the cooperatives have officially referred the matter to the customary chief of Kalehe regarding their refusal to pay the chief's tax on behalf of their members. As Fourier said in 1830, "the evidence of reason crumbles if it does not allow sensitivity to flourish". When the cooperative does not live up to the expectations of its members, frustrations arise, dissension gains ground and commitment wanes. Thus, poor management of cooperatives justifies their underperformance, low member commitment and bankruptcy (Manousakis *et al.*, 2021) in the Greek context.

The quantity provided improves the relationship between coffee farmers' satisfaction and their intention to leave coffee production cooperatives ( $t=-2.46$ ,  $p<.05$ ). Indeed, the impact of satisfaction on intention to leave is negative but less significant among farmers delivering large quantities. The quantity produced is a decelerator of the effect studied. This result confirms hypothesis (H2) in the sense that when the quantity supplied increases, coffee farmers are tempted to become independent. In practice, two satisfied farmers will all be less interested in leaving their coffee production cooperatives, but the one who produces more will be slightly more interested in leaving than the other. Behind these results, coffee farmers delivering large quantities have in mind (rightly or wrongly) that their coffees serve to enrich a category of actors (managers) to the detriment of themselves and their family members. More interestingly, these results confirm that, since tradition, the existence of a cooperative is closely linked to the presence of marginalized individuals (excluded from markets). Those who produce more feel able to fly on their own outside of coffee production cooperatives. From this perspective, cooperatives are seen as a way for small producers to unite their efforts. As with the microfinance study, it was also shown that certain variables (level of education) played a clear moderating role in the relationship between actors' satisfaction and their initial intention (Kanyurhi, 2015).

With regard to the control variables, the duration of the CBD at the head of a coffee production cooperative has a positive impact ( $t=3.38$ ,  $p<.05$ ) on coffee farmers' intention to leave. This situation can be explained by the fact that these same members complain about the lack of respect for the measures set out in the manual of procedures that governs the operation of their cooperatives. In general, the mandate of a CBD cannot exceed three years, renewable only once. This means that a former CBD must be in office for a maximum of 6 years. The reality in the field is quite different. Some people take the luxury of being at the head of their cooperatives for as long as possible. Some cooperatives in the field have been in existence for thirty years and have never changed their boards of direction. Similarly, education level is positively related to intention to leave coffee production cooperatives ( $t= 2.66$ ,  $p<.05$ ). These results imply that the more educated one is, the more tempted one is to leave their cooperative. The level of education increases the level of access to information, and therefore its in-depth analysis. Educated coffee farmers are not indifferent to the way their organizations are run, and the rents derived from cooperation. By realizing the existence of a gap between expectations and achievements, or the difference in living standards between members and leaders, members with a higher level of education wish to gain their independence.

### **3.3. Stakeholders' Approaches**

Indeed, the responsibilities for the situation described above are largely shared between the actors involved in the coffee sector: coffee farmers, coffee production cooperatives, international organizations (NGOs) that support coffee farmers, financiers, international buyers and the state.

Coffee farmers are threefold involved in their situation. First, they are under-informed about their role in the cooperatives they serve. They are not aware that the organization is a 'common good' that is accountable. They have an obligation to contribute to its development and to do so by checking on the spot all aspects related to governance, be it financial. A coffee farmer in Masisi says « ..... *we let them run their cooperative and do as they please* ».

Secondly, they are not loyal to their cooperatives. Deciding to hand over part of their crop to competitors reduces the room for manoeuvre of their organisations. To illustrate this, a coffee farmer we met in Idjwi-Nord said: « *If the cooperative does not agree to pay me in cash or if it does so at a low price, I have to deliver my coffee elsewhere* ». Finally, they have to accept, in certain circumstances, to give their products on credit (in case the cooperative has not been pre-financed). By demanding money, the cooperative is forced to use credit. Repaid with interest, this considerably reduces the overpayments to remunerate members at the end of the year. In order to do this, they must diversify their sources of income by introducing into their fields quick impact crops that do not harm the development of the coffee trees.

African agricultural production cooperatives practice governance that departs from universal cooperative principles. Their functioning is inspired by the colonial cooperative movement (Eckart et al., 2018). Colonial cooperatives, theoretically created to help the indigent, have seen their purpose drastically distanced from indigenisation. Their primary aim was nothing more than the export of raw materials and the enrichment of the settlers at the expense of the members they were supposed to serve (Eckart et al., 2018). Congolese production cooperatives are no exception to the rule. Given their modus operandi, they constitute an excellent field for empirical verification of agency problems. In order to get rich, men only think about creating cooperatives. Lacking resources, information on the cooperative and its governance, and regulations, these social entrepreneurs manage the organizations created as they please and benefit from the ignorance of the mostly uninformed village coffee farmers.

On this subject, a PCA we met in Idjwi-Nord said: « *In reality, this cooperative belongs to me. I am the only capital holder, people don't pay their shares, deliver coffee elsewhere, demand money...all the problems are mine alone. I only organise meetings to encourage them to deliver the cherries but the members are like customers. This is the reality everywhere. You see my colleague in Minova, it has been there for about 30 years, He has invested everything in it....* ».

Faced with this situation, some voices are being raised to clear up the ambiguity. Congolese social entrepreneurs have to choose between adopting a cooperative form and adopting a capitalist form (such as

private car washes). For each form adopted, the social entrepreneur must take full responsibility. Similarly, following the recommendations of Côté (2007), agricultural production cooperatives must be prepared to abandon what they are doing and devote themselves to creating something new. Almost all Congolese production cooperatives have no other source of income than the contributions of their members. It is essential for each cooperative to diversify its fields of activity in addition to its main area of specialisation (Niyonzima, 2010). The above is relevant insofar as the current agricultural context, marked by several constraints, pushes cooperative leaders to make both strategic and operational decisions, synonymous with internal changes (Czendes and Laszlo, 1970; Barraud-Didier et al., 2015).

Many of the coffee production cooperatives in the Great Lakes region have gained interest as a result of the interventions of international organisations (Manirakiza, 2021). These organisations have been instrumental in training actors and introducing new agricultural practices. However, some of them came with projects that were not adapted to an impoverished and uneducated village population. The interventions did not directly target the needs of the members, let alone strengthen cooperative governance. In Minova, a business advisor working for an international NGO argues that « *the projects are not target-oriented. No market research was done before the field interventions. The deterioration of coffee quality is partly explained by our inappropriate projects. By teaching the farmer how to process coffee at home without equipment, we implicitly encourage him to abandon the cooperatives* ».

In reality, these organisations, rather than simply encouraging the cascade of cooperatives, should at the same time strengthen the governance of existing ones. To do so, they should make partnerships conditional on the improvement of certain qualitative and quantitative indicators. In this respect, regular studies should be carried out to ascertain the actions of the coffee production cooperatives supported.

Financial partners are not exempt from the current situation. They grant loans with interest rates that do not take into account the return on investment for the village farmer. These organisations only look at the credit and repayment risks. In a meeting with the head of a bank that grants agricultural credits in the city of Goma, the manager stated the following: *"What interests me is simply to be sure that the cooperative requesting the credit is able to repay it on the agreed terms. I am not really interested in its cost structure, operational difficulties, governance and other managerial problems* ».

Ideally, these financial structures should instead conduct in-depth studies, trying to look at the entire agricultural value chain in order to identify the farmer's surplus in a bank-financed or unbanked situation. This analysis would allow them to set a negotiated rate, and above all, to find private organisations (CONGOAGRI CONSULTING) that can play the role of intermediation upstream, during and downstream of agricultural financing. This intermediation would considerably reduce the problems of adverse selection and moral hazard and decrease the risk of non-repayment.

As for international buyers, they set the selling prices of coffee at their own discretion without taking into account the operating costs and the multiplicity of intermediaries in the sector. This practice means that the money received is of marginal use to the coffee farmer, as the costs incurred from the field to the international sale are not better evaluated. They impose prices and cling to the 'best seller', forgetting that the next quantity offered will depend on the farmer's ability to renew the crop and thus control his costs. In the town of Bukavu, an international buyer states that « *the price is a variable that escapes the local market. It is set on the basis of certain quality criteria and takes into account current and future trends. The farmer who wants to be competitive has to respect the guidelines to improve the quality of his coffee, which means good markets* ». When asked if buyers have any idea of the return on investment for the coffee farmer, his colleague in Goma admits that « *this question would not interest any entrepreneur in the world, it is up to the state to play its game and the farmer to study his value chain to be a low cost champion* ».

As far as the state is concerned, it is doubly involved. On the one hand, it does not protect cooperatives against external threats, due to the lack of regulation. On the other hand, it stifles cooperatives with excessive red tape so that the surplus generated is swallowed up in corruption. This policy of "being served and never serve" is very detrimental to the coffee dynamic in Kivu. Yet, it is recommended that stakeholders

are close to each other (Muller and Tanguy, 2019) for concerted actions. In an interview with the state coffee manager in North Kivu, he gave a different version of the facts. He shows that « *the Congolese state has made enormous efforts by systematically reducing taxation. The isolated cases observed are more a matter of harassment. They must be denounced. Unfortunately, the economic operator himself is sometimes in complicity with these same individuals* ». In any case, denunciation would have no effect insofar as impunity dictates the law in the country. The evidence is that fraud is large-scale, illicit regional competition is present and border surveillance is weak. The cacophony in this sector is also due to the lack of regulation. In such circumstances, it is a jungle where the law of the strongest rules the market.

## **Conclusion**

Without satisfied and involved members, there are no cooperatives (Mangin, 2001). It is on the basis of this evidence that the study had a dual purpose. On the one hand, to test the link between the satisfaction of farmer-members of coffee production cooperatives and their initial intention. On the other hand, to verify if this relationship is affected by the farmer's agricultural potential. To achieve this objective, the study proceeded with a literature review on the issue and resulted in a questionnaire administered to 641 coffee farmers delivering their products to coffee production cooperatives located in the territories of Masisi (North Kivu), Kalehe and Idjwi (South Kivu) in DRC. After sorting, 255 farmer-members of the coffee production cooperatives were used for final analysis.

The results indicate that the level of satisfaction of farmer cooperative members is 54%. Meanwhile, their intention to leave is also 60%. Six variables define the satisfaction/dissatisfaction of coffee farmers in Kivu: internal democracy, community and environmental development, recognition of cooperative policy, social cohesion among members, member development and respect for procedures. These dimensions are the same as those valued by all the respondents. Similarly, there is a negative relationship between members' satisfaction and their intention to leave the coffee production cooperatives. However, this relationship tends to decrease as the quantity of coffee delivered annually to the cooperatives by members increases.

These results have strong implications. Theoretically, they show the variables that should be taken into account when studying cooperative issues, emphasizing that financial indicators are of second order. To better understand the phenomenon, the study shows the need to integrate interaction variables. On a practical level, coffee production cooperatives are informed about the opportunities and challenges that surround their organizations. They now know which variables to activate to increase satisfaction, and which to improve to reduce members' intention to leave. At the same time, stakeholders are informed about their respective responsibilities and the urgent actions to be mobilized to contribute to the promotion of coffee in Kivu.

Despite these contributions, this study also has two limitations. In a theoretical model such as this, the study would do better to analyze the contribution of coffee to household income. The intention to abandon would be amplified by the dissatisfaction of the coffee farmer following the deterioration of his income, and therefore the precariousness of his living conditions. Coffee farmers who are almost entirely dependent on coffee are more likely to leave than their counterparts who are not heavily dependent on coffee. This data was not easy to find, and the estimates are highly biased due to the lack of available statistics. Moreover, because only certain corners were targeted by the study, its results cannot be strongly generalized.

In terms of recommendations, given that satisfaction is practically inseparable from the governance mode in place (Vézina, 2013; Boujarfaoui and M'barka, 2021), the study recommends that this aspect be constantly reinforced by the coffee production cooperatives in Kivu. In the same way that cooperative consulting has contributed to the evolution of French agricultural production systems and agri-food chains (Filippi, 2015), support organizations would assist Congolese agricultural production cooperatives in their supervision. Apart from this subcontracting, should we think of a multisociety (Girard, 2008) including supporting members (experts) to better govern Congolese coffee production cooperatives so that they meet the needs they are supposed to satisfy?

Above all, the study of members' satisfaction with the services they received from their production cooperatives and their intention to leave should be ongoing to ensure the evolution of the climate in the agricultural sector and the dynamics of the members. Indeed, given the clear intention to leave the coffee production cooperatives, in-depth questions on the determinants of member loyalty or simply the analysis of the association appropriation by their members, are of paramount importance. Finally, future studies should verify whether their relationship with cooperatives has affected their potentials in coffee production. These are the different lines of attack of our next publications.

### Acknowledgement

The authors would like to thank the coffee farmers who voluntarily agreed to participate in the collection of information and authorised the publication of the results. They would also like to thank the stakeholders in the coffee sector who provided additional information for this study. Finally, they are grateful to the reviewers who helped enrich the text.

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## Community Responses, Enforcement of the Law of Child and its Implications on Child Sexual Assault in Arusha Tanzania

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### Abstract

Enforcement of the law means maintaining public order through prevention, detection, and investigation of crime and apprehension of criminals (Alvendia et al. 2018). Tanzania government, ratified the UN Convention on Rights of the Child (UNCRC) and the African Charter on Rights and Welfare of the Child (ACRWC) and enacted the Law of Child in 2009 for the purpose of protecting and responding to violence against children who are victimized. This study was conducted in Arusha region while involving 299 children age 10-17 both boys and girls. Arusha was selected because of having high prevalence of child sexual assault records than any other regions in the country. The objective of the study was to examine community responses on the enforcement of the law of the child to eliminate child sexual assault in Tanzania. The objective of the study was to examine low level of law of child enforcement influence in the increase on child sexual assault in Tanzania. The study used a multistage random sampling technique to select the districts involved in this study. Further, the study used both quantitative and qualitative approach for the triangulation of data, while using ecological system perspective. Methods of data collection were questionnaire and interview guide which was analyze by descriptive statistics and themes. The main findings of the study was; the communities lack adequate knowledge of the law of child act 2009. The communities rely on traditions ways of dealing with child sexual assault issues than reporting cases to police. The perpetrators of child sexual assault are not tried in accordance to legal procedures, instead they dealt traditionally. Therefore, low enforcement of the law lead to persistent child sexual assault. This appeal for supervision of law enforcement system and sensitization of the general public.

**Keywords:** Child Sexual Assault, Law Enforcement, Ecological system

### 1. Introduction

Child Sexual Abuse (CSA) is a world's prolonged problem that affects the well-being of societies. It affects human dignity of children and in the long run the well-being of the society at large, for example the physical, social and psychological aspects of life. Children experience effects like internal injury, transmitted diseases, depression, anxiety, stigma and low self-esteem. These effects result into direct and indirect short and long term consequences to both individuals and society including nation's government. Alarming rate of child sexual assaults has been presented by various researchers at different levels (Kang'ethe and Walioli 2020).

The literature shows the prevalence of child sexual assault in various continents as follows; Europe 9.2%, America 10.1%, Asia 23.9% and 34.4%. The estimate showed that, 7.9 % of males and 19.7 % of females universally faced sexual abuse before the age of 18 years. Moreover, literature provide data that, in United States of America nearly 1 in 3 females and 1 in 4 males experience rape for the first time between 11 and 17 years old. However literature indicate that, African region is highly hit by child sexual assault (CDC; 2021, Yemisi; 2020). Although the problem is rampant in African, the prevalence vary from country to country. Statistics showed that in South Africa the prevalence ranges from 4.1% to 60.0% among males, in Swaziland and Nigeria the rate was between 4.9 % and 56.0 % for females while the same ranges from 3.5% to 54.0% for males in Kenya and Nigeria (Selengia et al; 2020). In the same note, statistics showed

same trend in Tanzania, whereby the rate was 27.9% of females and 13.4% for males aged between 13 to 24 years old (URT, 2016). Moreover, the literature showed that, the problem in Tanzania is not only prevalent but also in a gradual increase (Singh *et al*; 2014, Badoe; 2017). Furthermore, incidences of child sexual assault have increased from 482 in 2013 to 13457 cases in 2017 (LHRC 2019; Mogoatlhe; 2019). This increase cause a huge range, equals to 2791.9%. The increase raises questions to the interventionists, professionals and the communities in which the problem occurs. Although the increase was alarming, it was not uniformly prevalent among the regions. Some regions had high rate of incidences than others which lead to the selection of the study area.

Several initiatives have applied by the government, civil society organizations and professionals to eliminate the problem without success. The situation continued to cause harm to children and compromise their value of dignity and worth of a person. Also contradict with the international, regional and national child protection instruments (UNCRC, ACRWC and LCA). The Law of Child Act (LCA, 2009), in its introduction part, states that the law shall be;

*“An Act to provide for reform and consolidation of laws relating to children, to stipulate rights of the child and to promote, protect and maintain the welfare of a child with a view to giving effect to international and regional conventions on the rights of the child”.*

The condition appealed for the study so as to examine the influence of the law of the child enforcement in the increase or decrease in incidences of child sexual assault in Tanzania. The study was guided by the following specific objectives; to understand knowledge of the community about the law of the child 2009, to understand authorities which communities reporting incidences of child sexual assault and to understand the extend of reporting incidences to child sexual assaults to the respective authorities.

According to Alvendia, et al (2018), enforcement of the law, means maintaining public order through prevention, detection, investigation of crime and apprehension of criminals. Relatively the Centre for Security Sector Governance (DCAF; 2015), describes, law enforcement, as the task of ensuring the provision of security for citizens going about their daily lives in accordance with a nation’s legal framework. Security provision is mainly done through deterrence and prevention, also with appropriate interventions to stop violations of the law. DCAF (ibid), added that, Law enforcement is carried out mainly by police, which is defined as a civil force responsible for prevention and detection of crime and maintenance of public order. Law enforcement or implementation of the law in other words, focuses on activities relating to prevention, detection, and investigation of crime and the apprehension of criminals (Bureau Justice Statistics; 2021, Alvendia et al; 2018). The effective law enforcement means that police organizations and personnel have the capacity to provide state and human security within a framework of democratic civilian control, and respect for the rule of law and human rights (DCAF; 2015). In the researcher’s view, without depleting the above description, law enforcement has also something to do with spreading knowledge of the respective laws to citizen in order to participate in the prevention of crime. This is because police get information from people concerning criminal acts through investigation or direct reported acts.

In Tanzania, law enforcement is mainly vested to police force. The police is mandated powers to maintain law and order: protection of life, property and prevention, detection and investigation of crime (APCOF; 2016, Mwakyosi; 2013, [https://www.unafei.or.jp/publications\\_No60/No60\\_19PA\\_Tibasana.pdf](https://www.unafei.or.jp/publications_No60/No60_19PA_Tibasana.pdf)). Further, Tibasana and Mwakyosi (ibid) account that, police force has the duty of preservation of the peace, the maintenance of law and order, the prevention, detection of crime, apprehension and guarding of offenders and the protection of property. Hence the government of Tanzania, established police posts all over the country to perform the critical role of maintaining peace and order including prevention of crime. Further, the country has ratified the UN Convention on Rights of the Child (UNCRC) and the African Charter on Rights and Welfare of the Child (ACRWC) and enact Law of Child in 2009 for the purpose of protecting children. However, acts of breaking the laws are widespread in the country, including child sexual assault. The situation raise questions as why the incidences of child sexual assault are rampant, persistent and increase in the presence of the law and enforcers. The literature show that, some people in the society do

not consider interpersonal sexual assault as a crime and Legal processes have limited potential to overcome barriers such as not being trusted, guilt and shame (Meba et al; 2019, Back; 2012). Prevalence of acts related to breaking the laws, denote weakness in the enforcement of the law and whether the communities in which the acts take place are responsible.

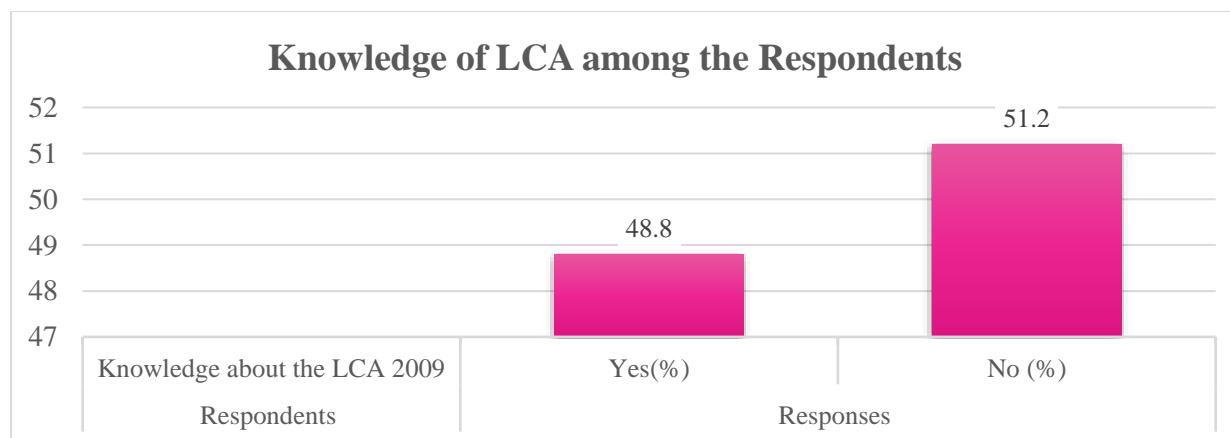
## 2.0 Methodology

This study was conducted in Arusha region. The reason why Arusha was selected was the prevalence of the problem. Different sources of data indicated that Arusha had more incidences of child sexual assault than other regions as follows; Arusha 808 cases, Tanga 691, Mwanza 500 and Ilala 489 (Ministry of Health-Department of Social Welfare; 2020, LHRC; 2018, Police Force 2016, Omar; 2015). The target population of the study were children aged 10 to 17 years, both boys and girls since they are victims of sexual assault incidents and have ability to provide information. The study was carried out using cross sectional research design because it allows a researcher to collect data from many different individuals at a single point in time and without influence variables involved. The sample of the study was 299 respondents and it was calculated from a known population of children (810,089) using Yamane formula (1967). The population was obtained from national census (URT; 2012). Further, multistage simple random technique was used to select the districts involved in this study. In stage one, three districts were selected, stage two, 2 wards from the selected districts were selected and stage three, selected 2 villages/schools from each ward and therefore made the total number of schools participated twelve. The study used both quantitative and qualitative approach for the triangulation purpose while using ecological system perspective. Methods of data collection were questionnaire and interview guide. The data collected were first, edited, classified and coded and before entered in Scientific Social Research Package (SPSS) version 20. Then, the incidents of child sexual assault (quantitative data) were analyzed by using descriptive statistics while data from interview was analyzed by using themes.

## 3.0 Results and Discussion

### 3.1 Knowledge of the Law of Child Act 2009 among Respondents

Distribution of Knowledge of LCA 2009 among Respondents (n= 299)



**Figure 1:** Distribution of Knowledge of LCA 2009 among the Respondents

Source: Research Findings 2021

The respondents answered the question asking if they have ever heard about the Law of Child Act 2009. The response indicate that 51.2% of all respondents had no knowledge of the law of child 2009 against 48.8% who were knowledgeable. Further, the respondent were asked the question about the source of knowledge of the law of child Act 2009. The findings for the question indicated that, 41.8% of the respondents got from television while only 14.3% got from parents/guardians. This findings may imply that, the parents/guardians do not know the law that protect children so that they can help in its enforcement. Legal and Human Rights Centre (LHRC; 2020), found that, knowledge of the community on protection issue is poor. The findings is complemented by opinion from research participant that;

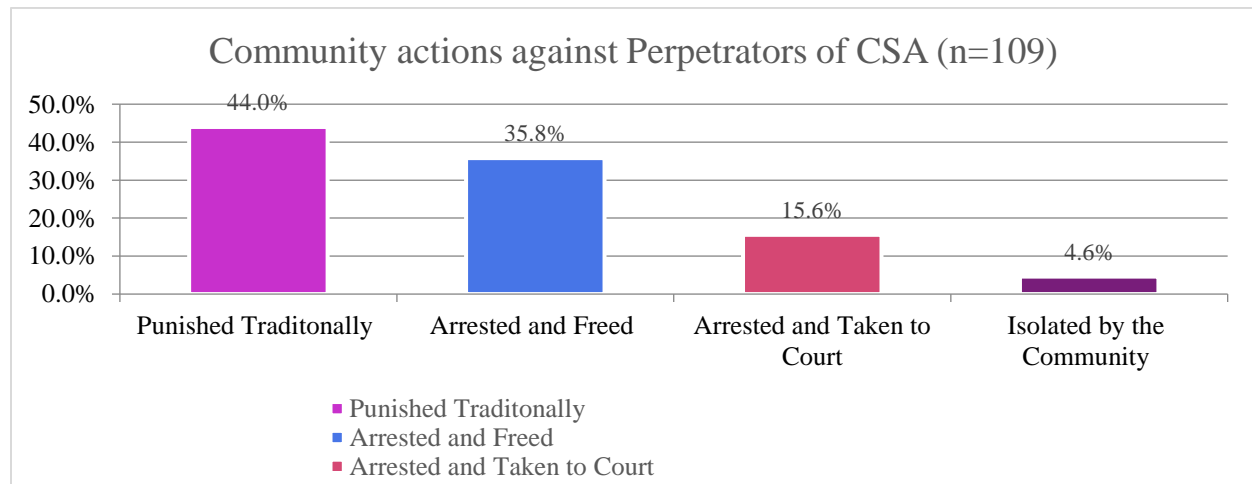
*“Many people do not know the law of child Act 2009, we have not seen the statute, even, teachers who could help implementing it have never seen”, (Participant; October 12<sup>th</sup> 2021).*

Being aware of the instruments protecting children from violence could make the general public help in prevention of crime something which is also a constitutional right. Contrarily Tanzanian citizens hardly enjoy this right. The literature show that Tanzania has no culture of disseminating information to citizen (LHRC, 2020, Kalemera et al, 2015).Kalemera pointed out that the right to seek, obtain and disseminate information is provided for under Article 18 of the Constitution of the United Republic of Tanzania of 1977.This is an indicator that there is low enforcement of the law. Knowledge of people in the enforcement of the law is very important because of awareness raising that lead to citizen demand for leaders’ accountability, individuals respect to laws including participate in enforcement through reporting incidences that violate the law. In ecological system perspective, the Society acts as an interdisciplinary agent for the presentation, discussion, dissemination and integration of ideas, information and discoveries about what is happening to her members including children (Leonard 2016, Crawford & Lewis, 2013).

### 3.2 Reporting Incidences of Child Sexual Assault

Reporting incidences of CSA is one the aspects of law enforcement including the law of child Act 2009. The respondents answered the question asking, where the incidences of child sexual assault reported by the community members. The results of response to the question showed that, only 36.4% of the respondent against 63.5% answered the question. Whereby 44.0% of those answered the question indicate that incidences CSA are reported to police. While 35.8% and 16.5% indicated to report to community leaders and parents/guardians respectively and 3.7 % report to teachers. This findings may imply that cases of child sexual assault are not adequately reported that is why the majority could not indicate any authority in which incidences of assault are reported. This argument correlates with the opinion from one of the research participants, that; *“The community is passive: hides the perpetrators because of social capital (i.e. relatives and neighbors), and thus they, solve such matters at home traditionally (Participant; 29<sup>th</sup> March 2022).* The literature provide that, reporting a crime means notifying the police about a criminal act that took place, however, victims report a crime to the police if the victimization is serious enough with regard to threat, injury or economic loss(Alameri at el; 2022, Holland; 2021,Guardian; 2006).

### 3.3 Response of the Community against Perpetrators of Child Sexual Assault



**Figure 2:** Community actions against Perpetrators of CSA

Source: Research Findings 2021

Dealing with, perpetrators of crimes like child sexual assaults, is actually one of the core aspects of law enforcement and function of law enforcement agencies. In this study the researcher wanted to examine how the community members deal with perpetrators of CSA. Are the actions taken correspond to legal procedures and or not? The findings for this question show that, actions taken to perpetrators upon

allegation with incidences of CSA, among others includes, punished traditionally. The findings as on figure 2, indicate that 44.0% of the respondents showed that, perpetrators are punished traditionally, 35.8% of them indicate that, the perpetrators are arrested and freed while 15.6% are arrested and taken to court. 4.6% are isolated by the community. This data, may imply that community do not act in accordance to the law or either do not value the right of the child. Moreover arresting the perpetrators and releasing them shortly indicate ineffective implementation of the law. The information gathered from one of the research participants pointed out that, *“Norms and traditions of using grass to settle critical issues is a barrier to the efforts initiated to end violence against children. For instance, a perpetrator can be arrested but parents meet and request to solve the matter at home”*, (Research Participant; April, 2022). The illustration from research participants qualifies that the communities rely on norms, beliefs and traditions than the legal system, no wonder why only few perpetrators are taken to court and majority are discharged at police and punished traditionally. The behaviour of hiding perpetrators has been observed in many countries including Tanzania, South Africa, Uganda just to mention a few as presented by several researchers (Pandey 2019, McCrann thesis 2017, Murray et al 2014,). However, collective response against child sexual abuse has tremendous impact in preventing crime like sexual assaults incidences including lessening them. Some parents hide the perpetrators especially when the perpetrator is a close relative, friend or known to the family of the survivor. In the same note, communities failure to act in accordance to the law when responding to incidences of child sexual assaults can lead to low enforcement of the law as the result incidences of assaults increase.

### **3.4 Prosecution of Perpetrators of Child Sexual Assault**

According to Britannica dictionary (2022) the term prosecution is defined as “the act or process of holding a trial against a person who is accused of a crime to see if that person is guilty”. Prosecution was considered as one of the core indicators of law enforcement: and for the matter of this study mean enforcement of the law of child Act 2009. Further, several researchers of prosecution admit that, prosecution is the goal of access to justice to both criminals and victims (Williams, et al; 2022, Stephanie, & Williams, 2019, Walsh, et al; 2010). Contrary to scholars’ argument and intention of the law, this study found that, only 15.6% of the perpetrators were arrested and taken to court (figure 2). Furthermore, the data obtained from the Resident Magistrate Court (RMC) Arusha-Juvenile Department indicate that only 13 cases of rape and sodomy (unnatural offence) were filed in the court in 2020 and 2021 despite the trend showed increase in cases reported. Out of those 13 cases, 3 were of rape and 10 of sodomy. All 10 cases of sodomy affected boys (Arusha Juvenile Court register, 28<sup>th</sup> March 2022).

## **4.0 Conclusion and Recommendations**

### **4.1 Conclusion**

The findings reveal that low enforcement of the law of child 2009 was contributed by inadequate knowledge of the community on the law of child 2009, to the extent that the statute has never been seen to the majority of the community. Community rarely report incidences of child sexual assault because of relying on norms, beliefs and traditional dispute resolutions. Further, community response to perpetrators is contrary to law enforcement because perpetrators were hidden, especially relatives and neighbors perpetrators. Therefore only few cases reach to the court for prosecution. The results imply that failure of the community response to incidences of child sexual assault lead to not reporting of incidences to the respective authorities and therefore not enforcing the law of child Act 2009 adequately. Consequently perpetration of child sexual assault increases. Furthermore, the study noted that, implication of ecological system theory does not happen automatically without human actions.

### **4.2 Recommendations**

The administrative bodies like District Commissioners, District Executive Directors should pay close supervision to police, child right duty bearers and community leaders for effective enforcement of the laws. Moreover, the government and child protection civil society organizations should publish a user friendly version of the law of child Act 2009 and make deliberate efforts to disseminate it through community

meetings, child rights clubs in schools and the media (televisions, radios and Newspapers). This will create awareness and sensitization.to the general public on children rights and the effects of children abuse

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## Examining Critical Success Factors for Africa's Sustainable Industrial Development with Special Reference to Zambia's Manufacturing Sector – Challenges, Prospects & Opportunities.

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### Abstract

This study was purposed to examine critical success factors for Africa's industrial development. The study employed a phenomenological research design in which a case study approach was used in targeting middle and top management key informant policy makers in line government parastatals and association(s) within the manufacturing sector in which 25 were interviewed comprehensively through convenient and purposive sampling techniques. Content analysis through determination of emerging themes was used to analyse the data. The study established technology, innovation, infrastructure, skills development, financing, R&D and actualized favourable manufacturing policies to be critical success factors to Africa and Zambia in particular's industrial development. Besides, the study found out that although the country has close to enough policy instruments and frameworks to guarantee meeting its SDG # 9 if implemented coherently, consistently and timely, there is no properly co-ordinated and prioritized attention to critically important productive sector policies for achievement of intended industrial development outcomes as the said factors fall across ministries thereby creating disjoints, discord and fragmentation in actions. On the other hand, the study established with concern that there was no properly streamlined and sectoral delineation for foreign investors' investments as some of them were found to be investing in mundane activities which economic activities are too basic and could be done by locals. The study concluded that the country needed to implement and actualize its industrial development policies and programmes as contained in its national policy documents, SDGs and the constitution with a further caveat that the social, cultural and economic rights must be enshrined in the republican constitution as a matter of urgency in order not to rationalize and make optional socio-economic development by politicians. If these policies can be implemented in correctly identified productive manufacturing industries, the nation would in no time overcome its alarming poverty, unemployment and inequality levels which have dogged it for generations now as raw commodity trade does not guarantee sustainable development.

**Keywords:** Critical Success Factors, Industrial Development, Africa, Zambia.

### 1. Introduction and Background

Modern industry contributes significantly to the accumulation of physical and human capital. It provides relatively well-paid jobs for large numbers of unskilled or under-educated workers—particularly those who are not integrated in the formal economy—which increases household income and, hence, domestic demand. In this way, industry generates substantial backward and forward linkages with other sectors, providing a wealth of opportunities for suppliers, distributors, retailers, and business services (Signe' & Johnson, 2018).

*Sustainable Development Goal number 9 (SDG#9)* set for fulfilment by 2030 candidly envisions “*Building resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation*” (SDGs, 2030). This SDG creates an imperative context for the coherent discourse as it pin-points specific aspects of socio-economic pre-occupations and policy focus for Africa and the rest of the countries in order to meet

the set benchmark. Industrialization is pivotal to Africa's long-term socio-economic development, and broadening and deepening the manufacturing sector will build more resilient economies which will automatically sustain the growing populations. Africa is endowed with vast resources – in agriculture, mining, and maritime resources, as well as a youthful labor force, which if properly harnessed, can stimulate a resource-based industrialization strategy (ECA, 2019).

The key boon of manufacturing is that it absorbs large swaths of workers and places them into productive and decent paying jobs. Throughout history, this exact recipe has transformed the United States, United Kingdom, France, Japan, and Germany into some of the world's wealthiest nations. Most recently, a new age of industrialization has helped push China into one of the world's fastest growing economies boasting the largest middle class, with other Southeast Asian countries following closely behind. These are all examples of how industrialization can generate rapid structural change, drive development, and alleviate poverty and unemployment (Signe' & Johnson, 2018). However, this narrative seems to exclude many African nations. Despite their manufacturing potential and promising trajectories, most African countries have remained relatively dearth of factories. This limited industrial development represents a missed opportunity for economic transformation and quality employment generation that alleviates poverty (ibid).

With permissible contextualization of the study and using Zambia as a case in point; the country is among the richest globally, yet very de-industrialized and underdeveloped. Zambia is a large, landlocked, resource-rich country with huge mineral resource endowments, especially with copper, forest and water resources, substantial agricultural potential (rich soils), home to the world's 7<sup>th</sup> natural wonder- the Victoria Falls and with sparsely populated land. Situated in the Southern Central part of Africa, Zambia has a total surface area of 752,618 square kilometres of landmass and 9,220 kilometres of water i.e. 48% of SADC water, shares borders with eight neighbouring countries that serve as an expanded market for its goods / services, and is Africa's second largest copper producer (World Bank, 2015). The description of Zambia herein is epitomic of many other African countries and the LDCs in general but the question which has remained begging/yearning for an answer is, "*Why the alarming levels of de-industrialization and underdevelopment amidst plenty of raw materials and natural resources in these nations?*"

### **1.1. Problematization**

Today, politicians, policy-makers, business leaders are increasingly realizing that manufacturing is a major factor in helping Africa achieve their goals of successfully reaching the next stage of socio-economic development. The African Union, for instance, has put the sector front and center in its Agenda 2063. African governments are seeking new and innovative ways to attract investment and nurture industry, implementing strategies that involve targeted investment in infrastructure, improved regional integration, and the establishment of special economic zones (SEZs) for priority subsectors (Signe' and Johnson, 2018).

*Zambia's revised National Industrial Policy* has prioritized the manufacturing sector as a driver of its envisioned industrialization, economic diversification, growth, wealth generation and jobs creation, especially for youths and women. Through its National Industrial Policy (NIP), food and beverage processing have been identified as leading subsectors to improve manufacturing sector growth from 5% to 20% p.a. and to improve manufacturing sector contribution to GDP from 8% to 15% by 2027. Agro processing enjoys special tax incentives and pays the least corporate income tax (10%) (2018).

Zambia as a case in point is among the richest globally, yet very de-industrialized and underdeveloped. Zambia is a large, landlocked, resource-rich country with huge mineral resource endowments, especially with copper, forest and water resources, substantial agricultural potential (rich soils), home to the world's 7<sup>th</sup> natural wonder- the Victoria Falls and with sparsely populated land. Situated in the Southern Central part of Africa, Zambia has a total surface area of 752,618 square kilometres of landmass and 9,220 kilometres of water i.e. 48% of SADC water, shares borders with eight neighbouring countries that serve as an expanded market for its goods / services, and is Africa's second largest copper producer (World Bank, 2015). The description of Zambia herein is epitomic of many other African countries and the LDCs in general but the question which has remained begging/yearning for an answer is, "*Why the alarming levels*"

*of de-industrialization and underdevelopment amidst plenty of raw materials and natural resources in these nations?*

It is against the foregoing background that the study took a critical focus on the urgent need for the country's sustainable industrialization and value addition in order to bridge the alarming poverty and unemployment gaps especially among the youth and women by reviewing and bringing out critical sustainable industrial development success issues for sustainable policy solutions.

## **1.2. Study Objectives**

- 1.2.1.** To establish critical success factors for Zambia's industrial development.
- 1.2.2.** To assess the efficacy of existing policy frameworks and/or governmental undertakings for guaranteeing Zambia's inevitable industrial development.
- 1.2.3.** To describe socio-economically viable actionable policy imperative measures to industrialize the country.

## **1.3. Study Justification**

Africa's need for sustainable industrialization cannot be over-emphasized as it has been long overdue. It is imperative to note that Africa could have been the first continent to industrialize on the globe had precautionary measures been taken from the inception of civilization. This continent has had all necessary ingredients for industrialization and value addition to its raw material and services even before Great Britain industrialized. Therefore, carrying out a study premised on critical success factors for the continent's sustainable industrial development provides insightful and imperative steps that the policy makers, politicians and business houses need to put in place to position the continent and respective countries on the socio-economic development agenda deemed to be panacea for its numerous challenges.

## **2. Review of Related Literature**

### **2.1. Critical Success Factors for Sustainable Industrial Development**

Since the turn of the millennium many African economies have been reintegrated into the world economy on a positive note and experienced substantial economic growth. This growth has primarily been concentrated in commodity exports. The central question, however, facing African economies is how to use economic growth to foster industrialisation and value addition thereby facilitating general development (Morris and Fessehaie, 2014).

Thus far higher GDP growth rates have not proportionately impacted on poverty reduction. This was because growth failed to translate into commensurate job creation and social progress. Indeed, sub-Saharan Africa, particularly in Central and East Africa, has shown the lowest growth-poverty elasticity in the world (Fosu, 2011). The mineral and oil sectors are capital intensive hence have lower employment linkages than the manufacturing sector. Moreover, the potential benefits accruing from higher revenues have often not materialised because of low tax regimes, tax evasion and financial mismanagement.

Africa needs to provide job opportunities to millions of young people. Only a massive industrialisation effort will enable Africa to eradicate poverty and achieve sustainable development. At the same time, this will facilitate dynamic processes of technological innovation, skills development, knowledge-intensification and capital accumulation. Linkage development to commodity sectors can open important opportunities in this respect (Morris et al. 2014).

Industrial development opens up opportunities for positive externalities that are difficult to quantify. African countries can promote a diversification of technological capabilities and of their skills base by developing backward linkage supply firms to the commodity sectors and resource-processing industries. The variety of technological capabilities and skills fostered in linkages also opens up opportunities for lateral migration into other sectors. However, policy makers need to carefully assess the competencies developed within a sector because some have more potential than others for horizontal linkages (Hidalgo et al., 2007). For example, engineering services and manufacturing competencies have a general applicability across a wide

variety of sectors. Investment into building broad “engineering skills” is therefore crucial. There are many other variables which are largely considered to be critical for a nation’s sustainable development. These are, but not limited to, human capital, innovation, supply demand, technology, natural resources, research and development, infrastructure, political will etc.

The quality of a country’s workforce, or its stock of human capital, is related to the country’s flexibility, productivity, and ability to innovate. Illiteracy, low education levels, and poor health conditions among the population hinder an individual factory’s productivity and its ability to absorb new technologies, creating a negative impact on the diversification of manufactured goods in the whole economy. Moreover, only through continuous innovation, either in formal product development or management process improvement—which need quality human capital—, can growth be achieved over the long term (Prakash and Gupta 2008; Schumpeter & Narayanan, 2001).

Infrastructure also has a huge role to play in the industrial development of a country owing to its capacity to either increase or lower the cost of doing business. Cost effectiveness is widely viewed as the primary constraint on growth in manufacturing for firms of all sizes, but particularly for SMEs. For example, Radelet and Sachs (1998) have produced a wealth of research linking shipping costs to a country’s prospects for growth in manufactured exports, as well as to its overall economic growth. These transport costs are largely determined by structural constraints, such as access to seaports, but also by macroeconomic policies, bureaucratic red tape, and the quality of infrastructure.

According to Signe’ & Simons (2018), the current trends in cost effectiveness, supply networks, and domestic demand indicate that Africa is poised for rapid industrialization in the coming years. In the near future, the region will possess a more productive and cost-efficient workforce, improved transport infrastructure and regulations, larger and more developed supply networks, and consumer markets to support a range of manufacturing subsectors. In Côte d’Ivoire, for example, the impressive projection of about 7 percent annual GDP growth through 2020 is attributed to about a 10 percent increase in the value of household consumption, growing access to markets across the Economic Community of West African States (ECOWAS), increasing public investment in infrastructure and agribusiness, and a shift in the workforce from farming (currently 70 percent of the workforce) to formal employment (Business Sweden, 2016, p.6).

From the Zambian context, the country’s long term aspirations are embedded in its long term policy national document commissioned by the 3<sup>rd</sup> Republican President Levy Patrick Mwanawasa in 2006 dubbed: Vision 2030. This document envisions Zambia to be “*A Middle-income Prosperous Nation*” by then. It is Zambia's first ever written long-term plan, expressing Zambians’ aspirations by the year 2030. It articulates possible long-term alternative development policy scenarios at different points which would contribute to the attainment of the desirable social economic indicators by the year 2030.

Although Zambia’s 2030 Vision espouses a socio-economically grown and developed country to a middle-income status by measurement, the document does not identify or pin-point industrialization as a promising vehicle to attaining such a development level. The document does not equally categorically identify and describe critical success factors for Zambia’s industrial development by the set year which equally coincides with the SDG 2030.

However, the 8NDP recapitulates that diversification and industrialisation are constrained by inadequate infrastructure in economic sectors such as transport, energy, agriculture and ICT, especially in rural areas. This contributes to the high cost of doing business and ultimately affects productivity and the competitiveness of the economy. In addition, inadequate access to productive resources, especially low-cost financing, adversely impacts efforts to industrialise and diversify the economy at the desired rate. Further, limited research and development, coupled with low use of applied research and innovation have compounded the low rate.

The enlisted description of the critical teething bottlenecks to Zambia's industrial development in the 8NDP in the foregoing paragraph is an eye-opener and a hope-filling breath that government might now objectively deal, by policy and action, with issues necessary for the industrialization of this country.

## **2.2. Policy Frameworks and Governmental Undertakings for Industrial Development.**

At continental level, according to the African Union Commission (2015), there is still significant room for growth in African manufacturing within the continent. Intra-African trade in manufactured goods has already increased from 10 percent of total trade in 2000 to about 16 percent in 2014. In order to support that growth, African regional bodies and governments are breaking down trade barriers, improving financial structures, and investing public resources in much-needed infrastructure— especially transport and energy networks and the Internet. Industrialization in Southern African Development Community (SADC) has been slow, particularly in the manufacturing sector, which has shown a decline in contribution of 10.6 percent to Gross Domestic Product (GDP) in 2015 compared to 14.1 percent in 2005 (SADC, 2020). The SADC framework hinges upon regional commitment, creation and intensification of individual country policies. The SADC region needs to increase the manufacturing sector share of GDP to above 25 percent to significantly transform the economic and social status of its citizens (Southern African Research and Documentation Centre, 2015). While there are concerted efforts towards regional industrialization in SADC, it is still a very individual experience. Member states will take different paths to achieve this goal. A study by Mkwizu et al. (2021) on Impacts and Challenges of Industrialization in SADC made a finding that *“while there is an impact on policy provisions targeted towards industrialization, there are challenges such as poor policy implementation that, if not addressed, could dampen efforts by policymakers in achieving the goal of industrializing the countries.”*

From the Zambian context, the National Long Term Vision 2030 (Vision 2030) is the country's first ever written long-term plan, expressing Zambians' aspirations by the year 2030. It articulates possible long-term alternative development policy scenarios at different points which would contribute to the attainment of the desirable social economic indicators by the year 2030. The Vision is operationalised through the five-year development plans starting with 5NDP (2006 - 2010) and annual budgets.

The foregoing Zambian Document detailing the aspirations of the country's citizenry by the year 2030 has mouthfully generalized issues which do not speak to specificities of industrial development of the country. It must be clearly stated that industrial development cannot happen in a vacuum devoid of favourable targeted policies with equitable financing, co-operation between the public and private players and prioritized considerations of investment in productive manufacturing sectors and line industries for potential achievement of backward and forward linkages.

Since the launch of the country's Vision 2030 in 2006, the country has had a number of NDPs (2006-2010, 2011-2016, 2017-2021) and the current 2022-2026 with their attendant budgets. Most of these documents, if not all, have been acknowledging the manufacturing sector as a pivot of economic development through its backward and forward linkages to economic growth, exports and employment creation through its potential to provide a market for primary products and sets the basis for exports with employment generation capacity. Policy, institutional and legislative reforms undertaken during the FNDP contributed towards a more conducive investment environment for both foreign and domestic investments, including the Micro, Small and Medium Enterprises (MSMEs). The main thrust during the SNDP period was to facilitate the up-scaling of the manufacturing sector towards higher value addition and upgrade capacity in the provision of related services. Emphasis was placed on transforming industrial businesses and complementary services particularly MSMEs into strong value-creating entities (6NDP).

The current NDP, the 8NDP (2022-2026) is themed: is ***“socio-economic development for improved livelihoods.”*** It targets massive job creation, poverty and inequality reductions anchored on investments in productive sectors like the manufacturing, mining, tourism and agriculture. *“It is, therefore, the focus of the country to attain economic transformation that will be marked by **advancements in industrialisation and economic diversification for sustained growth driven by agriculture, mining, manufacturing and***

*tourism. It will entail shifting labour and other resources from low to higher productive activities between and within sectors. Ultimately this will increase employment opportunities for all Zambians. To ensure sustainable economic transformation and resilience of the economy, measures will be undertaken to transition Zambia to a modern green and resource efficient economy.”*

The country equally has a revised industrial policy which espouses the growth of the manufacturing sector. *Zambia’s revised National Industrial Policy* has prioritized the manufacturing sector as a driver of its envisioned industrialization, economic diversification, growth, wealth generation and jobs creation, especially for youths and women. Through its National Industrial Policy (NIP), food and beverage processing have been identified as leading subsectors to improve manufacturing sector growth from 5% to 20% p.a. and to improve manufacturing sector contribution to GDP from 8% to 15% by 2027. Agro processing enjoys special tax incentives and pays the least corporate income tax (10%) (2018).

There are many other development national documents and institutions which speak to the socio-economic growth of the nation in the area of industrialization. These include the Zambia Development Agency (ZDA), the Citizens Economic Empowerment Commission (CEEC), the Industrial Development Corporation (IDC) which houses all public industrial parastatals and is chaired by the Republican President.

Therefore, from the studies reviewed, it is quite evident that firstly there are no specific industrial development success factors have been attributed to Zambia. Secondly, the country’s multiple policy documents are notable but the challenge could be coherence, coordination, financing and harmonization of them for targeted industrial development. Thirdly, they equally do not delineate the critical success factors for the country’s sustainable industrial development.

### **2.3. Conceptual Model for Potential Actionable Industrial Development Policies**

A conceptual framework is a narrative or diagrammatic structure which the researcher believes can best explain the natural progression of the phenomenon to be studied (Camp, 2001). *Figure 1: Study Conceptual Framework* diagrammatically presents the variables which anchor this study and attempts to explain the interrelationships between and among them believed to be panacea to Africa’s industrial development challenges. The CF identifies five independent variables, namely; Research and Development (R&D), financing, infrastructure, skills development, technology, and innovation which are deemed pivotal to the stimulation of the African continent and Zambia in particular to industrially develop.

#### **2.3.1. Research & Development (R&D)**

R&D has proved to be a trustworthy vehicle in transforming many developed countries now. The decisive synergy between academia and industry create a necessary condition for Higher Education Institutions (HEIs) to achieve socio-economic development by developing prototypes which are made available to industrialists to invest in industries.

#### **2.3.2. Financing**

This is a critical catalyst to industrialization. Industries cannot be opened devoid of sufficient capital investments in targeted productive sectors. Financing is also necessary for industrial infrastructure development of the country. Industries involve a lot of investment in production plants, machinery, tools and equipment which need sufficient budgetary resources from central government and /or through public private partnership frameworks.

#### **2.3.3. Technology**

Technology is an equalizer. This means that the LDCs must radically shake their primary industries structure to begin adding technology to their production to produce finished products. The Artificial Intelligence (AI) can be of great use in revolutionizing service provision by the public sector which is mostly marred with delays, bureaucratic inertia and red tapeism.

#### **2.3.4. Infrastructure development**

This is critical for any sound and meaningful development to take place. In the context of industrialization, the country needs to have basic and minimum standard infrastructure to support the crusade for industrial

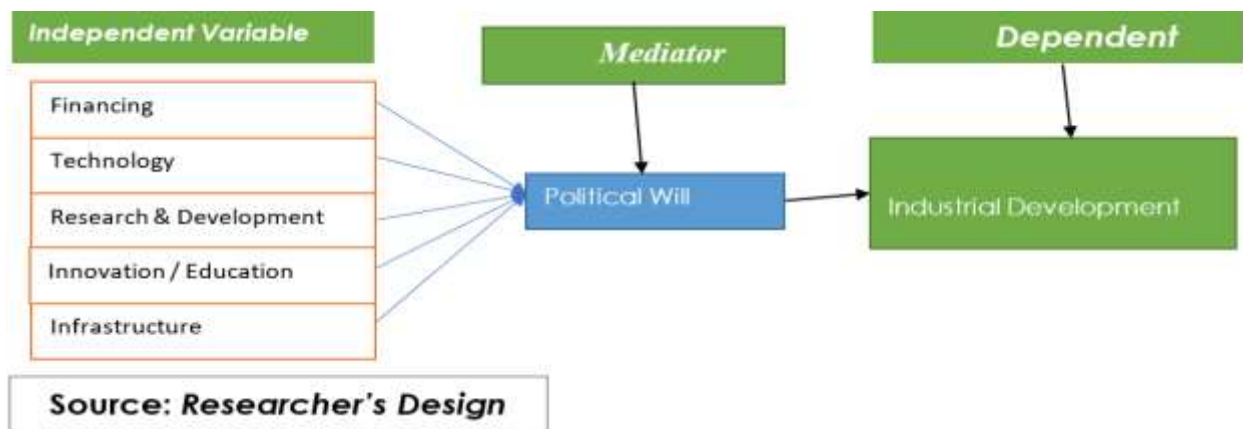
development. This may, among others, include good road and rail networks, airstrips, airports, warehouses and production plants, internet infrastructure, telecommunication towers, and many other industry specific infrastructure necessary for the development of industries.

### 2.3.5. *Innovation,*

This implies the citizenry's trained / educated minds and mindsets to create or design new products or add value to goods and services given favourable resource endowments of the country. This means that the education curricular of such nations must not just emphasize academics but vocational and other entrepreneurially oriented pathways which squarely resonate with their country's environmental resource endowments. In this way, education of citizens will be relevant and the citizens will participate fully in the socio-economic development of their respective nations. It entails overhauling colonial masters' reflective curricular at all levels and designing educational goals / curricular which are responsive to the countries' socio-economic development needs through specified skills training and development of human resources who will be useful to industrial development of their nations.

### 2.3.6. **Political Will**

This variable has been recognized in this study as a paramount intervening one whose presence or absence largely explains the industrial development status of these nations. Countries which have industrially developed in the past and present have been able to achieve such on account of the political leaders' and policy-makers' deliberate targeted efforts and financing of industrial-based policies coupled with consistent oversight roles on the same. In the African set up where development is largely politicized, it is of paramount importance that the ruling politicians give an outright buy in to industrial development initiatives, policies, programmes and projects with equitable financing or indeed an enabling business environment and policies supporting industrialization by the private players.



## 2.4. **Theoretical Models: Growth Pole Theory & Innovation Paradigm**

This study is anchored on French Regional Economist, Francois Perroux's Growth Pole Theory, developed in 1955 and Joseph Schumpeter's Innovation and economic development model. These two theoretical models speak not only to the industrial imperatives of modern times but also to the benchmark SDG which envisages industry, manufacturing and innovation as critical catalysts for the countries' meaningful socio-economic development. These theories equally complement each other. It is Perroux's considered view that investment in productive sectors which have backward and forward linkages can quickly equalize development. He considers development from a satellite perspective in which an investment in one industry automatically stimulates growth and development of other industries from respective regions towards the centre.

## 3. **Methodology**

The study was conducted within Lusaka district, the capital city of Zambia where most of these parastatal companies and the association headquartered and located. The study employed a phenomenological

research design in which a case study approach was used. It targeted middle and top management key informant policy makers in line government parastatals [(Zambia Development Agency (ZDA), the Industrial Development Corporation (IDC), the Citizens Economic Empowerment Commission (CEEC), the Lusaka South Multi-Facility Zone (LSMZ), and association, the Zambia Association of Manufacturers (ZAM)] within the manufacturing sector / peripherals in which 25 were interviewed comprehensively through convenient and purposive sampling techniques. Key informant interview was used as a data collection tool. The researcher equally reviewed national policy documents of the country and policies / legislations of these entities as secondary sources to complement / corroborate the primary data garnered through key informant interviews. The data was analysed by following the patterns of similar and dissimilar findings and categorized them into thematic sets and the highest ethical considerations were adhered to. Ethical considerations, among others, required that interviewees / informants were to speak on conditions of anonymity, the researcher(s) would not disclose particulars of informants to anyone at any stage and confidentialized all deliberations and engagements.

#### **4. Presentation of Findings**

##### **4.1. Critical Success Factors for Zambia's Industrial Development**

###### **4.1.1. Political Will**

The key informants collectively emphasized the significance of political will if Africa and its nations were to be sustainably industrialized. They cited other jurisdictions like UK, Singapore, Asian Tigers, among others, who made significant scores in industrial development on account of their leaders' political will.

*“Without political will, there is no expectation of industrial development as there is scanty evidence of any industrialized country which attained such status without the pivotal role of politicians working with policy makers to industrialize those nations world over. Examples of South Africa, China, Singapore, Malaysia, USA, UK, among others, speak volumes to this effect”* they observed.

###### **4.1.2. Financing**

Financing was equally pointed out to be a critical success factor to Zambia's industrial development and indeed any other LDC as industrialization required huge capital investments.

One informant observed:

*“Without adequate financing, no one should expect industrialization of a nation and this is where most LDCs fail because their annual budgets mostly revolve around basic and consumptionist needs. The lack of industries, ironically, is the cause for constricted resource envelopes for these nations and Zambia in particular is equally affected by this phenomenon. It is even worse that most of these countries survive their annual budgets through debts from financial institutions which they later have to pay back at high interest rates which further dwindles their ability to dedicate resources for industrial development.”*

The financing gap was re-echoed as a resounding challenge in the development of industries. The CEEC Director General, Dr. Charles Muwe Mungule, during a special interview on Prime Television, hosted by Amb Frank Mutubila, on 13<sup>th</sup> July, 2023 from 20:30 to 21:30, monitored by the researcher, stated the following with regard to the financial and operational challenges of the commission:

*“CEEC as citizens' economic empowerment statutory body began its operations in 2008 with total budget of K1.5 billion (USD 75,000,000.00) from 2008 to 2023 but only K880 million (USD 44,000,000.00) has been received since its inception. From 2008 to 2021, only 28% of the budgeted amount from treasury was released but the new government has demonstrated commitment in that in 2022, all the K350 million (USD 17,500,000) (budgeted amount was released to the commission and for the current year K236 million (USD 11,800,000) of the K397 million (USD 19,850,000) budgeted has already been received by mid-year. The commission has*



*also operational challenges in that it has a very small labour force which affects loan recovery at only 28% recovery rate as of 202. The commission has a strategic plan 2022 to 2026 targeting value addition projects but the challenge is the financing gap of K29 billion (USD 1,450,000,000) currently which makes the commission to refer some of the projects to banks for possible financing though at higher interest rates compared to the commission lending rate of 12% simple interest per annum.”*

#### **4.1.3. Innovation, Skills Development, Research and Development**

Key informants generally lamented that the country’s levels of investment in R&D were sub-optimal. They stressed that R&D was a priority aspect of financing in most countries which have made significant progress in industrial development in which resources were dedicated to scientific research to bring out product prototypes and product development including service value addition.

One of the informants cited an R&D research institution at the University of Zambia and said,  
*“Technology Development and Advisory Unit (TDAU) at UNZA has capacity to engage in production of industrial products. In fact, during COVID – 19, the unit produced an industrial ventilator but the project could not be scaled up due to lack of funding. Therefore, I can say the country has quite some skilled human resources and institutions which can engage in R&D to produce desirable results but the main challenge is lack of political will to decipher the necessity of financing such undertakings.”*

The informants collectively understand innovation to be the ability to creatively design new products or enhance features of such products and to add value to goods and services. Asked how they assess the country’s levels of entrepreneurial spirit and innovation; the informants were generally in unison that much leaves to be desired.

One of them stressed that:

*“The country is immensely rich in all manner of natural and human resources to turn this country into an industrial hub. I cannot fathom why a country with all manner of resources like copper, cobalt, gold, silver, emerald, coal, sugilite, nickel, manganese, iron, zinc, steel etc can still be a mere producer of such raw materials decades after their discovery but without appreciable value added to them for direct industrial use.”*

Another informant observed that the country has vast forestry which is valuable for timber and also with such trees like Mukula with medicinal value as well as gun handle production:

*“Can you imagine that this country has so much forestry which is an input in furniture production; Mukula for medicinal production and gun handle manufacturing but we still import finished products of these our raw materials? We have vast land with fertile soils for agribusiness but the country is still largely at peasantry level in terms of production and productivity with no desired value added to these products thereby trading in raw agricultural materials. The same case goes for our fish heritage which is simply fished from rivers and lakes then sold as is. This development approach has been responsible for the country’s alarming poverty levels and the earlier we realized and changed direction the better.”*

Asked what could be done to improve the levels of entrepreneurship and innovation, a number of the informants cited common issues of interest. They stated that there was need to relook and decolonialize the education curricular from Kindergarten to university levels so that those curricular reflect the resource endowments of the countries and provide relevant skills in multiple pathways along such. They also stressed

the need to have university curricular which do not just churn out white-collar-job graduates but those that create employments by applying their university acquired skills in production, R&D and various other innovations which revolutionize the economy. The mindset of most Zambians was also said to be at fault as most of them were living dependant lives devoid of hard work, business risk taking, self-reliance and industry.

Some of the informants stressed that:

*“The country needs to invest a lot of resources in human resources skills development necessary for the achievement of SDG #9. The government’s introduction of free education from pre-grade to grade 12 was a step in the right industrial development direction but it must take into account revolutionization of the curricular if the intentions of free education are to be achieved. There is nothing more important than having rightly skilled human resources across the productive sectors of the economy if the innovations and industrial development is to be achieved.”*

#### **4.1.4. Technology and Infrastructure Development**

75% of informants reiterated the importance infrastructure in order to guarantee industrial development. They stressed that infrastructure such as good road networks, telecommunication and internet facilities, airports, production plants, warehouse, railway and water transport were of paramount importance in ensuring that the manufacturing sector booms. They observed that industrial products need to be transported to various destination for sale and without necessary infrastructure success cannot be recorded.

One of them stressed that:

*“It is the role of government to ensure that necessary infrastructure is available in the country for industrial development. The basic infrastructure such as roads, railways, airports, telecommunication towers and internet facilities cannot be left to the private sector to develop as they were capital in nature. Such infrastructure need to be available to ensure that connectivity and networks within and across national borders are ease. Zambia, for instance, is still lagging in availability of such infrastructure necessary for industrial development. The country still has a lot of areas without roads, telecommunication towers, airports, internet infrastructure, among others, thereby making it practically impossible to achieve meaningful industrial development. The country is now gravitating towards electric battery motor vehicles but without building infrastructure to make success such a development, nothing will materialize.”*

Another informant remarked that:

*“The world has now gone digital and is in the 4<sup>th</sup> industrial revolution but our country has not yet moved some inch towards realizing some benefits from the digital world. A lot of office and industrial operations are still analog yet automation from Artificial Intelligence (AI) and the internet of things (IT) has revolutionized the globe with many countries cashing billions of dollars through digital platforms while improving their service delivery. There is need for a revolution in this direction sooner than later or the country will find itself drowning in high digital waters.”*

Making an additional comment on technology, one other informant narrated that:

*“Technology in our context means adding value to our raw materials so that they become finished products which would have higher sales value.”* The

*creation of the Ministry of Science and Technology by the Government of the Republic of Zambia must be seen as a step in the right direction as it government's realization of the important role played by technology in industrialization of the country. What is important now is to ensure harnessing appropriate technologies and providing an enabling environment for the private players to participate fully in the industrial development of the country through relevant policies from this ministry."*

#### **4.2. Efficacy of Existing Policy Frameworks for Guaranteed Targeted Industrial Development.**

The informants were asked to assess the efficacy of government policy frameworks and instruments in place to guarantee meeting the SDG # 9 benchmark and a lot of them raised critical issues while agreeing to a large extent that the country was not in want of policies but political will and citizens' revolutionized mindsets.

In reinforcing the foregoing observation, one of the informants noted:

*"If you look at the Country's Vision 2030, the successive national development plans (NDPs), the NIP, the establishments of the Ministry of Science and Technology, the CEEC Act, ZDA, TDAU, among others, they have extremely brilliant industrial development trajectory, but over the years, most of these are not annually funded equitably to implement those ideas and innovations. The issue of the political will is paramount in determining the successful implementation of the industrial development agenda."*

Some informants also yearned for effective and implementable energy policies which they observed were a serious impediment to Zambia and Africa's industrial development.

One informant stated that:

*"Zambia has over 40% of SADC water but has no stability yet in the production, generation, distribution and consumption of electricity. The industries are severally disrupted due to this erratic power supply which is also demotivating to would be industrial investors. The solar energy sector also has huge potential but the country is not seemingly tapping into this aspect to its detriment. There is need to ensure that existing energy policies are actualized so that the country can mitigate the national energy deficit and guarantee stability of energy to industrial investors. The country currently has the energy generation capacity of 3,356.6 MW, which may not suffice for multiple commercial industry operations."*

#### **4.3. Viable Actionable Policies for Industrialization**

##### **4.3.1. Political Will and Constitutionalism Aligned Policies**

On this topic, informants specifically remarked, *"we need politicians who understand and can apply their skills to policies around industrialization as the mainstay of the nation's socio-economic development. The country long been singing songs about job creation, poverty and inequality reductions but without integrating the actual panacea to the realization of these benefits which is industrial development. The social, cultural and economic rights need to be included in the republican constitution so as to compel these politicians to act in the direction of development and not self-service."*

##### **4.3.2. Innovation, Skills Development and Technological Adaptation**

The informants noted with concern that despite the availability of various policy instruments and frameworks on innovation, skills development and technological adaptation, the nation was still lagging behind in the implementation of the same.

*“Actualization of Innovation and entrepreneurship policies is the way to go. The Ministry of Small and Medium Enterprise along with the Ministry of Science and Technology, needs to ensure that various innovations, R&D purposed for industrial development are undertaken in order to fulfill the SDG # 9 target. The country has a brilliant industrial policy which must be actualized through adequate investment in required technologies, innovations and scientific research which must provide industry prototypes and patents for commercial markets. Skills training must be available to all citizens since government is deducting resources from workers’ payroll as without know-how, forget about industrial development.”*

#### **4.3.3. Streamlining FDI Policies**

Informants were also asked to indicate their perspectives with regards to foreign direct investment policies.

A number of them re-echoed the remarks that:

*“how can the government policy allow an investor all the way from Europe or China to come and invest in selling retail sweets of auto spares which are equally imported? The country cannot even produce tooth picks despite the vast forest, nails despite immense copper deposits and pharmaceutical products despite so many trees with medicinal value and investors are allowed to come and cut these trees, mine the minerals, kill the wildlife for raw export to Europe, China, Asia etc! This must change! Our FDI policies must be reviewed and changed to cure this recklessness as it does not guarantee sustainable development.”*

#### **4.3.4. Infrastructure Development Policy**

On infrastructure policy, informants collectively shared the view that:

*“There is need to have policy clarity and coherence on who is responsible for road and railway transport development, telecommunication and internet infrastructure, industrial development and energy infrastructure for the country to have an objective focus on industrial development. On the other hand, the government must prioritize the development of infrastructure in productive sectors which will add more value to the country’s GDP than venturing in rent-seeking activities. In fact, infrastructure development must be de-politicized if it is to be meaningful and sustainable. Policy expert in public offices must be able to register harmony and coherence in national policies to curtail discord and disjoints in the execution of national development projects” one of the informants stressed.”*

### **5. Discussion of Findings**

#### **5.1. Critical Success Factors for Zambia’s Industrial Development**

##### **5.1.1. Political Will**

This is one of the most outstanding variables which largely cut across most less developed countries industrial status. Academic literature opines that these nations are what they are on account of political decisions. Conversely, countries with political will tailored on socio-economic emancipations of their nations have shown a progressive trend of development and are classified as developed. It is, therefore, imperative that LDCs, Zambia inclusive, invest in improving their political leadership in order to have a cadre of politicians who will have the interest of their respective countries at heart. This requires statesmanship, patriotism, knowledgeability, maturity, and adherence to the rule of law by these politicians (by among others co-opting social, economic, cultural and political rights in republican constitutions).

### **5.1.2. Financing**

Capital is topping the list on the necessary factors for industrialization. The LDCs have for a long time failed to raise sufficient resources to invest in their manufacturing industries in order to compete favourably with their contemporaries on the international commercial and trade markets. However, it is noteworthy that these LDCs have borrowed huge sums of money which have been spent on consumptive expenditures to the detriment of their industrial development prospects. There is need to revolutionize the borrowing appetite and reasons for the same so as to align the borrowing of such resources to the industrial development of these nations. Zambia as a case in point is grappling with a huge foreign debt whose expenditure results are hardly seen nor felt by the citizenry in socio-economic terms. All this also speaks to the quality of politicians and policies in place to censor and sieve the needs of the country against those of political players. The borrowing of such funds are supposed to be invested in value-adding productive investment beneficial to a huger proportion of the population in poverty and inequality reductions as well as job creation opportunities thereby enhancing and expanding the country resource envelop for provision of effective social services.

### **5.1.3. Innovation, Skills Development, and Research and Development**

Creativity and innovation are at the centre of any meaningful and sustainable development undertaking. Countries which have invested in their citizens' skills, R&D, have definitely yielded hefty dividends and their economies have been thriving. China is one such case worth emulating and many other western countries. This view is consistent with the human capital theory, the Resource-based theory, and the innovation model by Joseph Schumpeter. Zambia and Africa at large are still far from this bench, which also gives justification for their industrial development status.

In his study which recognizes and buttresses the complementary role of technology and innovation in industrialization and value addition, Kaya (2015) noted that developing innovations is determined by the technologic and economic conditions, in which the firm (making innovation) is. Innovations may be intensified in certain periods and sectors, because in order for a radical innovation to be able to use its all technological potential, many complementary (small) innovations are needed. In other words, after a radical (successful) innovation, technologic change follow a certain way defined as —technological trajectory. On the other hand, Sungur (2007:12) stresses that, “product innovation expresses a product, whose performance features are increased, to be commercialized or to be adopted and in the simplest expressions, is defined as a new product. It is possible to divide into two the product innovation as goods and service innovation. In another word, the word “product” is a definition to encompass both goods and services.” The innovation, as a process, expresses to transform an opinion into a usable product and service, a new or developed method of manufacture and distribution, or a new method of social service (TÜBİTAK, 1997). This innovation includes significant changes in techniques, equipment, and software and is made to reduce the production and delivery costs per unit, improve quality, and produce new products (OECD, 2005: 53).

In agreeing with the foregoing, Prakash and Gupta (2008) hold that the quality of a country's workforce, or its stock of human capital, is related to the country's flexibility, productivity, and ability to innovate. Illiteracy, low education levels, and poor health conditions among the population hinder an individual factory's productivity and its ability to absorb new technologies thereby creating a negative impact on the diversification of manufactured goods in the whole economy.

The foregoing emphasizes the necessity of skilled workforce for innovation and creativity in the production processes in order to produce finished goods and value added services which have higher value for socio-economic development. This is the aspect where Africa and Zambia in particular have been lagging behind.

#### **5.1.4. Technology and Infrastructure Development**

O'regan et al. (2006) in emphasizing the importance of infrastructure for industrial development demonstrate by produced wealth of research linking shipping costs to a country's prospects for growth in manufactured exports, as well as to its overall economic growth. These transport costs are largely determined by structural constraints, such as access to seaports, but also by macroeconomic policies, bureaucratic red tape, and the quality of infrastructure within the country. Furthermore, Radelet and Sachs (1998) in agreeing with the important role of infrastructure in industrial development stress that it has a huge role to play in the industrial development of a country owing to its capacity to either increase or lower the cost of doing business. Cost effectiveness is widely viewed as the primary constraint on growth in manufacturing for firms of all sizes, but particularly for SMEs. There is a wealth of research linking shipping costs to a country's prospects for growth in manufactured exports, as well as to its overall economic growth. These transport costs are largely determined by structural constraints, such as access to seaports, roads, airports, but also by macroeconomic policies, bureaucratic red tape, and the quality of infrastructure.

There was collectivism from most informants interviewed that the infrastructure development of the country lacked coordination, prioritization and, therefore, effective implementation as most politicians directed the development of infrastructure merely for political mileage and not for socio-economic development though huge resources are spent. They expressed a lot of misgivings on policy convergence between or among infrastructures to be developed by the municipalities, the Road Development Agency, the Zambia National Service and the Ministry of Infrastructure Development, among others.

On the other hand, almost all the informants stressed the necessity of technology in the undertaking of the nation to desired industrial development. They noted that technology was a major missing link in the LDCs industrial development policies for socio-economic development as resources such as money were not sufficient to acquire necessary technologies which are pegged at high development or patenting fees. It is, however, important to note that owing to the rampant unemployment levels in most LDCs, Zambia inclusive, the technologies / digital platforms to be harnessed and utilized must be ones which are labor intensive in order not to solve a problem by creating another. This observation is buttressed by the G20 2019 Japan Conference too in the recap below:

*“The challenge for industrialization in Africa is how to leverage digitalization and information technologies to drive competitiveness of African manufacturing, and industrial development more generally. Digitalization of the economy is often viewed as being associated with the large-scale introduction of labor-saving technologies, requiring appropriate skills development for the labor-force (and general citizenry) across the region, in order to take advantage of digitalization. This, however, cannot be the focus for Africa, especially given the youth employment challenge in the region. There is need to leverage ICT technologies to support growth of productive sectors, especially those industrial sectors with high labor-intensity and strong backward and forward linkages. In addition to African manufacturers directly benefiting from the use of digital technologies, African governments can also use such technologies in public administration to enhance service delivery to (directly or indirectly) support the continent's industrialization.”*

#### **5.2. Efficacy of Existing Policy Frameworks for Guaranteed Targeted Industrial Development.**

In assessing the efficacy of government policy frameworks and instruments in place to guarantee meeting the SDG # 9 benchmark, it is indeed not in dispute that the country is not in want of policies but political will and citizens' revolutionized mindsets. It is categorically clear that the country has a National Industrial

Policy (NIP), the Industrial Development Corporation (IDC) – a supervisory authority of industrial development, Zambia Development Agency, Citizens Economic Empowerment Commission, Zambia Association of Manufacturers, Multi-facility Industrial Zones, National Scientific and Research Centres and various line ministries echoing the aspirations of these policy institutions. However, the missing links revolved around lack of implementation of brilliant ideas enjoined in these bodies' policies and strategies emanating mostly from lack of financing, political will and relevant technologies.

What is fundamentally impeding the LDCs industrial development in regions is what scholars have observed that while there are concerted efforts towards regional industrialization in SADC, it is still a very individual experience. Member states will take different paths to achieve this goal. A study by Mkwizu et al. (2021) on Impacts and Challenges of Industrialization in SADC made a finding that *“while there is an impact on policy provisions targeted towards industrialization, there are challenges such as poor policy implementation that, if not addressed, could dampen efforts by policymakers in achieving the goal of industrializing the countries.”*

### **5.3. Viably Actionable Policies for Industrialization**

There is need for policies and legal reforms which will censor and sieve individuals to occupy highest political offices at parliamentary and presidential levels to ensure they espouse values and virtues of nationalism with competency and self-motivation for national and not personal development. In stressing the import of political will in dealing with industrial development bottlenecks, the Africa Union Commission (2015, p.5) stresses that *“in order to address the remaining, non-structural constraints that can be improved through political commitment, African Union member states have committed themselves to substantial public investment in infrastructure, specifically a high-speed rail network, oil and gas pipelines, ICT broadband cables, and sea and air ports. All of this is part of the regional project to drive industrialization and to increase intra-African trade from 11 percent to nearly 50 percent of total trade by 2045.”*

On the aspects of streamlining FDI, there is a conspicuous observation which is fundamentally a policy gap that there is need to revisit the nation's FDI Policy which can only be described as being open-ended and encourages unfair competition as it is perceived to, among others, being more favourable to foreigners than locals. It is lamentably observable that the FDI policy allows foreigners to invest in any sector of the economy and in almost all forms of businesses including those which could be done only by local people. There are a lot of foreign investors who are simply running retail grocery shops, selling chickens / eggs, roasting maize by the streets, providing wheel burrow transport, growing agricultural crops on a small scale, selling minerals by-products, selling raw timber, raw minerals, raw wildlife, mineral water etc rather than being involved in manufacturing of finished products where more complex skills and technological investments are required.

It can, therefore, be reiterated that African governments (and Zambia in particular) need to streamline sectors and industries where foreign investors should invest with specific levels and amounts of investments. This should be tied to the need for them to use joint ventures with locals as a pre-condition for investment approval. It has become a development misdemeanor for investors to own chunks of arable land while locals are squatters or displaced by them due to the porous investment policies the country has.

## **6. Conclusion and Recommendations**

*The study has ably examined and critically analysed the critical success factors for Zambia's industrial development and its strides towards meeting the SDG #9 benchmark by the year 2030. First and foremost, there is convergence, in this study and the literature surveyed, that innovation, technology, skills development, infrastructure development, energy, and research and development, and financing are critically necessary for the nation to industrialize. These variables equally mirror the success stories of most*

industrialized countries as benchmarks of focus and investment with political will as an intervening or mediator variable. The context is such that Zambia as a country has most of the critical productive raw materials but the absence and/or inadequacy of these parametric variables coupled with political will has rendered the nation socio-economically de-industrialized and underdeveloped with alarming inequalities and poverty levels of about 65% in a population of about 20 million in which the majority are energetic young people with about 752,000 km<sup>2</sup> of underutilized arable land, vast valuable forestry, and enormous divers' mineral deposits across the country but largely traded in raw form for decades.

Secondly, the study has concluded that Zambia as a country, has close to enough policy frameworks, instruments and legislation to guarantee its success in the implementation of the national industrialization agenda as espoused in its Vision 2030 and successive national development plans along with the SDG # 9. Nevertheless, the drawback has been on the absence of a clear road map for effective implementation of such policies, which require, among others, deterministic political will, financing, bilateral co-operation and inclusion of social, economic and cultural rights in the national constitution as a way of compelling politicians to de-politicize development but take pragmatic actions for socio-economic development of the nations.

Last but not the least, it is not yet too late for Africa in general and Zambia in particular to revolutionize their socio-economic structures through industrialization. Zambia needs to appreciate the local, regional and global favourable environments to implement its industrial development policies in order to derive the value from them. There is need to implement and actualize the technological, innovation, skills development, infrastructure development, energy, and R&D policies with correct, coherent and consistent coordination, prioritization and financing. Through this prescription, the NIP, the TDAU, the CEEC, the Vision 2030, the SDG #9, the 8NDP, the National Science Policy, the innovation and entrepreneurial policies, the ZDA policies, the manufacturing policies etc must receive due support and timely implementation for the benefit of the nation as a whole. The increased and enhanced constituency development funding (CDF) must equally be correctly integrated in these existing policies in order to guarantee sustainable industrial development across the identified productive sectors.

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## Fourth Industrial Revolution and University Libraries; A Nexus of Skills and Training Readiness In Nigeria.

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### Abstract

This study examined the readiness of university libraries in Nigeria for the fourth industrial revolution from skills and training perspective. Literature was reviewed on the current digital skills possessed, existing digital skills training programme and the challenges of training and skill for Nigerian university library staff in the fourth industrial revolution. Findings revealed that there is a low level of digital skills and competence to function in this era. The training available is to enhance basic digital skill and no available training or sign of preparation for the advance digital skills required in the fourth industrial epoch and some of the challenges found were poor funding of libraries which further cascades into poor staff development programs and poor ICT infrastructure. Also, obsolete library schools' curriculum and lack of skilled staff to teach new skills on the emerging technology was identified. The study concluded that university libraries in Nigeria are at the level of preparedness in terms of awareness and skills assessment towards the fourth industrial revolution and there is a need to learn new competencies and engage in continual training to acquire the new skills required. The following recommendations were made: Information professionals and university library management should improve on staff training and continuing professional development. The Nigerian library schools' should revise the curriculum and encourage inter-faculty collaborations where there is skill and competency deficits.

**Keyword:** Fourth Industrial revolution, University Library, Skills, Training

### Introduction

Human society has evolved in phases over the years. There have been discussions by creationist around the creation of human with the belief that man evolved from being Homo sapiens, in some other quarters, there have been debates about the stand of the bible about creation and how the first set of humans emerged, the creation of Adam and Eve in Genesis and further arguments around the Charles Darwin theory of evolution. Human activities at that time were mainly gathering, agrarian and hunting (Ruse, 2022). It was postulated by Charles Darwin in a seminar work that human activities will transform from primitive practice to industrial society. (Darwin, 1859) and this gave birth to the first and second industrial revolution. These transformation phases birthed social and economic growth especially in industrial production of raw materials and agricultural products which were later accelerated by innovation and technology. Futurists also envisage a third industry or a third wave. A society that will be driven largely by information and knowledge, a network and paperless era (Toffler, 1991 & Castells, 1996)

Klaus Schwab, the chairman of the world executive forum at the convention in Switzerland came up with the concept of the FOURTH INDUSTRIAL REVOLUTION. He chronicled the previous phases of industrial revolutions, the First Industrial Revolution which used water and steam power to mechanize production. The Second revolution used electric power to create mass production and the third wave used electronics and information technology to automate production. The Fourth Industrial revolution builds on the third revolution with the use of technology to blend the physical, digital, and biological spheres" (Schwab, 2015; 2017). Kamble et al. (2018) enumerated the technologies that characterize Industry 4.0, to

include Internet of Things (IoTs), big data analytics, cloud computing, augmented reality and robotic systems, simulation prototypes and 3D printing. The reality of the 4ir in with us, the driver-less Elon Musk tesla cars are on our roads, automated bank tellers (ATMs) are in our shops, Virtual reality is playing key roles in sport(football), drones are very helpful with logistic, media/photography and military, Robot are to be deployed to war by the US government, blockchain has better enhanced cryptocurrency (Bitcoin, Ethereum, etc.), CHATgtp is here to write articles on any topic, Radio frequency identification (RFID) are here to replace front door security checks. etc.

The outbreak of COVID19 left most organizations with no option than to embrace emerging technology. Humans are now submitting their roles to technology. Literature suggests that university libraries like any other organization are adopting new technology to stay relevant in this epoch (Cao, Liang and Li 2018; Gul and Bano 2019). Some libraries are now implementing the 4IR technology such as AI in form of virtual reference chatbots ([Arora et al., 2020](#)), face recognition tools for security and surveillance activities ([Ali et al., 2020](#)). AEG and AI2 bot identify software bugs and cyber-attacks ([Prasad and Rohokale, 2020](#)). RFID technologies enhances modern library software to control the library collections from theft and loss and Alexa and Siri skills for frequently ask question FAQ ([Hussain and Shahid, 2022](#))

Despite the several benefits that come with accepting the 4ir, there is a global concern on how this will affect the relevance of human work force, loss of jobs and redundancy. In a 1994 editorial by David Raitt’s, he raised a question around his concern about the developments with the Internet, “will librarians still be around in 2024, and if so, what will they be doing?”. Oxford University forecasts a possible 35 per cent job loss in the UK due to automation in the next 20 years (Frey and Osborne, 2013). Several research in library field foresee a job lose tsunami and unemployment in the fourth industrial revolution era. (Hussain, 2020; Ayinde & Kirkwood, 2020; Chaka &Chaka, 2020). Deloitte alludes that there will not only be labor displacement, but a shift toward new skills ([Deloitte Global & the Global Business Coalition for Education, 2018](#)) [Nwaohiri & Nwosu \(2021\)](#) and Hussain (2023) predicts that inadequate skills with technology will be an impediment for librarians in the 4ir. It therefore becomes imperative to investigate the skills level of university library staff in readiness of the 4IR. This study is herewith guided by the following research questions:

1. What are the digital skills currently possessed by Nigerian university library staff in the 4IR?
2. What are the existing digital skills training programme for Nigerian university library staff in the 4IR?
3. What are the challenges of training and skill for Nigerian university library staff in the 4IR?

## Methodology

This research used a literature review approach to appraise published literature in line with the research questions. The University of Strathclyde Library’s discovery layer, “SUPrimo” was used to find sources published between 2015-2023. Google Scholar was also used to find relevant sources published on the 4IR. See Table 1 below for a breakdown of the procedure.

**Table 1.** Breakdown of searches and selection of resources.

Boolean keywords	Search engines and number of resources	Inclusion criteria	Number of resources after inclusion criteria
(4IR OR “Industry 4.0” OR “the fourth industrial revolution”) AND (“higher education library*” OR “university library*”)	<b>SUPrimo</b> EBSCO: 453 ProQuest: 118 Scopus: 229 Web of Science: 59 Emerald: 7 <b>Google Scholar:</b> 393	<b>Themes:</b> University library Digital Skill Training Nigeria <b>Language:</b> English <b>Full text</b>	<b>SUPrimo:</b> 21 <b>Google Scholar:</b> 17
<b>Totals</b>	<b>1259</b>		<b>38</b>

### **Methodology Procedure and analysis**

Table 1 above shows the search and selection procedure of resources. The first stage was to design boolean keywords derived from the topic of the research as the search string and this gave a total of 1259 resources. A set of inclusion criteria was applied on titles and abstracts of the located resources; The resource must be a full text, must be in English language and must carry the set themes of the research. 38 resources considered relevant for this study were downloaded and saved in an electronic Microsoft folder. These relevant resources were reviewed in line with the objectives of this study.

### **Literature Review**

The review gave insight into a general background of the 4IR, the current level of digital skills, the digital training pathways available to university library staff in Nigeria and the challenges of training programs for university library staff in Nigeria.

### **History Reflection on the 4ir.**

Human society has evolved in phases over the years. There have been discussions by creationist around the creation of human with the belief that man evolved from being Homo sapiens, in some other quarters, there have been debates about the stand of the bible about creation and how the first set of humans emerged, the creation of Adam and Eve in Genesis and further arguments around the Charles Darwin theory of evolution. Human activities at that time were mainly gathering, agrarian and hunting (Ruse, 2022). It was postulated by Charles Darwin in a seminar work that human activities will transform from primitive practice to industrial society. (Darwin, 1859) and this gave birth to the first and second industrial revolution.

The first industrial revolution was a period from the late-18th to mid-19th century, with the invention of steam and water to create new machines. This era brought rapid innovation in the areas of agriculture and manufacturing which brought transformation to the economy, created a market for innovation and profit making. This era formed a class of laborers. history has shown that this era was not pleasant for the average laborer. The ideology around this era gave emergence to the Communist Manifesto and the whole concept of the social sciences. This invention, first-time revolutionize mechanization of production and allow a drive towards a social change for human to became more urbanized. The second industrial revolution also known as the technological Revolution occurred from the late-19th to early-20th century, an era that propels the use of electricity and gave rise to mass production, The focus of this era was the power of electricity and the engines which gave emergence of light bulbs, automobiles, airplanes, telegraphs, weapons etc. This era fueled a lot of economic unrest that led to wars (Schwab, 2015)

The third industrial revolution also tagged the third wave was the era of digital Revolution which began in the 1950s, a third industrial revolution ushered the development of computers, electronics, and digital know-how to mechanize production. In the 1990s, the advent of internet brought a serious explosion to the third wave, expanding the scope from digital innovation to information explosion. This introduced the use of world wide web(www) and later micro blogging websites also know as social media. This information revolution resonates better within the library and information science profession. It is the reason why the profession has “information science” part in the name. It ushered positive developments for libraries. The services of the libraries were up-scaled to automated operations and services, digital catalogs, electronic databases, integrated library systems and other developments the increase the ease and efficiency of the library operations.

The concept of the Fourth Industrial Revolution era (4IR) was devised by founder and executive chairman of the World Economic Forum, Klaus Schwab in 2017 noting that the 4IR follows in the footsteps of the third wave and builds on the fundamentals established by previous industrial revolutions but is distinct pattern (Schwab, 2016). Schwab sees the 4IR as a revolution characterized by a fusion of technology that dissolves the physical, digital, and biological divides, blurring the lines between the physical space, technology, and human. The previous evolution phases substituted the physical human activities while 4IR substitutes human intelligence and cognitive. Also, In the previous revolution, technology took the roles and jobs of human but over time they learned more skills and adopted Ayinde and Kirkwood 143 advantage

of the higher cognitive tasks which the machine could not do (Ayinde & Kirkwood, 2020). The 4IR technologies are designed with the ability to think, sense, move, learn, code, decode and acting independently with little or no interference of a human. This brings about the argument that 4IR will send human beings into redundancy. Russell (2016) projects into the future and thinks AI would become the ideal personal assistant performing better than humans and be available to all. It is believed that The 4IR will make lives better, easier and more productive but jobs and livelihoods will become collateral damage.

The innovative technological developments brought by the 4IR are the Internet of things (IoT), artificial intelligence, robotics, nanotechnology, 3D printing, automation, machine learning virtual reality, quantum computing and other technologies with diverse applications. 4IR is the growing technological wave that changes how modern people live and work. It describes the information technology evolution towards greater automation and interconnections (Lund, 2021). The 4IR is largely divided into three categories which are physical, digital and biological. Physical: intelligent robots, autonomous drones, machine learning, 3d printing, smart sensors. Digital: internet of things, services, data. Biological: Synthetic biology, individual genetic make-up.

Some of the emerging reality within the 4IR is the apocalyptic future of the unrealistic activities in video games online suddenly become the reality for the physical world, for example, the Elon Musk's driver-less cars replacing the trucking industry. The invention of automated bank tellers and mobile banking. ATMs and online banking provide many of the common banking services previously available only with the assistance of a person. Virtual reality in sport especially the use of VAR in football has brought a lot of precision and accurate judgment. Radio frequency identification (RFID) technologies, which is an application of the Internet of things which is largely used for security in stores, malls, banks, and libraries through sensor.

Also, Alexa and Siri skills which fulfill various demands and activities of users through voice commands (Hussain and Shahid, 2022). Surveillance applications have made it possible to develop face recognition tools and thumb recognition that may be used for security purposes and surveillance activities (Ali et al., 2020). With cyber-attacks, AEG bot and AI2 are security tools for safeguarding data and applications, these tools can positively determine software bugs and cyber-attacks (Prasad and Rohokale, 2020).

### **Libraries in the 4ir**

The third industrial revolution, also known as digital revolution gave recognition to the library and information science profession, It is why we have that "information science" part in the name. It heralds digital computers and computer networks. Libraries gained digital catalogs, electronic databases, integrated library systems, the Internet, Microsoft Office, and all developments that increased the ease and efficiency of library operation and services.

The 4IR has introduced some innovative technology to the libraries. The library scene now use technology like the Internet of things (IoT), artificial intelligence, robotics, automation, blockchain etc. Liao (2019) asserts that many libraries in Singapore make use of robots for sorting of returned books, shelf reading and transportation of library materials. The University of Pretoria Library introduced a popular robot, by the name "Libby", which is now a new library employee. Libby is the first humanoid librarian in Africa ocholla & ocholla 2020. Some libraries use AI for virtual reference services, they have chatbots that use machine learning, through these services, a librarian can answer its patron regarding library queries (Arora et al., 2020). Alexa and Siri have been introduced by many libraries to respond to frequently ask question (FAQ). The University of South California fulfill various demands of users like FAQ, events updates and the library catalog search (Hussain and Shahid, 2022).

Radio frequency identification (RFID) technologies are some of the best examples of IoT. RFID uses sensor on Security doors and walk-through gates that are connected with modern library software, which controls the library collections from theft and loss. Also on security, Liu (2019), proposed a smart library management system that runs on block-chain technology. The system eliminates the possibility of data tampering, solves the problem of low efficiency, poor security of the central system by distributed



accounting, the danger of damage to the central database and guaranteed data security. Block-chain technology has also been used in the libraries for Digital preservation, inter library loan and voucher systems; library verification and credentialing of patrons, large storage of archival /special collections where provenance and authenticity are essential, library record keeping and data management of intellectual property. Libraries purchase items from all over the world in a variety of currencies, and currency fluctuations can have a significant impact on library budgets. Financial applications of block-chain-based currencies (such as bitcoin) for financial transactions between libraries and publishers, potentially eliminating exchange rate issues while streamlining acquisition processes (essentially a supply chain). Tella,Amuda & Ajani (2022).

These 4<sup>th</sup> Industrial technologies have enhanced library services such as Open Educational Resources (OER), Institutional Repository (IR), Integrated Library Systems (ILS), Website, Blog, Social Media, Databases and the operation of other emerging technologies in Nigerian university libraries. The 4IR phase in the Nigerian library environment is at the awareness level , the majority of the information practitioner simply have a basic understanding of its implications. Emerging researches from Nigeria on the 4IR indicate that Nigerian information professionals now lack the fundamental 4IR abilities needed for the job market and a wide range of broader 4IR-related skills. The results also show that Nigerian information professionals desired some 4IR abilities that are necessary to succeed in the future job market, including leadership, creativity, technology, people management, service orientation, entrepreneurship, and technical skills. (Ayinde & Kirkwood,2020; [Nwaohiri and Nwosu, 2021](#),Owolabi 2022; Tella, et.al, 2022 ; Ajani et.al, 2022)

The proposal of Ocholla et al., (2016), in response to the rapidly changing environment of university library in the 4IR, demands that library services be accessible anytime, and anywhere and revolutionize the speed of technology and impact of new systems to change this era. The figure below illustrates what a university library 4.0 should be but for the sake of this study, focus will be on SMART STAFF.



Source: Ocholla & Ocholla (2020)

### Skills Requirement for the 4ir Environment

the fourth industrial revolution is currently changing the responsibilities and roles of librarians worldwide. This situation has called for a fundamental rethink to reequip librarians with the necessary competencies to ensure effective and efficient delivery of services to clients whose needs are dynamic. Devi, Vikas and Devi (2006) defined skill as the application of the knowledge gained or development with the ability to use them to satisfy the users' information need. Previous research has clamored for the skills requirement in the third industrial revolution which can serve as basis and foundation for the the fourth industrial revolution. Some scholars have argued that library staff in digital environment need to have an hybrid of generic skills, core traditional librarianship skills, information technology skills and management skills (Gulati and Raina, 2006; Singh and Pink,2009; Carl, 2010; Arif and Mahmood, 2010)

Buarki et al., (2011) have listed the professional digital skills needed by library staff, ranging from basic computer skills, knowledge of technologies, library automation software usage, online database searching, online cataloguing experience, information retrieval, word processing, desktop publishing and webpage

design and maintenance. Inyang and mngutayo (2018) identified the some digital and software applications, skills and competencies needed to be, basic knowledge of computers, ERMS (Electronic Resources Management System), library website content management, Integrated Library System (ILS), digital repository system, social media usage and understanding the mobile devices and related technology that are applicable to a library. Bughin et al. (2018) in a McKinsey report categorized workplace skills in the 4th IR into five groups: physical and manual skills, basic cognitive skills, higher cognitive skills, social and emotional skills, and technological skills. Also, Koya and Gopakumar (2018) elaborates on IT skills which information professionals should possess including hardware skills, software skills, content management and development software skills, programming skills, reference management skills, and software security.

Baro, Obaro and Aduba (2019) investigated the digital skills of librarians working in various universities libraries in English-speaking countries in Africa and found that their basic digital skills i.e., documents uploading, social media usage, e-mail services, etc. is remarkably high. While ability to use open-source software, digital library development skills, skills in applying modern technologies, metadata development skills, and library website development skills were rated to be moderate and low. Okeji, Tralagba and Obi (2021) investigated the available digital skills of librarians in university libraries in Nigeria and rated their knowledge of network and system security; ability to apply security software firewalls, filtering routers and ability to protect access to digital content and these were found to be poor. Friday and Onuh (2022) revealed in their study of 21<sup>st</sup> century librarianship skills in public universities in Nigeria. the basic digital skill of emailing, word processing, internet surfing and social networking skills were prevalent among the librarians while the advances digital skills to navigate in a digital environment was extremely low. Tella et al. (2022) report that skills mismatch with the recent trends in the information professions is one of the greatest threats facing Nigerian information professionals, most especially in the 4IR era, and if care is not taken, it could negatively affect the future of information professionals

Ajani etal (2022) asserts that 78% Nigerian information professionals were not sure if they had the 4IR skills to secure a position in the global job market. This means that the vast majority of Nigerian information professionals lack the necessary 4IR skills and might find it difficult to get job in the 4IR era. There is a beam of hope as Nigerian information professionals have shown desire and willingness to acquire some 4IR abilities that will make them relevant in the epoch of the 4IR ( Ajani ET.AL 2022)

### **Training Readiness for the Emerging Digital Environment**

The shortage of skill and skilled workforce have posed a lot of challenges on the operations of the libraries in this digital era. libraries were grasping to develop skills and catch-up with the technology of the third wave, The 4IR heralds a storm of new technology. The evolving nature of the unfamiliar environment requires that library staff possess additional knowledge and new skills to work within the digital information world. Choi (2006) emphasized that educating and re-skilling the library workforce in this dynamic and complex digital environment must become a high priority. Updating of skills and competencies could be achieved through teaching/learning, training, and skill acquisition. Skill updating is an aspect of professional development and human resource development which could be in the form of education and training. Education takes place in formal learning environment and lays the foundation on which the training on the job takes place. The focus of formal education is to give pre- service training while job roles and Specific task training is the sole responsibility of the employer. The in-service training acquired when one starts working in an organization and it continues throughout the work life. On-the-job training takes the form of demonstration, lecture, discussion, programmed instruction, mentoring, literature research, job exchange, regular staff meeting, project and task management and technology assisted training while off-the-job training takes place outside the normal working environment in form of, further education and career development, interest group, professional contribution, conferences/ seminars, short courses, and workshops.

Chiware (2007) also alluded that training for library staff or information professionals could be approached in two broad ways; Library school LIS courses and continuing education programmes She noted that digital library education should be incorporated into LIS course contents for the sound theoretical knowledge.

Also, continuing education programmes (workshops, short courses, and conferences), visit to other libraries and on-site visits by experts should be encouraged. She further affirmed that there is lack of competent trainers for digital environment even in the LIS education sphere as the library school educators need to upgrade their knowledge and skills. Their prior training and the curricular that produced them, pre-dates this new digital environment. Some measures to help enhance the training of librarians for the digital environment according to Ocholla and Bothma (2013) are re-orientation, curriculum review and revision of LIS education for increased use of emerging technology. These authors believe these are a veritable means of updating the skills of librarians in the digital environment.

Inyang, and Mngutayo (2018) alludes to how to acquire required skills and competences of the digital revolution technology. They regard formal training as one way that required skills are taught. This could be short duration courses, library workshops and seminars organized by software manufacturers or special libraries. Also, competency could be acquired through training by suppliers. The vendors who have supplied software are responsible for its installation in the library and train the personnel of the library in the usage and maintenance. Furthermore, skills could be updated through formal education in library schools. This can be achieved through courses included in the curriculum of library schools and taught to undergraduates or postgraduate levels. The authors, however, debunked the general notion that being computer literate does not translate to possessing the required digital skills required to carry out library activities. Atanda (2018) asserts that for an effectively and sustainable digital projects to be successful, skilled workforce are essential for the implementation. There is a need to build on the framework of a well-trained information technology workforce. What obtains in libraries is that tech contractors employ trainers to visit and give superficial training for few days at great cost and leave without some back-up capacity on the ground. This has caused a major setback in information systems and technology development projects in developing countries and plaguing their operation more with lack of trained workforce.

Obuh (2019) Investigated the proficiency of librarians as managers of library systems in academic libraries in Nigeria with special focus on the form of training on ICT skills. the finding revealed that most librarians in Nigeria acquired their skills through self-studies, colleagues' influence and on-the-job. Oyovwe-Tinuoye, Omeluzor and Patrick. (2021) up-holds this assertion that most staff of the university library acquire ICT skills through self-sponsorship. Friday and Onuh (2022) attests to the popular method of acquiring skills by librarians in university libraries in Nigeria to be; colleagues' assistance and training at workplace. Echem (2022) gave insight to the capacity development programs in university libraries in Nigeria, his correlation result revealed that, there were weak but positive relationships between on-the-job, in-service, off-the-job, mentoring and capacity development of librarians. This shows that there is scarcity of training for library staff in Nigeria. furthermore, Osesi et.al, (2022) conducted an assessment of the professional development and training of library staff at a federal university in Nigeria, they found that the available professional development programs for the library staff are Orientation, On-the-job training, In-house Training, Seminars and Instructor-led-Training. However, Distance Educational Programs, Conferences/Workshops, Study visits, formal professional library education, and TETFUND Programs are unavailable to the library staff. In a study by Ikolo and Nongo (2022) on the need for continuing professional development to update the skills of librarians, the respondents indicated that they prefer participating in seminar/workshop and face-to-face courses. Very few of the respondents have attended any specialist digital skill training. The librarianship degree acquired from library schools only creates a background and foundation for librarians. Skills development and competence up-scaling can help librarians put theoretical knowledge into practice and apply general conceptualization to role specific responsibilities such as the ability to function in a digital environment. The library profession has become conscious of the need for skill development and continuous training, because of the increasing variety of emerging technology brought by the 4IR. Academic libraries, by the nature of its operation of providing information and retrieval services, are intimately tied to the constant technological changes of this information epoch; therefore, the role of training and retraining of staff to meet this challenge is inestimable and unavoidable.



### **\*Challenges of training and skill for Nigerian university library staff**

Adetunla, et.al (2023) Stated that the advanced digital skills to navigate in the 4IR was extremely low and the major factor responsible for this low level of advanced skills was lack of training. They further looked into the challenges of training in public universities in Nigeria and found; poor funding of libraries which further cascades into lack of fund for staff development programs, negative managerial attitude towards staff development, non-availability to digital courses in library schools' curriculum and poor ICT infrastructure. In another study by Ikolo and Nongo (2022), The foremost challenge of training identified was excessive cost of training and this has caused a wide skills gap and low performance output in most libraries in Nigeria. They suggested that librarians should be armored with the required on-the-job training and affordable courses. Ajani et.al (2022) explains the difficulties involved in training future information professionals for the 4IR include lack of funding for the training school, lack of skilled staff, a poor attitude on the part of the staff to learn or seek a new set of skills, lack of staff to teach new skills, as well as the antiquated and subpar nature of the training system. As a result of these challenges, the study, therefore, concludes that poor preparation of future information professionals in Nigeria could result in job losses, economic disparities, unemployment, and workplace under performance in the 4IR.

### **Finding.**

The status of adoption of the innovation of the 4IR in university libraries in Nigeria is low compared to their counterparts in the developed countries and South Africa where there is use of robotics and AI for the library operations. The technology of the Third wave which found it's extension into the 4IR such as automation and IoT are the only evidence of the 4IR in university libraries in Nigeria. The development of literature on the 4IR in university libraries in Nigeria has shown that the libraries are at the level of preparedness in terms of awareness and skills assessment.

### **Current Digital Skills Level of Nigerian University Library Staff in the 4IR**

The review of literature has revealed that there is low level of digital skills and competence to function in this era. Library staff in Nigeria were found to have the basic digital skills for their day-to-day operations, such skills as; use of Microsoft word, connection to WiFi and networks, use of email to send and accept documents etc Also, they possess other soft skills such as managerial and core traditional librarianship skill but lack the advanced digital skill like knowledge of technologies, library automation software usage, library website content management, Integrated Library System (ILS), digital repository system, expert Chat-box system etc. The findings have shown that Nigerian university library staff do have the requisite skill to function in this fourth industrial era and this is corroborated by the assertion of Tella et al. (2022) and Ajani et.al (2022) that the current skills mismatch is one of the greatest threats facing Nigerian information professionals in the 4IR era, and this could negatively affect the future of information profession.

### **Existing Digital Skills Training Programme for Nigerian University Library Staff in the 4IR.**

Findings revealed that, the training found available to university staff are meant to enhance their basic digital skill. and no available training or sign of preparation for the advanced digital skills required in the fourth industrial revolution epoch. Notable types of training programs available to the university staff are On-the-job training, In-house Training, Seminars and Instructor-led-training on the existing basic technology tools. However, Distance educational programs, Conferences/Workshops, Study visits, formal professional digital library education, and TETFUND Programs are largely unavailable to the library staff for training on the 4IR. By implication, it means there is poor level of preparedness as there no focused training to upscale the skills level of the Nigerian university library staff in the 4IR. This outcome conforms with Osesi et.al, (2022) and Ikolo and Nongo (2022) that the library staff in Nigerian universities lack professional development programs for the 4IR.

### **The Challenges of Training and Skill for Nigerian University Library Staff in the 4IR**

Some of the challenges found to have contributed to the low skills level and inadequate digital training program were poor funding of libraries which further cascades into poor staff development programs and poor ICT infrastructure. Also, obsolete library schools' curriculum which has led to non-availability of

digital courses on the emerging technology. Another foremost challenge of training identified was lack of skilled manpower within the system to teach new skills. These findings are in consistence with the report of Adetunla, et.al (2023).

### Conclusion and Recommendations

4IR is the growing technological wave that changes how modern people live and work. The effect of the innovative technology has been felt across every aspect of human endeavour and by extension the field of library and information services and specifically the university libraries. University libraries across the globe now make use of AI, robots, IoT, automation etc. Despite the several benefits that come with accepting the 4ir, there is a global concern on how this will affect the relevance of human work force, loss of jobs and redundancy.

One of the quotes of Schiller as cited by [Marwala, \(2019\)](#) comes to mind, that “you cannot wait until a house burns down by fire before you put insurance on it.” The 4IR is here upon us with disruptive technology that has come with numerous benefits and threats. University library management cannot wait until there are massive dislocations in our libraries to prepare for the 4IR. The time to prepare our libraries for the 4IR is now. Based on these concerns, the following recommendations are made:

- information professionals should develop a positive behaviour to accommodate the new era., by upskilling and re-skilling to remain relevant in the 4IR era.
- University library management should improve on staff training and continuing professional development to improve the readiness and preparedness of the library for the modern technological trend this era has brought upon us.
- The Nigerian library schools’ should revise the curriculum to accommodate the awareness about the emergence of the 4IR era and core 4IR skills.
- In Nigerian library schools where there is skill and competency deficits, universities should encourage inter-faculty collaborations. Library schools situated in the Humanities and Social sciences faculties should form alliance with faculties like Sciences and Engineering.
- Nigerian universities can support this process by offering flexible multi-disciplinary programs that respond to these real-world needs to enable library staff acquire the skills needed for the jobs of the future. This is already evident in some universities and library schools:

Block-chains for the Information Profession at San Jose State University iSchool,  
Artificial Intelligence; a program of Stanford University Libraries and  
the Good Systems Program at the University of Texas ischool

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## Success Factors of Agribusiness Digital Market Places in Tanzania, the case of selected agribusiness firms participating in DMP in Tanzania

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### Abstract

This research paper explores the underutilized digital market potential in the agribusiness sector of Tanzania, contrasting it with the global prevalence of such platforms in other countries. The study delves into the factors contributing to the limited adoption of digital marketplaces in Tanzania, highlighting the lack of awareness and financial constraints as major impediments. The research aimed to identify the key success factors for agribusiness digital marketplaces in Tanzania. It specifically investigates the impact of technological competence, financial commitment, industrialization policies, and organizational e-readiness on the adoption of digital marketplaces. To accomplish this, the study employed a quantitative research design, surveying 200 agribusiness firms across seven regions of Tanzania. The findings revealed a readiness among Tanzanian agribusinesses to embrace digital information technology due to its potential in reducing information asymmetry, transactional costs, and facilitating demand-supply matching. However, the study also identifies a lack of government support and incentives to promote digital solutions in the agribusiness supply chain in Tanzania. The research underlines that the success of agribusiness digital markets is heavily influenced by technological competence, financial commitment, and organizational e-readiness. Greater financial commitment leads to higher technological competence, enabling firms to leverage digital technologies for production and marketing. The paper recommends various initiatives to promote the widespread adoption of digital marketing technologies in Tanzania's agribusiness sector. Government agencies, policymakers, development institutions, BDS providers, financial service institutions, and the ICT industry should collaborate to make digital marketplaces economically appealing to key stakeholders, including agro-processors, farmers, input suppliers, logistics companies, traders, and consumers. This collaborative effort is vital for enhancing the applicability and usage of digital marketplaces in Tanzania's agribusiness sector.

**Keywords:** Digital Market Places, Success factors, Agri business firms

### 1. Introduction

Digital marketplaces (DMPs) are market institutions that employ digital information technology such as computers, the Internet, and the World Wide Web to reduce transaction costs and provide trading services to buyers and sellers (Clasen and Mueller 2006). An increasing number of agribusinesses are looking to the Internet as a marketing, management, service, and coordination tool (Kumar, Sowdhamini and Virupaksh, 2021). As a business tool, the Internet has proven to be an enamouring concept for many individuals and corporations (Molla and Licker 2005). Agribusinesses possess a history of quick adoption and assimilation of new technologies, especially cost reduction technologies (Montealegre, Thompson, and Eales 2004). Internet technology has provided the possibility for cost reduction and demand enhancement along the food supply chain by using e-commerce (Yiwu Zeng et al., 2017). Agribusiness DMPs can improve the firm's efficiency by reducing inventory levels, transportation costs, and order and delivery time. Digital markets are expected to be more transparent and more competitive than physical markets; conditions which attract more consumers and thus increase demand for agricultural products (Clasen and Mueller 2006).

A big issue in Tanzania, and indeed the rest of East Africa is connecting agricultural buyers and sellers (URT 2016). The fact that produce goes bad because it cannot find a buyer is a real problem regarding the incomes that farmers can receive. Agro-processors also face the problem of limited supply of inputs, which may translate to idle capacity or inefficiency, resulting in limited growth of their businesses and high costs of production. High production costs of processed agro-products translate to high price, which is born by consumers, hence decreased savings or inability to consume the products. There's a significant discrepancy between what is produced, and what reaches the market; much produce is going off as it cannot find a buyer or is being processed to a more final product (URT 2017). On the other hand, it takes much time for the farmers' produce or the products of small/medium agro-processors to reach the physical markets or traders as these key players (farmers, processors, and traders) have limited information on the timing and availability of shared transport in their localities. It has also been observed that key players (agro-processors, farmers, inputs suppliers, logistics and transport companies, traders, consumers) along the agribusiness value/supply chain face the challenge of accessing the appropriate services from government agencies and development institutions to foster their performance and investment in digital technologies (such as internet, display advertising, mobile phones) for marketing of products or services.

Therefore, there is a need to bridge the gap between food supply and consumer demand by enhancing marketplaces that digitize Tanzania's agricultural sector. The presence of DMPs is increasingly seen as a necessity to agribusiness existence. Benefits are expressed as garnering more customers, increasing public awareness of agricultural and food products, promoting strategic or policy-related positions, and selling more products (Clasen and Mueller 2006). Initiatives on the enhancement of digital marketing access to farmers are acknowledged, but they do not focus on the agribusiness value/supply chain focusing on micro, small, and medium firms. They also ignore the role of government, as well as the establishment of agribusiness online trading platform, the utilization of which could lead to more innovation and improvement in policies related to agribusiness development. Therefore, the research paper aimed at analysing the success factors of agribusiness DMPs in Tanzania; taking the case of selected agribusiness firms participating in DMPs in Tanzania.

Based on the theory of diffusion of innovation by Rogers (Mvogo, Ndzana and Bidiassé, 2022) the firm's technological capability plays a vital role in the success of agribusiness DMPs. Agribusiness firms that participate in DMPs are likely to flourish when firm accumulation of the number of e-business and e-enabling technologies relevant in the agribusiness supply chain is available and used in business operations (Molla et al., 2014). Moreover, there is evidence from other authors which explain that agribusiness firms that invest in farm automation technologies can provide real-time information in pre-harvest maturity monitoring, ripeness determination, and postharvest treatment of agricultural products (Molla, 2014). Internet technologies; e-supply chain technologies; and mobile technologies such as broadband, websites, electronic document interchange, bar-coding, and short messaging services are essential tools to facilitate accurate ordering; delivery; invoicing; and sharing another agri-business information, which is essential for firm profitability (Bryceson 2006; Trevarthen 2007). Thus, it is equally important to analyze the influence of firm technological competence towards the success of agribusiness DMPs in Tanzania. Moreover, the consideration of the firm's financial commitment to invest in digital information technology when analyzing the success of agribusiness DMPs is also essential.

Apart from the firm's technological competence and financial commitment, previous studies emphasize the role of perceived organizational e-readiness (Mueller 2001; Hung, Chang, Lin, & Hsiao, 2014) and government provided incentives (Pollard 2003; Molla et al., 2014)) in promoting the success of agribusiness DMPs. This conclusion is based on research done in developed countries such as Australia, USA and China which in no small extent differs from Tanzania regarding the development of agribusiness DMPs. Lessons from the world-leading countries in agribusiness DMPs are not entirely transferable to Tanzania, due to differences in demographics like land size, population, density, income, and the nature of e-business and digital information usage as well as differences in the level of adoption of digital information technologies for the marketing of agricultural products or services. Therefore, it was important for this study to analyze

the perceived organizational e-readiness and the provision of government incentives for the use of digital information technologies in the agribusiness supply chain and their contribution to the success of agribusiness DMPs in Tanzania.

### **Policy Implication/Contribution to Policy**

The recent introduction of DMPs has brought a positive turn in Tanzania agribusiness that is through organizations such as The Southern Agricultural Growth Corridor of Tanzania (SAGGOT), The Agribusiness Innovation Center (AIC), and Hello Food (Abotsi, 2015). Furthermore, Tanzania has made several policies and strategies since its independence regarding agriculture such as the Politics is Agriculture of 1974, Life and Death Effort to Improve Agriculture of 1974/75, Arusha Declaration of 1967, and National Agricultural Policy of 1983 among others. Nevertheless, The Tanzania policy of Kilimo Kwanza which was introduced by the former Hon. Jakaya Kikwete was well received by Tanzanians, and among its implementation plans included the use of modern science and technology to increase revenue from agribusiness in Tanzania (Ngaiza 2012). In Tanzania, the digital marketing concept has been well received because of the implementation strategy of Kilimo Kwanza. The strategy included teamwork by all farmers, financing farmers by introducing TADB (Tanzania Agricultural Development Bank), good governance, promoting local producers by consuming what we produce and producing what we consume, attracting investments on the development of ICT infrastructure, industrialization policy, promoting the use of modern technology, developing infrastructure, and involving both the private and public sector in agribusiness (Ngaiza 2012). Also, different stakeholders are interested in the wider adoption of digital information technologies to facilitate the exchange of agricultural trading information in real time; Adella, Hepelwa, Yami and Manyong (2020) explained that, the government of Tanzania through the industrialization of agriculture has set up management practices aimed at creating best digital solutions to reduce costs and increase value with partners in the agribusiness supply chain. In conjunction with government policies and strategies, this research provided the avenue for understanding the means to promote public awareness and acceptance of the use of agribusiness DMPs.

### **The Contribution of the paper to the Field of Youth Engagement in Agribusiness and Rural Economic Activities in Africa**

Agribusiness if fully optimized can deal with the issue of food security. Our agricultural capacity must be utilized for us to achieve this. In the rural areas of Tanzania, agriculture is best placed to tackle poverty. However, young agro-entrepreneurs face many challenges including access to financial and capacity development resources. This, unfortunately, drives the young to migrate to urban centers whereby reducing the number of youths who can farm and engage in the food supply chain. This creates a bigger problem in urban areas, creating a dependent society and degrades the infrastructure of the urban areas which are poorly planned. Promoting agribusiness DMPs in rural areas will help keep young people rooted at home and create opportunities for them. However, Tanzania, being among emerging economy nations, allows risk-takers to make enormous profit and among the sectors that is worth risking is agriculture because Tanzania is blessed with good soil, rivers, and a vast number of cheap labourers. Instead of the youth waiting to be employed, it is best for them to employ themselves in agribusiness to increase government revenue, expand knowledge, and make better use of subsidies and exemptions that are given to farmers in Tanzania. This will go a long way to address unemployment in Tanzania. Therefore, in-depth research findings from this study will promote the application of information technology in entrepreneurship and agribusiness development planning and management, to build on capacity development professionals who are actively engaged in the agribusiness digital market opportunities and food security activities in governmental and nongovernmental organizations in Tanzania.

## **2. Literature review**

### **2.1 The Potential of a Digital Market in the Tanzania Agribusiness Sector**

There are many ways in which digital marketplace services can support agricultural development and improve the livelihoods of the agriculture-dependent community in Tanzania. This is significant because



digital marketing penetration can provide affordable ways for millions of people living in rural areas to access information such as markets, finance, crops status, and governance system (Ngowi, 2015).

Recently, the uses of digital marketing in agribusinesses in Tanzania have been mostly handled based on the instinct and knowledge of experienced farmers, agribusiness owners, and managers. There is no systematic approach to optimize available technologies such as smartphones and apps, aimed at managing and analyzing agribusiness operations, transactions, and projects (URT 2017). Although agribusiness firms have been keeping records on paper to manage business transactions, operations, and projects, the role of digital market-based technologies such as mobile phone applications, online live chats, online shops, and display advertising could reduce the managing burden and enable the implementation of better access to information between buyers, agribusinesses, and rural farmers about market status.

Over the past decade, the use of mobile phones has been growing fast in Tanzania, according to the Tanzania Communication Regulatory Authority (TCRA): *“The number of subscriptions in terms of the figure increased from 3 million subscribers in 2000 to 15 million in 2009. Moreover, in the mid of 2013, the number of subscribers already reached 26 million”*

Despite all these good figures of mobile users, much has been grasped yet nothing has been done to eliminate the challenges facing the small-scale agriculture sector in Tanzania. While other stakeholders such as policymakers, researchers, agricultural officers, supporters (business development services (BDS) providers, financial institutions, telecommunication companies) and facilitators (government agencies and development institutions) are available in each region, there is no digital platform which could implement a suitable business environment to integrate them with agro-processors, farmers, input suppliers, logistics and transport companies, traders, and buyers. Therefore, this initiative will open doors for the younger generation to be leaders in introducing and scaling new digital information technologies into Tanzania agricultural systems which have the potential to empower rural farmers to market their products more effectively.

## **2.2 Theoretical Framework**

### **2.2.1 Technological Perspective Frameworks and the Theory of Diffusion of Innovation.**

The technological perspective frameworks address the technological determinants of the adoption and diffusion of innovation in the agribusiness supply chain (Molla et al., 2014). The theory of diffusion of innovation by Rogers (2003) focuses on the perceived characteristics of an innovation such as relative advantage, complexity, compatibility, and observability (Weerasinghe, 2009). According to this theory, the rate of adoption of innovation is mostly influenced by the way consumers perceive the new technology; this perception is based on different attributes of the innovation which are a relative advantage, observability, compatibility, trialability, and complexity (Potluri and Rao, 2021). Based on this theory, the agribusiness firms will adopt the digital information technology when the relative advantage, compatibility, trialability, and observability attributes are perceived as higher and when the complexity attribute is perceived as lower than those of the existing technology (physical markets).

For this study, the theory of diffusion of innovation was used to explain the influence of the firm's technological competence towards the success of agribusiness DMPs. DMPs are likely to flourish when agribusiness firms have developed technological capability (Molla et al., 2014) by investing and using a number of enabling and digital technologies that digitize their value chain processes and functions.

### **2.2.2 Managerial Innovation Models**

Managerial perspective addresses the managerial innovation models which suggest that the adoption of digital market technologies depends on managers' awareness of the problems and organizational culture that encourage risk taking (Molla et al., 2014). For this study, a firm's possession of adequate resources to access and use the internet in business transactions and operations, in addition to technical and managerial capability as suggested by Molla et al (2014) was considered to be advantageous in assessing the readiness of the organization to use digital information technologies for implementing, building, and developing sustained DMPs for their business practices.



### **2.2.3 The Organizational-Technology-Environment Framework (OTE)**

The organizational-technology-environment framework (OTE) by Molla et al (2014) explains that the technological (internal and external technologies), organizational (firm size, scope, complexity, slack resources) and environmental (industry and competitors) contexts of a firm can either facilitate or inhibit the acceptance and use of a given technological innovation. For the purpose of this study, the organization-technology-framework was used to prove that agribusiness firms need the know-how, capabilities, and stock of ICT resources to manage their business projects and routines effectively and to facilitate or slow down the acceptance and use of DMPs.

### **2.2.4 Perceived E-readiness Model (PERM)**

The perceived e-readiness model by Molla and Licker (2005) is comprehensive enough for unifying the four factors influencing the use of digital marketing: technology, managerial, organizational, and institutional (Broni and Owusu, 2020). PERM by Molla et al (2014) suggests that perceived organizational e-readiness—POER (awareness, commitment, and the stock of digital information technological resources)—and perceived environment e-readiness—PEER (readiness of market forces, government and other supporting industries)—are critical in a business’s decision to adopt and institutionalize the use of digital information technologies..

PERM is relevant and useful for this study, as the government of Tanzania has created an enabling environment to encourage foreign investment in the agricultural sector to transfer technology to the local producers, increase productivity and expand to broader markets, both domestic and international. Concerning the study, the industrialization policy via the Tanzania Kilimo Kwanza strategy of good governance has played a significant role in promoting investment in agribusiness by encouraging local farmers to produce more through the advancement of technology and winning the agribusiness in DMPs.

## **2.3 Empirical Review**

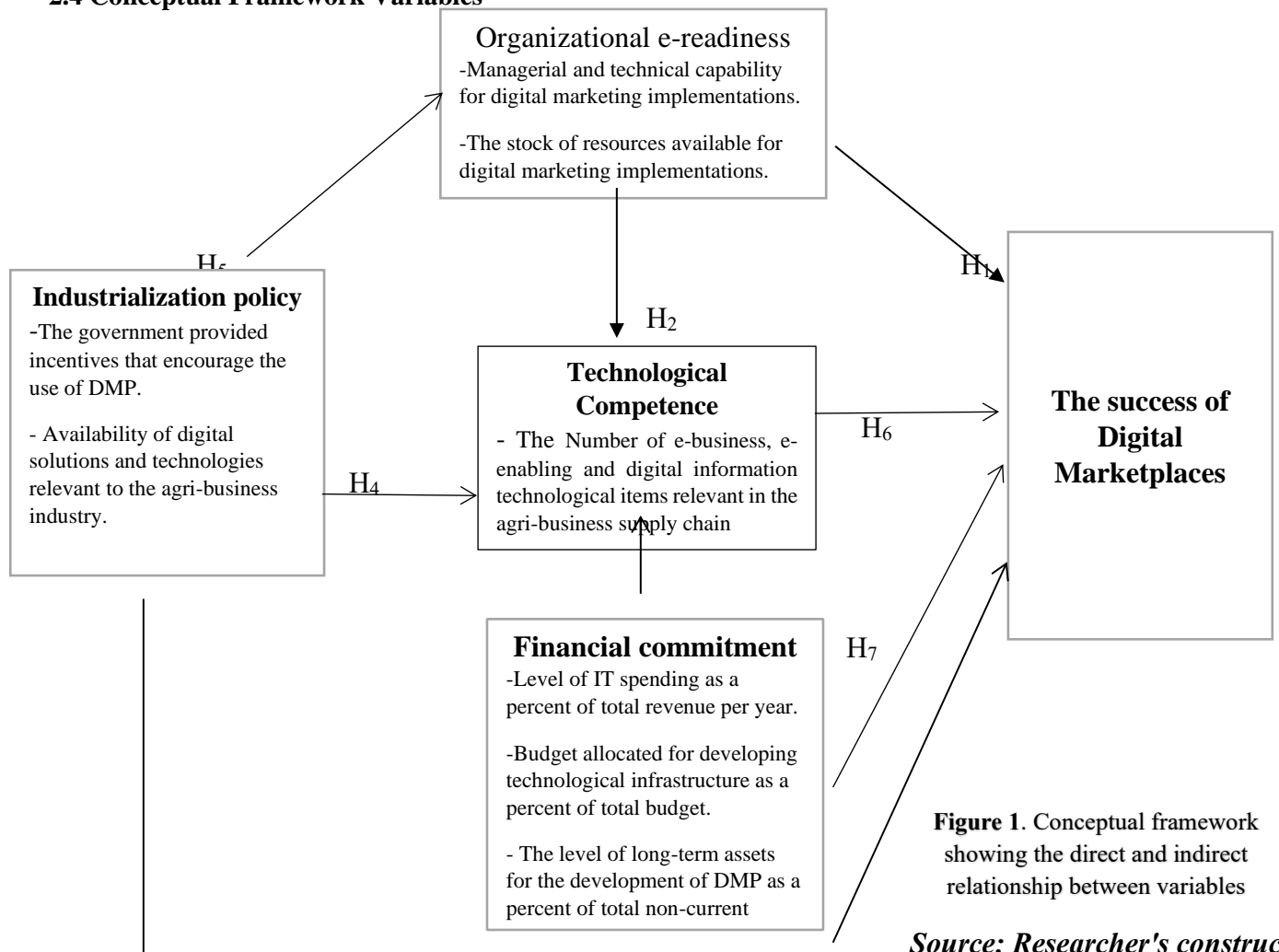
Relevant agricultural e-commerce literature suggests a series of characteristics that will serve as determinants of success for agribusiness DMPs. Molla, Konrad, and Pittayachawan (2010) did a study on e-business use in agribusiness taking a case of the horticulture sector. Their findings showed that technology competence, financial commitment, perceived environmental e-readiness, and organizational size are influential factors that directly affect the use of e-business in agri-business. Furthermore, Molla et al (2014) suggested that government, horticulture associations, growers, and digital marketplace operators, through understanding these factors can make effective decisions to develop their support, capabilities, and offerings towards the success of agribusiness DMPs.

Huizingh et al. (2007) conducted a study on measuring e-commerce website success. Their study suggested that transactional capabilities are important to conduct an online financial transaction; so as to reduce cost as well as increase revenues by attracting new customers and sales or transferring existing sales to a more profitable medium. Junjuni Li (2009) suggested that customers and businesses can create and use an online trading system to place and accept orders, track order and delivery status, make and receive payments, and access and update accounts. Their study concluded that both transactional and informational functions have a positive impact on e-commerce website success.

Because using the World Wide Web to do agribusiness is still relatively new to many organizations, and thus forecasting sales and profits is typically vague (Ghandour, Deans and Benwell, 2012), managers are likely to rely on subjective measures for company’s IT spending or expenditure. However, and as noted by Epstein (2004), it is only by making a “business case” for digital technology expenditure that managers can truly integrate the impacts of digital technologies usage into their business. A clear business case can be presented by identifying metrics (with indicators) of digital marketing performance and its impacts on profitability. These indicators empower managers with the information to evaluate whether the digital marketing program is achieving its stated objectives and is contributing ultimately to profitability and organizational benefits, which will satisfy or dissatisfy managers according to the digital marketing stated objectives (Ghandour, Deans and Benwell, 2012).

Additionally, when digital marketing is able to communicate certain features that enhance the experience of agri-businesses, generate trust, and strengthen the competitive position of the company, then managers are inclined to be satisfied if they feel that digital market presence is paying off (Ghandour, Deans and Benwell, 2012). The extent to which this is realized is either in monetary terms (sales increased or cost reduction) or in the form of intangible benefits (Huizingh 2002). Furthermore, previous studies have investigated Internet and Web adoption in agribusiness. For example, Molla et al (2014); Stricker et al. (2003) discussed the situation of agricultural ICT in Germany; Pollard (2003) explored the impact of a government-sponsored e-services program to improve communication activities of farmers in rural Australia. While these studies have contributed to understanding some of the issues of agribusiness, some gaps that motivated this research study do exist. Most of the studies tend to focus on the potential of digital technologies in addressing some of the causes of agribusiness inefficiencies and neglected what agribusinesses should be doing to take advantage of growing digital marketing of products or services using digital technologies such as the internet, display advertising, smartphones apps, and many others (Andreopoulou et al., 2009). Therefore, this paper attempts to resolve the gaps identified in the current literature by analyzing the success factors of agribusiness in Tanzania. The focus of this research, however, is the success of the digital marketplace in the context of digital marketing usage taking the views of the agribusiness firms participating in the digital marketplace. The perceptions of business owners or managers can help to pinpoint areas within the firm where digital marketing creates value (Ghandour, Deans and Benwell, 2011).

#### 2.4 Conceptual Framework Variables



**Figure 1.** Conceptual framework showing the direct and indirect relationship between variables

*Source: Researcher's construct (2019)*

### **i) Perceived organizational e-readiness (POER) and the success of agribusiness DMP**

H<sub>1</sub>: Firms with greater organizational e-readiness are more likely to use digital marketing to a greater extent.

H<sub>2</sub>: Firms with greater organizational e-readiness are more likely to build higher technology competence.

### **ii) Industrialization policy and the success of agribusiness DMP**

H<sub>3</sub>: Government promotion on the use of modern technology through industrialization policy will stimulate the use of digital technologies and more likely to bring the success of agri-business DMP.

H<sub>4</sub>: The government provision of incentives for the use of digital marketing in the agribusiness supply chain is more likely to build higher technological competence.

H<sub>5</sub>: The government support on the use of digital information technology in the agribusiness supply chain is more likely to achieve a greater organizational e-readiness.

### **iii) Technology competence and the success of agribusiness DMP**

H<sub>6</sub>: Firms with higher technology competence have a greater extent of digital technologies used for marketing products or services.

### **iv) Firm's financial commitment and the success of agribusiness DMP**

H<sub>7</sub>: Firms with a greater financial commitment to digital information technologies are more likely to use digital marketing to a greater extent.

H<sub>8</sub>: Firms with a greater financial commitment to digital information technologies are more likely to build higher technological competence.

## **3. Methods**

### **3.1 Research Design**

This study employed a quantitative research design. Following the set research objectives, the study quantified the success factors of agribusiness DMPs to arrive at more objective conclusions, testing hypothesis, and determining the issue of causality.

### **3.2 Area of the Study**

The study took place in Dar es Salaam, Kilimanjaro, Arusha, Morogoro, Tanga, Mwanza, and Zanzibar. Dar es Salaam is the country's capital city as well as a principal commercial center for agribusinesses. It is also the major seaport for the country and its landlocked neighbours. Kilimanjaro, Arusha, Mwanza, Morogoro, and Zanzibar are among the business hubs for agricultural activities and headquarters of the agribusiness firms that are using DMPs to sell agricultural and food products. These regions also have the sufficient number of agribusiness firms participating in digital marketplaces and engaged to different agribusiness subsectors.

### **3.3 Population, Sample, and Sampling Procedures**

#### **3.3.1 Population/Sampling Frame**

The targeted population for this research paper comprised the agribusiness firms that participate in DMPs from the selected regions in Tanzania (Dar es Salaam, Zanzibar, Arusha, Morogoro, Tanga, Kilimanjaro, and Mwanza).

#### **3.3.2 Sampling Procedure**

The Yamane formula of sample size calculation (**Table 1**) was used.

**Table 1.** Sampling procedure for the study.

<b>Regions</b>	<b>Population size (N)</b> Number of agribusiness firms participating in DMPs for each region (Source: Regional Trade Offices 2019)	<b>Population proportion of size</b> (Number of agribusiness firms for each region/ Total number of agribusiness firms for the selected region*100)	<b>Sample size (n)</b>
Dar	270	68%	135
Zanzibar	14	4%	7
Moro	20	5%	10
Arusha	26	7%	13
Kilimanjaro	10	3%	5
Mwanza	44	11%	22
Tanga	16	4%	8
<b>Total</b>	<b>400</b>	<b>100%</b>	<b>200</b>

### **A simplified formula for proportions**

Yamane (1967) provided a simplified formula to calculate sample size. This formula was used to calculate sample sizes for this study in Figure 1. A 95% confidence level and  $P = 0.05$  are assumed for the equation.

$$n = \frac{N}{1+N(e)^2}$$

Where  $n$  is the sample size,  $N$  is the population size,  $n$  is the sample size and  $e$  the level of precision (Adella, Hepelwa, Yami, Manyong, 2020). When this formula is applied to Table 1, the following results

$$n = \frac{400}{1 + 400(0.05)^2} = 200 \text{ Agribusiness firms}$$

### **3.3.3 Sample Size**

The sample for data collection covered 200 agribusiness firms participating in DMPs from the seven selected regions that were obtained from the records found on trade regional offices. The study sample size included 200 firms because of the econometric analysis that was used to analyze the data; which requires that the sample size must be at least 20 times the number of variables to be used to get accurate results.

## **3.4 Data Collection Procedure**

### **3.4.1 Type of Data**

Primary data was collected using a personally administered questionnaire that was prepared and sent to key management personnel (employees who have authority to directly or indirectly plan and control business operations).

### **3.4.2 Data Collection Techniques**

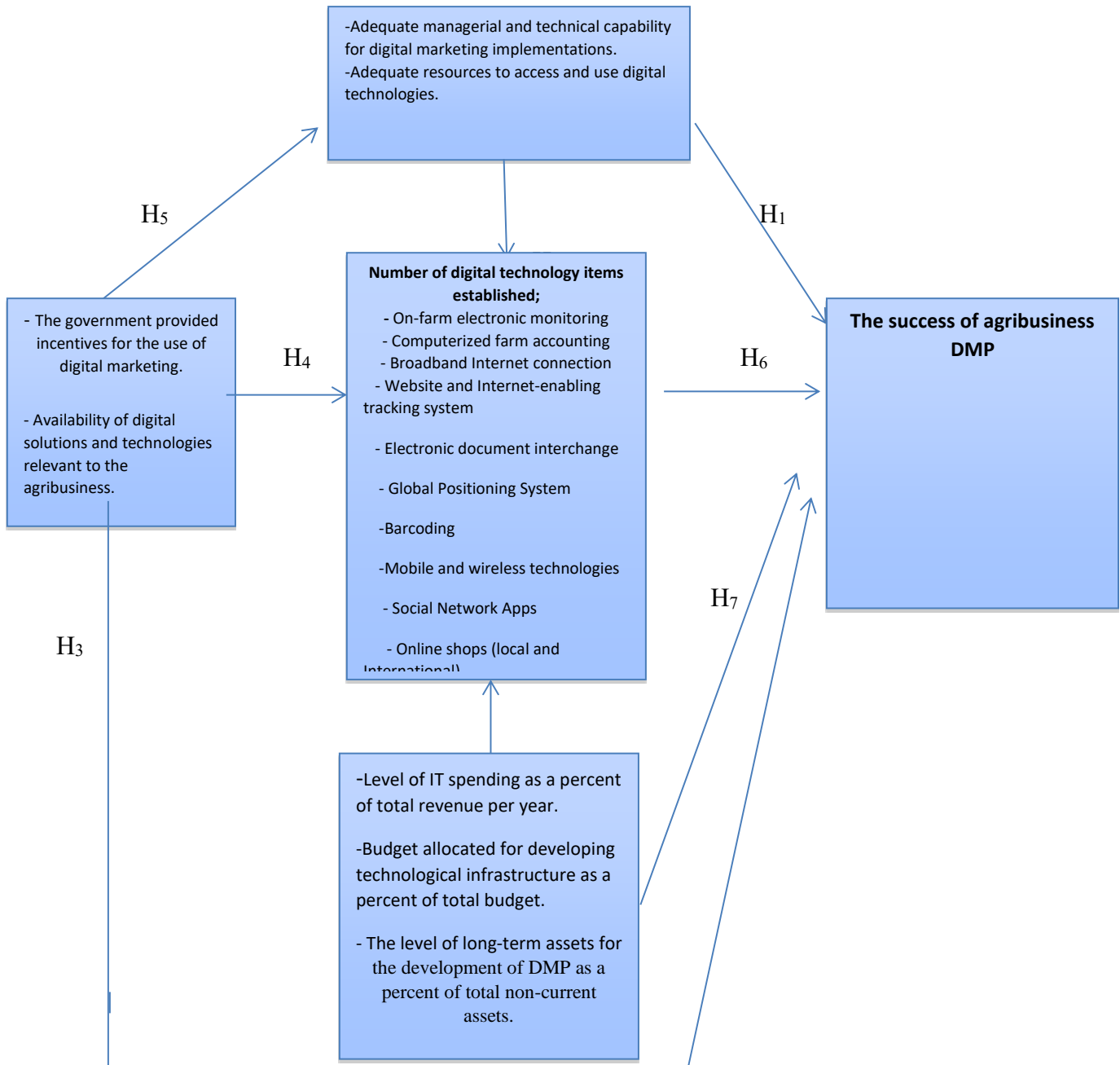
The study employed the use of personally administered questionnaires. The questionnaire included both open and closed questions.

## **3.6 Data Management and Analysis**

The data was analyzed using the SPSS statistical package for descriptive data analysis, to run the validity test, reliability test, correlation test, and path analysis. Furthermore, cross tabulation which is embedded in the SPSS was used to show the relationship between study variables. Path model analysis is used to examine the relationship between dependent and independent variables (Kwigizile et al., 2020), this research paper used path model analysis to obtain the estimates of the coefficient for each parameter, and to know the significance of the variables and test the study hypothesis.

### 3.7 Econometric Model

The proposed conceptual model was tested using path analysis. This technique is preferred over multiple regressions because of its ability to account for measurement error, test all hypotheses in the model simultaneously, and control Type 1 error (Molla et al., 2014). The path analysis involves several assessment steps such as performing the validity test, reliability test, and correlation test of the measurement model. Second, the hypothesis was examined by estimating standardized path coefficients. The proposed integrated model in the below Figure 2 is more illustrated by input path analysis in Figure 3



**Figure 2. The input path diagram showing the direct and indirect relationship between the study variables.**

To move from the input path diagram of causal relationships developed in **Figure 2** to the output diagram, the researcher computed path coefficients. A path coefficient is a **standardized regression coefficient** (beta weight). The researcher was able to compute the path coefficients by setting up the following structural equations:

$$\text{Success of agribusiness DMP} = \beta_{11\text{OER3}} + \beta_{12\text{OER5}} + \beta_{13\text{IP1}} + \beta_{14\text{IP4}} + \beta_{15\text{TC2}} + \beta_{16\text{TC9}} + \beta_{17\text{TC4}} + \beta_{18\text{TC5}} + \beta_{19\text{TC6}} + \beta_{110\text{TC7}} + \beta_{111\text{TC8}} + \beta_{112\text{FFC1}} + \beta_{113\text{FFC3}} + \varepsilon_1$$

$$\text{Technological competence} = \beta_{21\text{FFC1}} + \beta_{22\text{FFC3}} + \beta_{23\text{OER3}} + \beta_{24\text{OER5}} + \beta_{25\text{IP1}} + \beta_{26\text{IP4}} + \varepsilon_2$$

$$\text{Organizational e-readiness} = \beta_{31\text{IP1}} + \beta_{32\text{IP4}} + \varepsilon_3$$

Whereby,

- 1) OER5 = Adequate managerial and technical capability for digital marketing implementations
- 2) OER3 = Adequate resources to access and use digital technologies
- 3) IP1 = Government provided incentives for the use of digital marketing
- 4) IP4 = Availability of digital solutions and technologies relevant to the agribusiness industry
- 5) TC2 = Computerized farm accounting
- 6) TC9 = Online shops and social networks
- 7) TC4 = Website and Internet-enabling tracking system
- 8) TC5 = Electronic document interchange
- 9) TC6 = Global Positioning System
- 10) TC7 = Barcoding
- 11) TC8 = Mobile and wireless technologies
- 12) FFC1 = The level of IT spending in the company as a percent of total revenue per year
- 13) FFC3 = The level of long-term assets for the development of digital marketing assets as a percent of total non-current assets.
- 14) The terms  $\varepsilon_1, \varepsilon_2, \varepsilon_3$  are the error or unexpected variance terms.

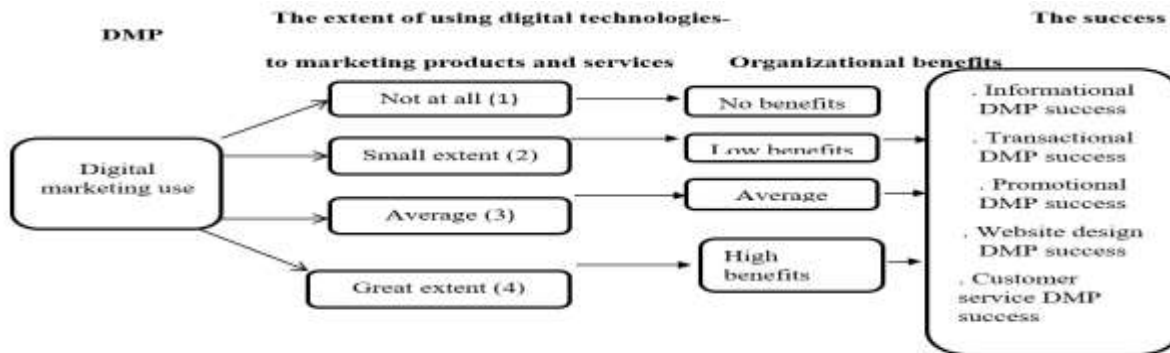
### 3.8 Operationalization of Variables Specified in the Model

#### 3.10.1 Measurement of the Success of Agribusiness Digital Marketplace

This study adopted the updated DeLone & McLean (D&M) Information System Success Model (2003) to obtain the metrics for the success measure of agribusiness DMPs. The D&M model is useful for the study because, since 1992, it has been the central study for all research addressing the success of Information System Morteza (2014). This research is no exception in recognizing the potential of the model and its applicability to identify the success measure of DMPs for the following reasons:

- The D&M model is based on communication theory; it is highly suited to measuring the digital information technology and communications phenomenon that is the Internet.
- The creation of the updated D&M IS Success Model is driven by a process that understands digital information technology and the net benefits obtained from using digital technologies (Ghandour, Deans and Benwell, 2012)

Furthermore, According to Tang et al (2006) and Motaghian et al (2013) the updated D&M Success Model identified six interrelated dimensions of success in Information System as follows: system quality, information quality, and service quality, intention to use, user satisfaction, and net benefits. According to Ghandour, Deans and Benwell (2012); The Model suggested that the quality of the content, system, and service of the Information System determine the users' intention to use, their actual use, and their satisfaction with the Information System (DeLone and McLean 2003). In relation to the study, the more satisfied the users (agribusiness firms participating in DMP) are with the DMPs, the more users will use it, and this determines the benefits that the users obtain from using the Agribusiness DMPs. The benefits then reinforce the users' intention to use, their actual use, and their satisfaction with the agri-business DMPs in Tanzania.



**Figure 3. The success measure constructs of agribusiness Digital Marketplace.**  
*Source: Researcher's construct based on the DeLone and McLean Model, 2003.*

## 4. Results

### 4.1 Descriptive Analysis

**Table 4.1. The profile of respondents (agribusiness firms participating in DMP).**

Socioeconomic variable	Frequency	Percent
<b>Region</b>		
Arusha	13	6.5
Dar es Salaam	135	67.5
Kilimanjaro	5	2.5
Morogoro	10	5
Mwanza	22	11
Tanga	8	4
Zanzibar	7	3.5
<b>Total</b>	<b>200</b>	<b>100</b>
<b>Business Age</b>		
<= 5	52	26
6–10	61	30.5
11–20	55	27.5
21–30	16	8
> 31	16	8
<b>Total</b>	<b>200</b>	<b>100</b>
<b>Agri-business subsector</b>		
Growers	8	4
Retail/Wholesalers	42	21
Exporters	8	4
Agriculture equipment suppliers	20	10
Commercial farms	7	3.5
Warehousing and storage	12	6
Irrigation farms	3	1.5
Fertilizer and pesticides suppliers	11	5.5
Agribusiness associations	2	1
Production, harvesting services, and logistics	7	3.5
Marketing and distribution services	27	13
Processors	14	7
Catering, restaurants, bakery	4	2
Beverage's suppliers and producers	5	2.5
Farmers	10	5
Importers	6	3
Agribusiness marketing, consulting, advertising agency	14	7
<b>Total</b>	<b>200</b>	<b>100</b>
<b>Business employee size</b>		

Micro (<= 4)	31	15.5
Small (5–19)	58	29
Medium (20–99)	54	27
Large (>= 100)	57	28.5
<b>Total</b>	<b>200</b>	<b>100</b>
<b>Business category</b>		
Sole proprietor	44	22
Partnership	6	3
Company	133	66.5
Institution	2	1
Agency	3	1.5
Organization	9	4.5
NGO	3	3
<b>Total</b>	<b>200</b>	<b>100</b>
<b>Respondent's position in the company</b>		
Managing Director/CEO	48	24
Chief Accountant	26	13
Administrative Manager	11	5.5
Operations Manager	25	12.5
Branch Manager	3	1.5
Finance Manager	7	3.5
HR Manager	4	2
Sales & Marketing Manager	76	38
<b>Total</b>	<b>200</b>	<b>100</b>
<b>Education Level</b>		
Ordinary secondary education	7	3.5
Advanced secondary education	6	3
Diploma	29	14.5
Degree	129	64.5
Masters	28	14
PhD	1	0.5
<b>Total</b>	<b>200</b>	<b>100</b>

**Source: SPSS output data, 2019**

Table 4.1 above shows that most of the agribusiness firms (67.5%) participating in DMPs are located in Dar es Salaam, which is a principal commercial area for agribusinesses. Most of the respondents (38%) were marketing managers and 24% were managing directors/CEOs, thus they had adequate awareness about the relevance of DMPs to their business practice. The majority of the agribusinesses had been operating for a period of six to ten years. Of these, micro agribusiness firms made up 15.5%, small agribusiness firms 29%, medium agribusiness firms 27%, and large agribusiness firms 28.5% of the total number of samples selected; that gives a researcher a good way to make comparisons on why some firms realize higher benefits from the use of DMP and succeed in digital marketing while some do not succeed in digital marketing of products and services.

Most of the agribusinesses (66.5%) were registered companies with business licenses and recognition to conduct business transactions, marketing, and trading services online. The majority of the respondents (64.5%) had attained a first degree, indicating that they possessed the capabilities to implement digital marketing for building and developing sustained DMPs. Moreover, the majority of the agribusiness firms engaged in wholesale and retail supply of agricultural products using DMPs (21%) and marketing & distribution services (13%) since they dealt with local producers and final consumers.



#### 4.1.2 The Relationship between Dependent Variable and Independent Variables

**Table 4.2. Cross-tabulation between organizational e-readiness and success of agri-business digital marketplaces.**

	The success of agribusiness DMP			Total
	Small extent	Average	Great Extent	
	Exchange of trading information online and in real time			
<b>1. Adequate awareness about DMP</b>				
Strongly agree	3	27	87	117
Somewhat agree	15	32	24	71
Not sure	0	1	0	1
Somewhat disagree	9	1	1	11
Strongly disagree	0	0	0	0
<b>Total</b>	<b>27</b>	<b>61</b>	<b>112</b>	<b>200</b>
<b>2. Application of digital information technology</b>	<b>The website provides access to database and information relevant for agribusiness industry</b>			
	6	42	92	140
Strongly agree	6	35	15	56
Somewhat agree	0	0	0	0
Not sure	3	1	0	4
Somewhat disagree	0	0	0	0
Strongly disagree	<b>15</b>	<b>78</b>	<b>107</b>	<b>200</b>
<b>3. Adequate resources to access and use internet</b>	<b>Shipment and logistics management are facilitated via the internet</b>			
	3	30	81	114
Strongly agree	11	35	25	71
Somewhat agree	0	1	0	1
Not sure	6	7	1	14
Somewhat disagree	0	0	0	0
Strongly disagree	<b>20</b>	<b>73</b>	<b>107</b>	<b>200</b>
<b>4. Automated business</b>	<b>Joining electronic intermediaries (e-markets) for online purchase or sale of products</b>			
	1	19	74	94
Strongly agree	9	51	31	91
Somewhat agree	0	1	1	2
Not sure	10	3	0	13
Somewhat disagree	0	0	0	0
Strongly disagree	<b>20</b>	<b>74</b>	<b>106</b>	<b>200</b>
<b>5. Adequate managerial and technical capability</b>	<b>Stock availability, prices, and delivery time are shared electronically and in real time</b>			
	1	25	74	100
Strongly agree	20	39	29	88
Somewhat agree	0	0	0	0
Not sure	9	3	0	12
Somewhat disagree	0	0	0	0
Strongly disagree	<b>30</b>	<b>67</b>	<b>103</b>	<b>200</b>
	<b>Website supports online advertisement of the products and events to communities</b>			

<b>6. Implementing, building, and developing sustained DMP</b>	3	22	92	117
Strongly agree	3	47	25	75
Somewhat agree	0	0	0	0
Not sure	5	3	0	8
Somewhat disagree	0	0	0	0
Strongly disagree	<b>11</b>	<b>72</b>	<b>117</b>	<b>200</b>
<b>Total</b>				

**Source: SPSS output data, 2019**

The cross-tabulations results in Table 4.2 above show that, out of 112 agribusiness firms which use digital marketing to a greater extent, 87 firms strongly agreed to have adequate awareness about the use of DMPs for exchange of trading information (such as orders, delivery notices, invoices, statements, and remittance advice) online and in real time. Likewise, 92 firms strongly agreed that application and use of digital information technology have provided benefits to their line of business, including the creation of the company website which provides access to database and information relevant for the agribusiness industry. Also, the majority of the respondents (81 firms) which possess adequate resources to access and use the internet in performing their business transactions, operations, and projects strongly agreed that the application and use of digital information technology has provided benefits to their line of business.

Moreover, 105 agribusiness firms with strongly automated business processes for the use of digital information technology agreed that they had joined electronic intermediaries to a greater extent. Likewise, 103 firms agreed that they had adequate managerial and technical capability for digital market implementation that enabled them to share stock availability, prices, and delivery time to a great extent. In addition, 117 firms with websites which support online advertisements of products and events to communities strongly agreed to provide the necessary resources to implement, build, and develop sustained DMPs.

**Table 4.3. Cross-tabulation between industrialization policy and success of agri-business digital marketplaces**

	The success of agribusiness DMPs			Total
	Small extent	Average	Great extent	
	Joining electronic intermediaries (e-markets) for online purchase or sale of products			
<b>1. Government provided incentives</b>				
Strongly agree	2	15	34	51
Somewhat agree	7	32	47	86
Not sure	2	11	6	19
Somewhat disagree	8	16	19	43
Strongly disagree	1	0	0	1
<b>Total</b>	<b>20</b>	<b>74</b>	<b>106</b>	<b>200</b>
<b>2. Government engagement with agribusiness firms electronically</b>	Exchange of trading information online and in real time			
Strongly agree	3	17	47	67
Somewhat agree	15	25	49	89
Not sure	3	4	3	10
Somewhat disagree	6	15	13	34
Strongly disagree	0	0	0	0
<b>Total</b>	<b>27</b>	<b>61</b>	<b>112</b>	<b>200</b>
<b>3. Nature of regulatory authority encourages the use of DIT</b>	Website supports online advertisement of the products and events to communities			

Strongly agree	0	20	51	71
Somewhat agree	9	44	39	92
Not sure	1	3	5	9
Somewhat disagree	5	11	10	26
Strongly disagree	0	0	2	2
<b>Total</b>	<b>15</b>	<b>78</b>	<b>107</b>	<b>200</b>
<b>4. Availability of digital solutions and technologies</b>	<b>Stock availability, prices, and delivery time are shared electronically and in real time</b>			
Strongly agree	2	24	52	78
Somewhat agree	10	23	38	71
Not sure	3	8	4	15
Somewhat disagree	5	18	13	36
Strongly disagree	0	0	0	0
<b>Total</b>	<b>20</b>	<b>73</b>	<b>107</b>	<b>200</b>
<b>5. Government institutions engagement with agribusiness firms in DMP</b>	<b>Shipment and logistics management are facilitated via the internet</b>			
Strongly agree	2	14	51	67
Somewhat agree	10	26	36	72
Not sure	1	8	1	10
Somewhat disagree	17	19	15	51
Strongly disagree	0	0	0	0
<b>Total</b>	<b>30</b>	<b>67</b>	<b>103</b>	<b>200</b>

**Source: SPSS output data, 2019**

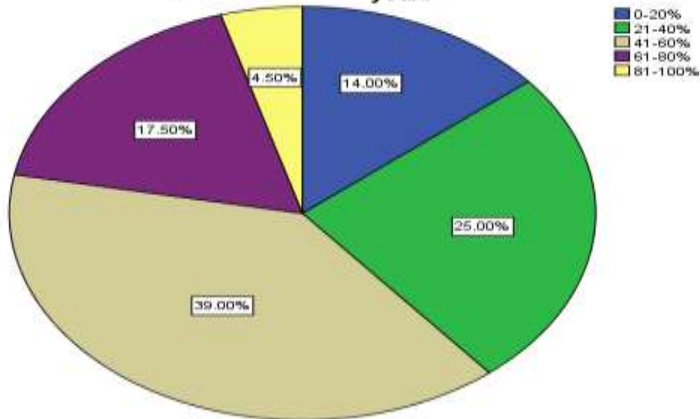
The cross-tabulations results in Table 4.3 above show that, out of 106 agribusiness firms which use electronic intermediaries (e-markets) to a greater extent, only 34 strongly agreed that government provides incentives for the use of DMPs in their business practices. Likewise, only 67 of 200 firms strongly agreed that the government of Tanzania needs to engage with them electronically. Of the 107 agri-business firms with websites that support online advertisements of products and events to communities, only 51 strongly agreed that the nature of regulatory authorities encourages them to use digital information technology in their operations, projects, and transactions.

Likewise, only 78 agribusiness firms out of 200 strongly agreed on the wide availability of digital solutions and technologies relevant to the agribusiness industry to facilitate the sharing of stock availability, prices, and delivery time electronically and in real time. Also, only 67 out of 200 agribusiness firms strongly agreed that government institutions are ready to engage with them in DMPs.

#### **4.1.3 Summary of the Firm's Financial Commitment**

Figure 4.1 below depicts that the majority of the agribusiness firms use 41% to 60% of their total revenue per year as IT spending; this shows that these firms engage in digital marketing because they realize the benefits generated from the use of digital technologies in developing benefits associated with DMPs. In fact, most of their systems have already been strongly automated so as to capture the net benefits of employing digital information technologies to their line of business.

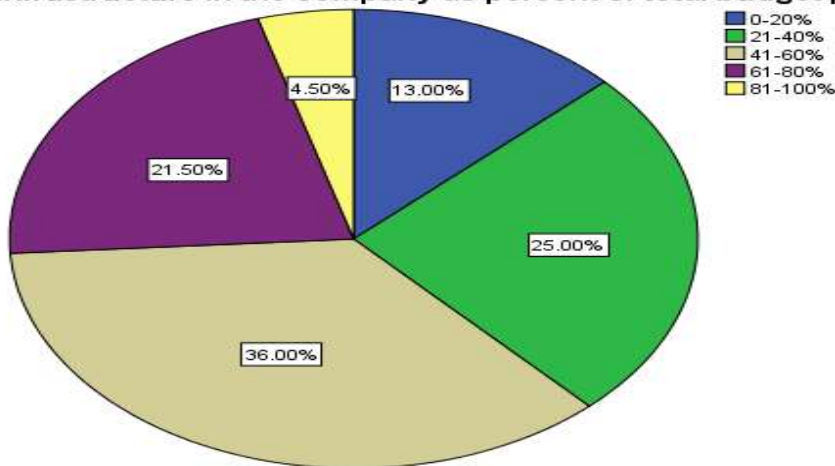
**The level of IT spending in the company as percent of Total revenue per year?**



**Figure 4.1 Summary of the level of IT spending as a percent of total revenue per year.**

Figure 4.2 below depicts that the majority of the agribusiness firms allocate 41% to 60% of their total budget per year for the development of ICT infrastructure; these results are in line with the results of the level of IT spending in the company. This indicates that the IT expenditure for most of the agribusinesses firms matches the budget allocated for the development of ICT infrastructure. Thus, they justify IT expenditure in the organization in line with the study by Ghandour et al (2012), as a measure of agribusiness digital market success, along with other organizational benefits that managers determine their IT expenditure according to their satisfaction and profit generated from the use of digital information technology.

**The level of budget allocated for the development of ICT Infrastructure in the company as percent of total budget per year**



**Figure 4.2 Summary of the level of budget allocated for the development of ICT as a percent of total revenue per year.**

Figure 4.3 below depicts that the majority of the agribusiness firms have made long-term investments in the development of digital market assets with 81% to 100% level of long-term assets for the development of digital technologies that digitize their value chain processes and functions; to communicate, interact, and transact with their trading partners, and result in company profitability.

**Figure 4.3 Summary of the level of long-term assets for the development of DM assets.**

**Table 4.4. Summary of firm’s technology competence.**

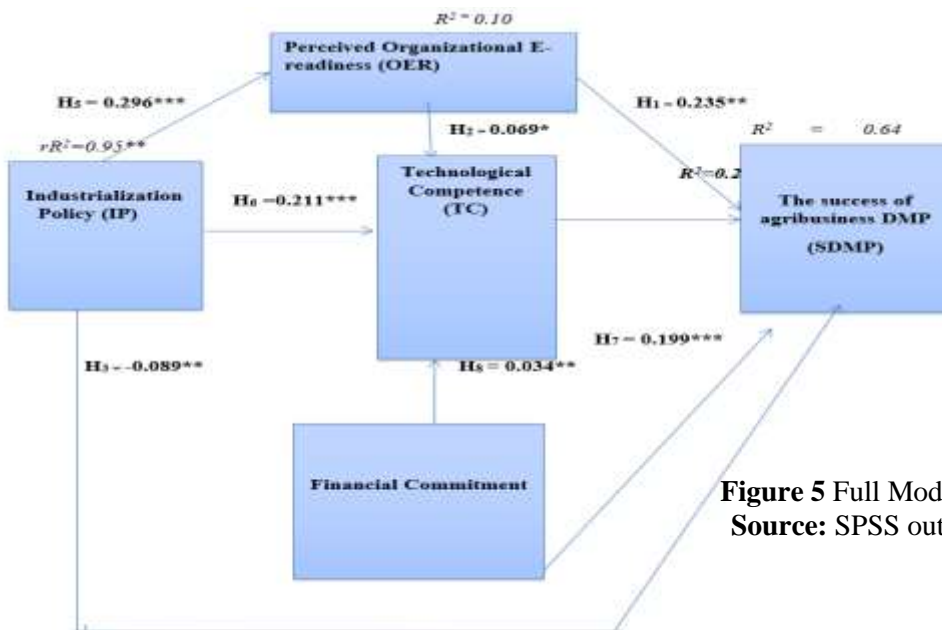
Number of digital information technological items	Number of companies using certain technology out of 200 companies	Percentage
On-farm electronic monitoring	9	4.5
Computerized farm accounting	23	11.5
Broadband internet connection	74	37
Website and internet-enabling tracking system	73	36.5
EDI (Electronic Document Interchange)	117	58.5
Global Positioning System (GPS)	96	48
Barcoding	55	27.5
Mobile and wireless technologies	159	79.5
Social networks	178	89
Online shops	76	38
Accounting systems	114	57

**Source: SPSS output data, 2019**

Table 4.4 above shows that there is limited use of on-farm electronic monitoring, computerized farm accounting, and barcoding to sense, monitor, track, and transact agribusiness activities. Very few agribusiness firms e-enabled their supply chain with farm automation technologies (only 4.5% of on-farm electronic monitoring and 11.5% of computerized farm accounting) to provide real-time information in the pre-harvest maturity monitoring, ripeness determination, and postharvest treatment of agricultural products, respectively. However, there is a greater use of the digital marketplace for selling and buying via local online shops (such as Ninayo, Jumia Food, Fursa 101, and Hello Food), international online shops (such as Alibaba, eBay, and Amazon), and social networks (such as Facebook, Instagram, Twitter, Linked in, yellow page, Zoom Tanzania, and WhatsApp). There was greater access to business-to-business technologies such as electronic data interchange, accounting systems, global positioning systems, website and internet-enabled tracking along the agribusiness supply.

**5. Path Analysis and Discussion of Findings.**

The proposed model (Figure 5) was tested using path analysis in SPSS.



**Figure 5 Full Model Test Results.**  
**Source: SPSS output data, 2019**

The asterisks (\*\*\*) , (\*\*), and (\*) represent 1% , 5% , and 10% level of significance, respectively. The model has evaluated whether it fits the data, and the results show that R-square is 0.64, which indicate that the model represents the data very well. The hypotheses were examined by estimating standardized path coefficients. The results (Fig. 5) show that the relationship between perceived organizational e-readiness, financial commitment, technological competence, and success factors of agribusiness digital marketplace was statistically significant and positive, whereas the government promotion through industrialization policy had a negative relationship with the success factor of the agribusiness digital marketplace. The results showed that the first model explains 64% of the variance in success factors of agribusiness digital marketplace. Further, the second model indicated that 22% of the variance in technological competence is explained by financial commitment, industrialization policy, and organizational e-readiness factors. The third model shows that industrialization policy explains 10% of the variance in organizational e-readiness. The findings is in line with the Keimasi and Chitsazan, 2015)

### **Organizational e-readiness**

Organizational e-readiness is statistically significant and positively related to the success of the agribusiness digital marketplace, meaning that adequate awareness and resources to access and use digital technologies are essential for successful digital marketing implementations. These findings are in line with the findings by Kumar, Sinha and Gupta (2018) and Molla and Licker (2005) who concluded that an organization's capability concerning e-business awareness, commitment, and resources is very important for the success of e-business practices in agribusiness. This finding is also supported by that of Yilmaz et al (2020) who concluded that agribusinesses' knowledge on application of ICTs to trade with less effort influences their e-readiness to participate in the digital marketplace.

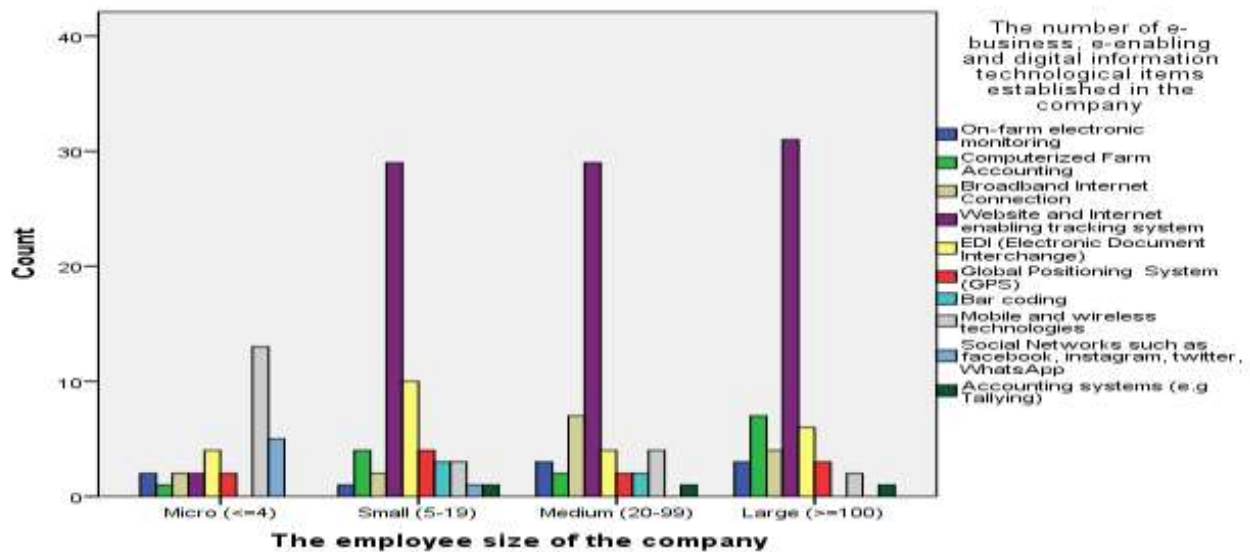
### **Industrialization policy**

Government promotion through an industrialization policy is statistically significant and negatively related to the success of agribusiness DMPs in Tanzania; which provides evidence that the Tanzanian agribusiness supply chain appears to lack enough government promotion and incentives to stimulate the widespread use of digital solutions and technologies in agribusiness operations, projects, and transactions. On the other hand, research findings by Molla et al (2014), Zhu and Kraemer (2005), and Xu et al. (2009) suggested that the readiness of a firm to conduct business electronically depends not only on its efforts but also on the support from the government and regulatory institutions.

### **Technology Competence**

Technology competence is statistically significant and positively related to the success of agribusiness DMPs; meaning that agribusiness firms with higher technology competence are more likely to make more use of digital technologies to attain benefits from the digital marketing of products or services. This finding is supported by those of Sean Xu (2010), Bryceson (2006), Clasen and Mueller (2006), and Zhu and Kramer (2005) who concluded that greater access to e-business technologies such as on-farm electronic monitoring, electronic data interchange, accounting systems, global positioning systems, website, and internet-enabled tracking along the agribusiness supply chain facilitate the exchange of information..

Nevertheless, the findings show that micro agribusiness firms have limited the use of e-business and e-enabling and digital information technological items to sense, monitor, track, transact, and support online advertisement and marketing of agricultural products and services. This is evidenced in Figure 5.1 which depicts that micro agribusiness firms have a limited use of on-farm electronic monitoring, computerized farm accounting, bar coding, electronic document interchange, website, and an internet enabling tracking system to sense, monitor, track, and transact agribusiness transaction and trading activities.



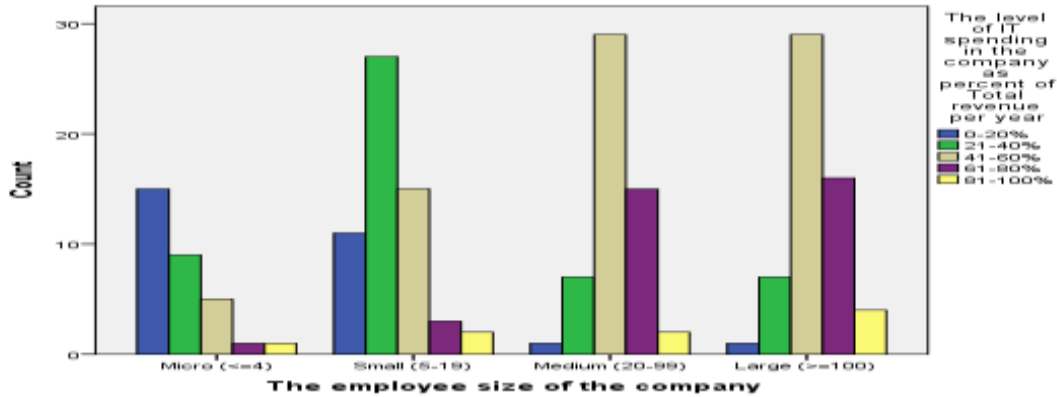
**Figure 5.1 The firm’s employee size and the level of technology competence.**

#### Financial Commitment

Financial commitment is statistically significant and positively related to the success of agribusiness DMPs, meaning that firms with greater financial commitment to digital information technologies for the production, marketing, and distribution end of the agribusiness chain are more likely to develop e-business capabilities and use digital technologies to a greater extent to exchange the trading information with their partners electronically and in real time. This finding is supported by those of Mavondo (2005) and Zhu and Kraemer (2005) who concluded that financial resources are very crucial for IT investments in agribusinesses; which in turn enables the agribusiness firms to realize higher benefits generated from the use of such technologies.

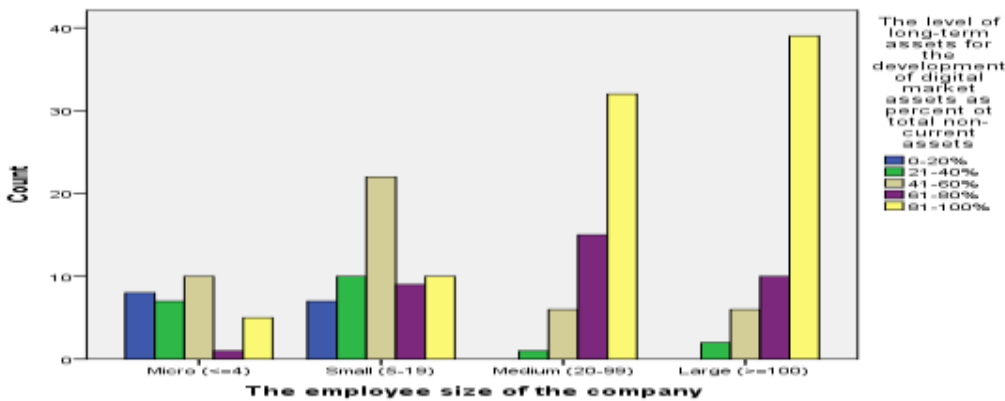
Again, the findings of this study are in line with Weerasinghe, 2009 on the managerial innovation models, on the relative advantage of one technology (digital marketplaces) over the alternative (physical markets). Therefore, this study gives researchers a good way to compare why some firms succeed in digital marketing and some don't. From the findings, medium and large agribusiness have a greater financial commitment to digital information technology and use digital marketing to a greater extent, which implies that these firms have realized higher economic benefits from investing and using digital marketing technologies in their lines of business. This is evidenced in Figures 5.2 and 5.3, respectively.

Figure 5.2 depicts that medium and large agribusiness firms have a higher IT spending, that is, they use 61%–80% and 81%–100% of their total revenue per year for IT spending, respectively. This is because these firms have engaged in digital marketing and realized the higher benefits associated with the use of DMPs. Unlike the small and micro agribusiness firms, that use 0–20% and 21%–40% of the total revenue per year for IT spending, respectively.



**Figure 5.2: Firm's employee size and the level of IT spending in the company.**

Further, Figure 5.3 below indicates that medium and large agribusiness firms have made a long-term investment on the development of digital market assets with 61–80% and 81 to 100% level of long-term assets for the development of digital technologies, respectively. This implies that these firms have a greater focus on long-term digital technology investments in terms of time and money, which is important to build technology competence and capture the performance. On the other hand, micro and small agribusiness firms make an investment with 0–20% and 21–40% level of long-term assets for the development of digital marketing, but their level of investment is low compared to that of large and medium agribusiness firms. This means that efforts are needed for these firms to recognize the need to assess the payoffs of the digital marketing investment, and capture the opportunities of the growing demands of digital marketing and the net benefits of employing digital information technologies to their line of business.



**Figure 5.3. The firm's size and the level of long-term assets for the development of DMP.**

### 5. Discussion

The study has managed to establish that firm's financial commitment and technological competence, organizational e-readiness, and government-provided incentives are essential factors for successful digital marketplace implementations (also supported by Ton et al. (2001), Sticker (2003), Bryceson (2006), Clasen and Mueller (2006), Zhu and Kramer (2005), Morteza (2013), and Lai et al. (2006), Enver (2007) and Munirah (2022)

The study was able to establish that the organizational e-readiness is statistically significant and positively related to the success factors of agribusiness DMPs; implying that firms with greater organizational e-readiness are more likely to use digital marketing to a greater extent, as it was postulated on the first study assumption (H<sub>1</sub>).

The study established that the success of agribusiness DMPs is highly influenced by the firm's financial commitment to use digital information technologies, as it was postulated in the seventh hypothesis (H<sub>7</sub>).



This is in line with the findings by Mavondo (2005), Zhu and Kraemer (2005) and Boston (2002). Moreover, the study findings reveal that firms with a greater financial commitment to digital information technologies are more likely to build higher technological competence, as it was postulated in the eighth hypothesis (H<sub>8</sub>). This is in line with Boston (2002).

The study reveals that the success of the agribusiness digital market is highly influenced by the firm's technological competence, as it was postulated in the sixth hypothesis (H<sub>6</sub>). This finding is also in line with that of the technological perspective frameworks by Rogers (2003) and managerial innovation models by Damanpour (1991).

The path model results indicate that government promotion through an industrialization policy relationship has a negative relationship with the success of agribusiness DMPs. This finding does not support the third hypothesis (H<sub>3</sub>) that government promotion of the use of modern technology will stimulate the use of digital technologies and more likely to bring about the success of agribusiness DMP. This is because the Tanzanian agribusiness supply chain appears to lack adequate government promotion and incentives to stimulate the widespread use of digital information technologies in agribusiness operations, projects, and transactions. This finding is in line with Molla et al (2014) and Kumar et al (2021)

However, the study reveals that the government support on the use of digital information technology in the agribusiness supply chain is more likely to achieve a greater technological competence and organizational e-readiness as it was postulated in the fourth (H<sub>4</sub>) and fifth (H<sub>5</sub>) hypotheses, respectively. This is in line with Munirah (2022).

## **6. Conclusion**

### **6.1.1 Facilitators: Government Agencies, Policy Makers, and Development Agencies**

The government and policymakers should note that there is a possibility of high penetration of digital marketing usage in the agribusiness sector in Tanzania; agribusinesses are more ready to participate, make application and use of digital information technology, develop managerial and technical capability, and spend and invest in long-term assets for the development of ICT infrastructure and digital market assets.. Therefore, strong government promotion of DMPs and involvement of potential policymakers from government institutions, development agencies, and private sectors (involved in the agribusiness supply chain), are vital in facilitating access to digital marketing opportunities.

Furthermore, initiatives by the government, policymakers, and development institutions should be made to support and speed up the wide use of digital information solutions and technologies in agribusiness, for example, through (i) the creation of favourable regulatory conditions to ease the use of DIT in agri-business operations, projects, and transactions; (ii) creation of an electronic system for acquiring goods transportation clearance online and in real time; (iii) organizing a session, workshops, and conferences for discussion with key stakeholders along the agribusiness value chain to push the use of DMPs; (iv) encouraging agro-entrepreneurs to register their businesses in order for them to acquire a business license and recognition to conduct business transactions, marketing, and trading services via online shops and trading platforms.

The government should build capacity to enhance digital tools utilization in the agribusiness sector, and ensure the availability of digital market assets and equipment at low cost (through tax exemptions. In implementing this, the primary focus should be on creating awareness on agribusiness DMPs, describing opportunities, benefits, and marketing strategies of DMPs to all key players along the agribusiness supply chain. Publicity for DMPs is very important in the promotion of digital marketing usage; hence there should be the creation of public awareness and acceptance on the use of digital technologies for production, marketing, and trading activities. This should be done through the use of available technical human resources that can share their experiences and knowledge in workshops and conferences, and provide detailed insight into the government institutions. Moreover, this can be done through advertisement in media, including advocating radio and television shows and programs on the use of agribusiness DMPs.

Also, the government and development agencies can launch programs and conduct a number of awareness campaigns that encourage their engagement with agri-businesses electronically.

The secondary focus of the government should be on the provision of incentives to key players along the agribusiness supply chain that motivate them to use digital information technologies for marketing their products and services. The Government of Tanzania (GoT) should support start-up agro-processing projects involving the use of digital marketing of products and services; GoT should allocate more funds to the research and implementation of agribusiness DMP projects, conduct digital promotion of small-scale agricultural production, and acquire important lessons, and best practices. GoT should also adopt relevant digital technologies from the world leading countries in agri-business DMPs such as China, Australia, USA, and India. The government should continue to seek funds from multilateral organizations such as USAID and FAO, to implement agro-projects that encourage the use of digital information technologies.

### **6.1.2 Supporters: BDS Providers, Financial Institutions, and ICT Industry**

The involvement of providers of business development services (BDS), financial institutions, and the ICT industry is very important in providing resources for implementing, building, and developing sustained DMPs and related ICT infrastructure for the agribusiness industry. BDS providers, financial institutions, and the ICT industry should offer agribusiness entrepreneur skills and training, and financial and technical support to both the government of Tanzania and agri-business key players (such as agro-processors, farmers, inputs suppliers, logistics and transport companies, traders, and consumers.) in order to provide understanding, confidence, and competence that help agri-businesses to participate and realize benefits from the use of DMPs.. Also, they should organize a session, workshops, and conferences for discussion with key stakeholders along the agribusiness value chain on how to enhance the active use of websites for all agribusiness firms.

Financial institutions such as banks should support start-up agro-processing projects encompassing the use of digital marketing of products and services. Also, they should come up with products which innovate or invent new technologies for marketing agricultural products. Moreover, financial institutions such as TADB should offer loans to agribusiness DMP participants to invest in long-term assets for the development of digital market assets, under reasonable and guaranteed conditions. By doing so, financial institutions should make agribusiness DMP participants committed to digital marketing usage. Agri-business DMP participants need to be more committed by conducting online advertisements and remote displaying of products or services during production and marketing. This advertisement should be obligatory for agribusiness DMP participants using funding from financial institutions.

The ICT industry key players (such as TCRA, telecommunication companies) should play a major role in developing technological resources and assets that provide access to database and information relevant for the agribusiness industry. The emphasis should be on the establishment of digital information centers for connecting agribusiness key stakeholders; improvement of agri-business information technology; and marketing strategies to include face to face, teleconferences, and online live chat programs for agribusinesses to interact with existing and prospective customers. In addition, the ICT industry can play a role in disseminating e-business knowledge, showcasing, designing, and establishing relevant ICT applications.

### **6.1.3 Key Players**

The key players engaging in the DMPs need to seek more opportunities that enhance the know-how, capabilities, and the stock of ICT resources to manage and facilitate their business projects and routines effectively online and in real time. This can be done by maintaining reliable, assured market, and the display of market prices through the internet. By doing so, it will open doors for the younger generation to be leaders in presenting and topping new digital information technologies into Tanzania agricultural systems which have the potential to empower rural farmers to market their products more effectively.

#### **6.1.4 The Creation of Online Mobile Trading Platform**

The key players faced challenges of accessing the appropriate business development services (BDS) and financial services as well as auxiliary services from facilitators (government agencies and development institutions) to foster their performance.

Therefore, the researcher recommends the designing and establishment of the **online trading platform supported by mobile technology** to bridge the information and transaction/market gap, and facilitate effective and efficient online transactions and information sharing among key players along the agribusiness value chain. This is supported by Ogbeide and Ele (2020). The researcher also recommends connecting these key players with facilitators and supporters of the agribusiness supply chain in Tanzania and the East African Community.

#### **6.1.5 Developing and distributing Agricultural Insurance Solutions to farmers.**

This involves combination of Mobile Technology as well as Satellite remote sensing technologies; whereby, Machine learning and Satellite data are combined to understand how Climates behave. Example; to know how the area has been affected by floods; Therefore, this policy brief recommends the designing and deliverance of Innovative Agricultural Insurance and Digital products to help farmers endure yield risks, improve their farming practices and bolster their income over time. This is also supported by FAO, 2023; Pilot Digital Village Initiative in Africa.

#### **6.3 Areas for Further Research.**

In presence of wide predictions of the potential of doing agri-business over the Internet, the agri-businesses are advised to join and use the electronic intermediaries (digital markets) for online purchase or sale of products. However, there is a general outcry that agri-business firms throughout the agribusiness value/supply chains face a severe challenge to develop into a functional online trading platform for the produced raw materials and processed agricultural products. This study has managed to provide insights on the first challenge by providing information on the success factors of agri-business digital marketplaces in Tanzania. Another area of interest that the researcher suggests is trying to look at government incentives (economic, market-based incentives and advocacy incentives) that promote agri-businesses and private sector participation in the development of digital marketplaces, ICT related infrastructure and digital marketing projects in Tanzania. In this way, we will be able to know the incentives-based instruments targeting private sector in the promotion of digital marketing adoption, as private investment is also crucial in promoting the use of digital marketplaces in Tanzania. It will also enhance a combination of private financing and public funding in the development of digital marketplaces and future projects associated with building and developing sustained digital marketplaces. Thus, bring balance to the interest of both public (demand side) and investors (supply side). Another area of interest should be on the actions of other institutional agents towards the development of digital marketplaces in Tanzania.

#### **7. Acknowledgement**

The authors acknowledge the support from IFAD, IITA Ibadan Nigeria and IITA Tanzania for awarding the grant to pursue this research, for providing excellent field trips, English Editors and funding this research. Special thanks also go to the Management of Agri-business firms participating in digital markets for their involvement in the data collection and for granting the permission to collect data from the potential respondents. Special thanks and gratitude to the family of Mr. Gabriel Rwakibarila for funding research stay during writing of the research paper.

#### **8. Funding**

This research paper was funded by International Fund for Agricultural Development (IFAD) under the research grant number 2000001374, 2018; “Enhancing capacity to apply research evidence in policy for youth engagement in agribusiness and rural economic activities in Africa” Project is under the International Institute of Tropical Agriculture (IITA).

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## Governance of African Comics Festivals in The Covid-19 Lockdown Period: A Model for African Artistic Renaissance

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### Abstract

Comics festivals, organized annually in several African countries, have always been moments of reunion between cartoonists, artists, the public, amateurs, cultural mediators and several stakeholders to celebrate comics. However, due to the context of the pandemic, these artistic events have undergone changes. Therefore, this research aims to question the changes that have occurred in the artistic governance of African festival-goers and cartoonists in the context of the pandemic. As a result, this research has demonstrated that these changes are the reorganization towards the digitalization of practices, hence the two-sided emergence of e-governance and e-resilience. Therefore, this change of reorganization promotes African Renaissance through the thematic promotion of Pan-Africanism and intra-African interactions. To carry out this research, this study focuses on the experiences of Benin, Cameroon, Congo and Madagascar.

**Keywords:** Comics festivals, African Renaissance, new artistic governance, innovation, Africa

### 1. Introduction

The comics (cartoons and comics book) sector and its annual festivals hold considerable paradigmatic, educational and leisure stakes in the African experience. Also shown as a reality and not a myth, this artistic-event industry is highly resilient and survives a wave of various challenges over time (amateurism, issues of training for cartoonists, publishing problems, printing and marketing in the African market) (Mbiye Lumbala, 2009). However, the year 2020 was marked by the health pandemic (Covid-19) and which had been widespread worldwide, and Africa is not spared. The continental context is recording socio-economic crises that have a major impact on the artistic-cultural sector. This has therefore caused the restriction of freedoms and movements. Many waves of direct mutations have been generated. Moreover, in the world as on the African continent, the Covid-19 pandemic has greatly affected the cultural and artistic sector (Wahba and *al.*, 2020). Several limits and obstacles have been implemented, including the closure of museums and cultural institutions that promote the festival events. This deprivation of access to culture has inevitably generated changes such as self-defense reactions, responses to crisis and the mobilization of alternatives. In view of this situation, the analysis of the experiences of African comics festivals is immediately captivating.

Most of the works that deal with African comics revolve around the ontology of cartoonists (Mbiye Lumbala, 2009), its historical cartography (Mbiye Lumbala, 2009), its aesthetic study or its transition to rationality or artivism (Defy Hate Now, 2020). Mutations are also studied, such as the case of comic book regionalization stimulated by the virtual community. This regionalization is expressed through the resurgence of South-South exchanges, in addition to North-South collaborations, around the African comics industry (Gueydan-Turek, 2019). Comics festivals are also studied through the subjectivation of artists, their issues and interests (Cassiau-Haurie, 2011) or even their controversial durability (Cassiau-Haurie, 2008). Although it is present, the scientific documentation of African comics festivals reveals a deficiency. Thus it will be appropriate to focus on an innovative but also topical look that deals with the governance of



comics festivals in Africa in times of health crisis. This same governance is a set of actions to manage “better” an area that requires a transparent, participatory and inclusive management system. As a result, the governance has a pragmatic character that would seek to address problems from an angle of good management and economic rationality (Svandra, 2007). In the context of the health crisis, the governance of the artistic sector is intriguing and captivating. Therefore, in the era of the Covid-19 pandemic, let us ask **what are the deviations from the trajectory of the artistic governance of comics festivals in Africa?**

As a hypothesis, the changes are the reorganization towards digitalization practices, hence the two-sided emergence of e-governance and e-resilience. Consequently, this reorganizational change promotes African Renaissance through the thematic promotion of Pan-Africanism and intra-African interactions. Thus, this present research consults the changes that have occurred in artistic governance (1), to introspect the forms of resilience of African festival-goers and cartoonists in the face of the pandemic (2) and to understand how these changes have boosted the African Renaissance. To carry out this research, this study focuses on the experiences of Benin, Cameroon, Congo and Madagascar. Determinist and constructivist theories as well as the analysis of social discourses are mobilized by relying on the documentation and interviews with focal points, festival-goers and cartoonists. This is followed by participatory and non-participatory observations of comics festivals (Vootoon, Mboa BD, Bilili BD Festival and Gasy Bulles) and associations of cartoonists on social networks and in the field. Primary data collection took place in the 2011-2022 interval. Finally, this study looks into the new constructions of a new governance, a new resilience and a new orientation towards African Renaissance in the frame of comics festival in Africa.

## **2. The Construction of an e-governance**

The experiences of African comics festivals in the year 2020 demonstrate the construction of a governance focused on digitalization on which are grafted changes in management and artistic products.

### **2.1. Towards the Digital Transition**

A double discernment evokes the fragility of culture in the era of the pandemic crisis. On the one hand, the immediate closure of borders upsets the balance of African markets given the “strong dependence on the Western world” (UNESCO, 2020). And on the other hand, the artistic-cultural industry is a sector severely affected given its event aspect. Given that its event aspect is likely to bring together crowds, it is seen to be a vector for transmission of the Covid-19 virus. Its restriction by ministerial and inter-ministerial decisions has therefore led to its isolation and vulnerability. In the context of the crisis in Africa, as in all parts of the world, the weight of art and culture on essential services is low and automatically leads to the neglect of States and governments in this regard, hence the attribute of the “non-essential” industries of theater performances, cabarets, cinemas and any other artistic event. This administrative roadblock occurs as early as March 2020 and is reproduced consecutively in all African countries.

In view of this circumstance, the major comics meetings, which are the annual festivals, come up against a blockade. The contingencies have reduced, in absolute terms, the choices of organizers and festival-goers to two options: 1) either cancellation or 2) digital switchover. The “online alternative” lexical combination is inserted into language *habitus* and is driven as the unique solution. The uncertainties generated by the health crisis therefore proved the second choice right, hence the adaptation of African festival-goers to adapt to the digital habits. In this context, digitalization presents itself as an innovation that focuses on the renovation of organizational modes of communication and information (Brasseur *and al.*, 2018). This changeover deals with a major reform of managerial practices which ranges from the smallest tasks (paperwork, internal and external meetings, establishment of forms, online registrations for participation) to the largest (workshops, conferences, public communication, relations public, etc.), hence the imposition of a digital transition of artistic governance.

Concerning the case of Mboa BD, the Cameroonian comics festival, which is running for its tenth edition in 2020, the preparation is done half-face-to-face and half-virtual. Virtual management deals with meetings (of activities, planning and programming, etc.), communication and administrative procedures [*for example: the interactions between the authors and the public or with the clients are organized to collect*

*their feedback and ask for their interest (1); the acts of taking responsibility by festival-goers and their (imperative) adaptations to appropriate digital skills (2); the digitization system and an internet connection mechanism for the team of festival-goers are put in place (application of virtual fairs) (3)*]. This Cameroonian festival is organized every December, therefore, if the pandemic is declared in March, the festival takes place at the end of the year, hence an advantage of mitigating the risks and harms of the crisis on the event on the one hand, and sufficient time to adapt upstream on the other. However, the challenges remain multiple, in particular a longer preparation and an obliging compression of the days of the festival [*originally scheduled for eight days, the event is reduced to four days*]. The positive balance shows the non-necessity of the traditional study of sites and implementations. However, the disadvantages remain heavy, namely the high intensity of the pace of work, the management of stress and unforeseen events, the challenges of the Internet connection (frequent cuts, instability and saturation of the network) and the expensive expenses related to electric energy.

This discursive synthesis thus reveals a deconstruction of the classic practice of face-to-face management towards the construction of digital or virtual artistic governance via the digital transition and technological instruments. And it has been reported that initially, the alternative or solvent nature through virtual management wants a shortcut to facilitation and tasks lightening. However, there are new ambiguities and difficulties (new disadvantages) that it entails. The understanding of this process of deconstruction-construction also lies in the analysis of African “followerism”, as the global transition itself drives it. This transition is a global overall movement and also presents issues of securing funding in an artistic world in full construction, innovation, evolution and globalization. Let us therefore remember that the erratic nature of the managerial mode remains a dynamic and changing “social construct”, and continually presents the renewal of challenges and difficulties to tackle.

Moreover, forced, imposed or constrained, this mutation joins the global dynamic of the transition of the arts (Solomos, 2017) by focusing on continuous and constant evolutions. Nevertheless, it is appropriate to reveal that this artistic e-governance is constructed as a mode of transversal coordination, in the sense that once already launched by the festival-goers, it is an irreversible process. This “better” management system that was constructed on the change of procedures is a construction that does not present itself as being only rigorous for the duration of the pandemic. It therefore does not have a return to the initial given the technological evolution and the growing competitive context of the cultural-events.

## **2.2. Towards the Digitized Artistic Content**

As the Cameroonian management process has related that turning to digitalization has become an imperative, it is relevant to state the potential of social networks because they are gradually becoming a modern showcase (*or vitrine*) of art (Franquet, 2018). However, a whole sum of configuration follows this managerial approach, in particular the products to be presented, hence the digitization of the comics and the contents of the festival. In Congo, the Bilili BD Festival takes place online in December 2020 and in its presentation file, it relates visual covers and digitized edition posters. Subsequently, it reveals a digital transition of services [*E-streaming, e-guests for conferences, “book platforms”, animated films and video game designs*]/ products of Congolese authors and cartoonists (and also from other African and Western countries). In the contemporary era, the festival publishes mostly digitalized content on its social networks on local and international levels, in particular polarized towards Japan. In fact, the Japanese influence in creative practices is based on the origins of the Manga style which is a Japanese reproduction. The international reproduction is observable, especially in certain African practices. However, this digitization does not deal with the scanning of sketched drawings but rather with the digital approach of the drawings on drawing software ranging from Paint, Photoshop, Illustrator or Sketchbook. The excessive sharing of these digital drawings therefore further enhances the digital transition of the arts. It is therefore appropriate to take an introspective look at the experiences and consequences of this transition.

Let us raise the externalities (impacts) generated by this promotion of digital content. The positive spin-offs (impacts) for cartoonists and festival-goers are their gain of greater visibility. In other words, digital works facilitate the dissemination of work. A cartoonist expresses: “[...] *the advantage is the easy access,*

for readers, to digital productions, being permanently connected on their smartphones and other compatible devices". This discourse extract thus reveals a more fluid decentralization and democratization of an artwork and which, along the way, guarantees a better mobilization of readers. Positive externalities can also deal with the aesthetic nature of digital works, given the great possibility of manipulation of the artwork (retouching, zooming, color homogeneity, pixelation, etc.). On the other hand, the negative externalities are observable. A cartoonist says:

*"The disadvantage of working with digital is that it is limited to the device that produces or broadcasts it. In terms of production, creating digital works requires a computer or other devices capable of using drawing software; and it all works with electricity. The real challenge is therefore to have electricity permanently, which is not always the case in our context".*

This discourse thus shows the financial blockades encountered by a majority of African authors and cartoonists who do not have access to modern technological equipment (graphic tablets, digital styluses, software, interactive screens, high quality computers, etc.) and whose costs are expensive [*These sophisticated materials are rare on the continent and require travel to the West or the East to obtain them. Other means of supply are also viable: expedition and partnership*]. In this challenging context, issues of property rights and protection are also visible. Less discussed, the cost-free of digital works (comics, comic strip, caricature and drawing) disseminated in socio-digital networks is precipitated by the issue of visibility, however, its reverse also presents a free sale of works. This free access therefore promotes a reappropriation of the artwork by readers, hence its vulnerability or the flagrant risk of visual plagiarism. The copyrights on the illustrations and extracts from comics by African cartoonists are in fact flouted, even omitted and unknown to the virtual public. In addition, other social externalities may arise, in particular the accentuation of forms of inequality and exclusion, whether towards authors, cartoonists or readers. Nevertheless, although digital artworks are gradually gaining consideration in the context of comics festivals, a festival-goer says:

*"I think that digital drawing is not a prerequisite for the success of a comics festival, but it can very well contribute to it; what is highlighted in this type of festival are the productions themselves, whether digital or physical. The digital drawing can bring a plus in terms of the communication of the festival, for example flyers, program, visuals for social networks, teasers, etc. In addition, the digital drawing can be represented in various sections of the festival such as competition, concrete drawn and drawn concerts".*

This assertion is reaffirmed by the cultural mediators of Bilili Festival who point out that pencil drawing is promoted in the same way as digital drawing, although this digital drawing presents more advantages. Thus, with regard to the existential separation identified between the two mediums, digital technology presents itself as an extension of creative possibilities and therefore additional advantages. Broadly speaking, the digitization of drawings is a "social construct" which nevertheless presents a dualism of positive and negative externalities.

### **3. The construction of a social e-resilience**

Through determinism, the pandemic accelerates the construction of digital artistic governance, and subsequently, a new form of resilience to resist this shock is mechanically activated. This is related by presenteeism and the renewal of stakes.

#### **3.1. Virtual presenteeism versus deletion**

Let us once again examine the experience of the Mboa BD festival in Cameroon. Long before the outbreak of the pandemic, the conversion to digitalization was already in the making, as stated through this statement: *"Digital? But we have already thought about digital long before the Covid. But the arrival of the Covid was therefore a pretext [...]"*. This statement thus refutes the "digital" innovation initiated by the pandemic as the media paradigm of the year 2020 promotes it. In reality, the contribution of this pandemic is only its acceleration. This process of ideation is however subjective, according to the geographical contexts in Africa. This digital innovation is absolute in the traditionalist realities that have not a fluid access to Internet. Nevertheless, a festival organizer reveals: *"Before the Covid, we were only able to mobilize two regions of Cameroon, especially Douala and Yaounde. But during the pandemic, we were able to target the ten regions*

[...]” This discourse converges towards visibility on social networks. There is a call for comparison in order to illustrate the positive evolution. If the context A (pre-pandemic) reported a limited physical mobilization in terms of geographical and regional representativeness, context B (during and post-pandemic) demonstrates a better presentist position. This presenteeism is, therefore, significant because of the conversion of (the summary and reports) activities to be relayed to communities outside the two regions concerned (Douala and Yaounde). Nowadays, the priority is centered on the possibility of online, live and inclusive assistance.

However, this presenteeism is protean, but its objective remains the survival in the face of public oblivion. The objective is to adopt a strategy to survive and to remain a winner in the changing dynamics. In this sense, upstream, during and downstream of Mboa BD, festival-goers remain active online. For example, the Facebook page of Mboa BD, outside the month of December, remains stirred with an amply interactive “*Did you know*” or “*Saviez-vous?*” section to keep the public's attention, to fuel their interest and to safeguard their loyalty on a weekly basis. This section on the Facebook social network is for information, education and fun. It does not simply freeze on the content of the festival, but also on the theme of comics to vary the topics. It initiates the comics-loving public and artists of all kinds through participatory questions such as: “*Did you know what a cartoon bubble is? Did you know what an onomatopoeia is?*”. In short, remaining present virtually is a festival practice that confers a better strategic position in order not to lose sight of the artistic and public community (and vice versa, so that this same community does not lose sight of festival-goers and cartoonists). In addition, it allows to enlarge the community in order to ensure a more viable and promising edition for the next sessions.

However, cancellations of events in the six to seven months preceding the big start of the pandemic (March 2020) are strong and immediate. For its part, the Benin comics festival “Vootoon” is scheduled annually during July. Concerning it, given its time difference in relation to the pandemic alert which is precisely four months, the flagship festival has opted for the cancellation of the event. This choice is fueled by legal reasons to avoid any problems with the authorities. Various arguments are still added to these reasons of public discipline, especially the rejection of the organizers concerning risk-taking which is prudently sanitary, hence a cancellation for a good cause. Beninese festival-goers therefore evoke the “security position” in their discursive approach. Moreover, notwithstanding the cancellation, Vootoon is still developing a strategy to maintain interaction with its audience, hence the mechanical focus on the study of a virtual semi-festival (use of page, site and digitization of activities). On a practical basis, its Vootoon Festival page remains active. It publishes, at regular intervals, news and content related to comics in Benin.

This nascent openness towards virtual resilience and resistance to bankruptcy or disruption is also observable in the experience of the Festival Gasy Bulles of Madagascar which commonly takes place in June. During the pandemic period, the festival withdraws and fails to resist the cancellation. The uncertainties and the constraining context linked to the crisis have strongly encroached on the expected results. The customary activities (workshops, exhibitions, etc.) of the canceled festival, however, have taken a transfer position. By default, a large number of the involved cartoonists participated in a virtual comics competition organized by a third-party structure (July 2020) with a view to a residency and the publication of a collective comics album. This reduction and transfer of opportunity is perceived given the subsequent uncertainties of the socio-political circumstances of Madagascar. These uncertainties dealt with are: the waves of new pandemics, institutional blockages, controversies and public resistance, new administrative or political restrictions, the blurred horizon, etc. Madagascar also has a highly delicate environment because health governance, on which artistic/cultural governance inevitably depends, remains on the alert (political debates, international crises, democratic difficulties, nation branding in the face of the international, etc.). The eight months of confinement, compared to the majority of African countries, is clearly long and spread out. The almost permanent closure of borders during 2 years, non-compliance/ lack of intersubjectivity vis-à-vis the international or government reluctance with regard to the vaccine in Madagascar (until March 2021) have an undeniable impact on the artistic market, hence the deep uncertainties.

As a result, the act of participation in the parallel event (virtual competition), organized by the third party structure, by festival-goers and cartoonists is underpinned by symbolism so as not to break a chain of annual edition of a decade of experience. Always being there despite the reduced size (or the cancellation of the event) has become its leitmotiv. In addition, there is also a strengthening of partnerships between the stakeholders. In addition, its online e-resilience is also in the making given the continued sales of festival t-shirts online.

These three festival experiences commonly demonstrate a resilient e-strategy based on digital trial with regard to the weak guarantee of mobilization of a large and enthusiastic audience. One detail is evident: in the case of event cancellations and reductions in Benin and Madagascar, the missed meeting led to reduced visibility could harm their notoriety, in particular the awakening of public doubts or pessimism about their sustainability. Although with regard to virtual presenteeism, this public doubt is not entirely hidden, hence the call for the multiplication of the creation of online content in order to avoid the threat of deletion or erasure [*This deletion (erasure) or self-deletion is observable in other African experiences. Often interpreted as a "break", the silence of festival-goers, although they already have a strong real or virtual audience, remains a clear risk. During the pandemic, the case of the Algiers International Comics Festival (FIBDA) in Algeria is a case, given the scarcity of its publications since its last edition in 2019*]. As a result, virtual presenteeism is based on endurance and influence work in the mediasphere by feeding visibility at a regular rate. In this order of ideas, the e-resilience of festival-goers was constructed in the aftermath of the shock of the pandemic and in the crisis generated by this pandemic. However, the practice of this same e-resilience remains in a long time temporality, hence its continuity. Enduring presenteeism also demonstrates its character of sustainability. In the long term, it will be perceived as a communication strategy. To summarize, the practice of e-presenteeism by festival-goers of African comics fights against the deletion, erasure and oblivion of the public or by the public, hence its denial of ephemerality and the assurance of its continuity in the long term.

### **3.2. The mutation of directions and stakes**

Let us state that in this e-resilience in the face of the pandemic, a mutation of the stakes and interests is undeniably emerging. This assertion results from the constructivist theory which takes into account the evolutions and social changes constructed by agents (Klotz *and al.*, 1999) in situ and their changing interests. Consequently, the stakes of African comics festivals establish an erratic trajectory from the educational and leisure encounters of yesteryear towards strategic professionalization which can be illustrated by organizational communication and e-marketing.

Let us draw up a synthetic historical panorama of these renewals in Cameroon. Mboa BD's organizers explains that in the pre-pandemic period, the challenge converged towards the revelation and promotion of local authors and cartoonists. In other words, it was therefore a question of integrating the market and positioning itself as the showcase (*or vitrine*) for the authors of the comics in Cameroon. What follows is a shift in interest and purpose. The current interest reveals the quest and promotion of exchanges, at the first degree between the authors and the public, and at the second degree between the authors, and between the authors and the professionals of the comics. In short, the current interest revolves around cultural mediation. However, given the dual evolving and constraining circumstance of the pandemic, future stakes revolve around production, especially the emphasis on digitalization. This futuristic issue wishes to inspire and emancipate new modes of distribution channels although these still remain under-exploited. Almost anxiety-provoking but highly potential, the use of the Internet for e-marketing is gradually conquering the configuration of the interests of organizers. In this frame, the Mboa BD after 2020 therefore plays to remain productive. The renewed purposes are therefore to initiate and encourage authors to virtual distribution and the creation of digital accounts, or to boost the digitization of presentation press kits with a view to facilitating communication with cultural journalists.

However, the Vootoon's experiential knowledge demonstrates a shift towards regionalization or internationalization. The ambition is to come back in force for the following years (2021 and 2022) by adopting a virtual and face-to-face mix, particularly in communication. This semi-new vision is motivated

by the stake of making up for the delay caused. This inconvenience, which penalized the festival (the cancellation) favored the erratic trajectory towards the methods of recovery and overtaking. To illustrate its new interest of deploying an active and new force, let us collect the speech of its leader which states: *"we want to do this to prevent the public from forgetting us, we want to regain the memory and the esteem of the public"*. This new orientation, which supports the classic physical and market positioning objectives, will therefore rely more on the attractiveness of the virtual/non-virtual mix.

These two experiences in West Africa and Central Africa confirm the moldable and deviant trajectory of the strategic orientations of festival-goers depending on the circumstances. In the era of the pandemic, the rush to develop e-influence is immediately applied. The theory of influence states the life cycle of "information": the phases of birth, emission, media coverage, mobilization, impact on opinions and decline (death). This whole chain thus crosses a media environment and is driven by a personality holding power or authority. The new influence (or e-influence) theory, on the other hand, no longer focuses on elites and is distributed, with great possibility, among individuals. In addition, it takes place in the digital space (Ducrey, 2010). If Ducrey theorizes that the time between the transmission of the message and the impact on public opinion lasts three days, African festival-goers follow this logic to crystallize their influence and professionalism. With this flexible and elastic temporality, the virtual interactions (comments, reactions and shares by the target audience or the community) are carried out within an interval of ten minutes to four days after the publication of the festival-goers. Given these new social parameters, the evidence of e-influence follows. Festival-goers therefore no longer need a chain of media intermediaries (press, radio, etc.) to communicate (with influence) with the public. They are therefore closer to their targets, but the challenge remains attraction, loyalty and above all, the expansion of their virtual community. The interests that gravitate towards this deviation are based on new opportunities, such as the democratization of online purchases of works (France Soir, 2020), possible virtual fairs or even an ambition to integrate online market places (Gastou, 2019).

Ultimately, the renewal of the stakes and purposes orbits around the massive production, commercialization and strategic professionalization of authors and cartoonists in order to gain and exert a stronger e-influence in the virtual sphere. Especially since the industrial machine of art is gradually innovating and suspended opportunities are resurfacing, the recovery and revalorization are helped by institutions, such as the case of the Virtual National Arts Festival of South Africa (UNESCO, 2020) which encourages the promotion of digital works or the honoring of culture by the African Union for the year 2021 (Lartigue, 2021).

#### **4. The construction of a decolonization of African artistic practices: towards African Renaissance**

The new governance of African comics festivals is distinguished by the emergence of a new "trendy" theme. The trend will favor the themes of multiculturalism, living together, Africa's talents or even Agenda 63 [*The Agenda 2063 is the Africa's blueprint and master plan for transforming Africa into the global powerhouse of the future. It is the continent's strategic framework that aims to deliver on its goal for inclusive and sustainable development and is a concrete manifestation of the pan-African drive for unity, self-determination, freedom, progress and collective prosperity pursued under Pan-Africanism and African Renaissance. In sum, it is the main policy of African Union and its goals until 2063 (African Union, 2015)*]. In this frame, the speeches of festival-goers and African artists reveal an argumentative mutation. Discourses are converging more and more towards the continental paradigm and the creation of an identity affection. For example, the themes and speeches around the festivals no longer focus on cultural or national singularity like (*we the Cameroonians, we the Beninese, etc.*). Henceforth, the speeches evoke the search for similarity, the global, the macro as "*we the Africans,*" Given that the discourse itself has a performative, socializing and influential intention (Razafindrakoto, 2022), this intention is, here, the consolidation of a feeling of belonging to a common identity, which is Pan-Africanism. This Pan-Africanism conveyed by the discourse relates in particular to the resumption in hand of the future of Africans by Africans, the moderate refusal of Afropessimism and the quest for revenge (to deconstruct the weak politico-economic-social consideration of African cartoonists). At the same time, this pan-African discourse becomes a "motivational speech/brand" and is spreading exponentially in the related artistic (or not) spheres such as comedy, public

speaking, entrepreneurial discourse, literature, paradigm, science, political discourse, strategic marketing, etc.

Moreover, with regard to the constructed e-governance, digitalization is becoming a medium with great added value. It becomes a bridge to create opportunities and relational open doors. Africans are very aware since their community and networking flair are very sensitive. As a result, Africans, who have access to IT tools and social networks (LinkedIn, Facebook, etc.) are setting out to conquer intra-African collaborations. Interactions have become more and more fluid since digitalization is democratized. In short, this phenomenon creates two facts: on the one hand, a militant/ activist/ entrepreneurship spirit to establish the African identity and the natural joy of the contact established. On the other hand, decolonization practices through contacts and the minimization of old barriers (geographical, psychological and based on stereotypes).

In these new circumstances, the reconcentration on the “endogenous” is developing. Since festivals now want to go beyond the national side and seek to become pan-African. They want to favor the participation of African countries and are no longer limited to the classic invitation of Europeans. This is the case of Vootoon 2021 and 2022 where there is the presence of Madagascar, DR Congo, Togo, Cameroon and Nigeria. The Nigerian participation is also significant since there is an aspiration to open up to African anglophone speakers to break down linguistic separations. This policy of pan-African rapprochement (the act of bringing closer) is boosted by several facts: the resurgence of debates on the suffering of the artist, the opening of minds (without leading to the anti-West insurrection), the multiplication of dialogues of influence and motivation, political and normative questioning as an initiative to dependence on exogenous funding. By consulting artists, festival-goers and their stakeholders, there are several debates of refocusing on the endogenous cultural market are linked.

Obviously, this aspiration to consolidate intra-African bases can lead to renew/ to change the relationships with exogenous sponsors (in French-speaking countries, there are the Instituts Français, the Goethe Institut, the Alliances Françaises or the SCAC Fund of the French Embassy). If the first reflex says that the African artists and festival-goers must get rid of exogenous sponsors, the survival instinct will immediately deconstruct this reflex. They are aware that undoing relationships is impossible, thankless and suicidal. In any case, exogenous funds are available (although through tough competition or a quality network). Nevertheless, even if the new generation of cartoonists and festival-goers wish to convert themselves into Pan-Africans, exogenous sponsors are not reluctant to this phenomenon. In fact, since 2019, many intra-African initiatives are even encouraged and sponsored by the donors themselves (for example Pro Helvetia). This can be interpreted as an indirect migration policy. If the old trends were to attract potential African artists in the West (artist residency grants, invitations to cultural events, etc.), with the current migration crisis, these same targets are redirected to a destination in the region or African sub-region. The knowledge transfer patterns of yesteryear are no longer the trend. Now this has given way to a new trend of South-South regional mobility, and therefore intra-African.

The other interpretation that could justify the docility/ enthusiasm of Westerners to finance intra-African projects is that it is strategic. First, it prevents African artists (in general) from experiencing the difficulty of obtaining visas (since 2021). This could tarnish the Western image as artists in general have a strong audience. And secondly, it is an investment that benefits because Western countries (in general) become intermediaries between African actors. The status of intermediary is unavoidable because it can establish a form of moral debt and new domination even if its primary arguments are help and support. However, in this context, the artists and festival-goer beneficiaries obtain several gains. First, through the Information and Communication(s) Technology (ITC), the artists maintain the intra-African relations created thanks to the festival. They no longer wait once a year (during festivals) to create events since they will deploy their e-resilience. They therefore become visible and accessible permanently and over the long term. Moreover, as friendships and networking are easier and more fluid between artists, these relationships will give rise to non-festival projects such as private trips, relational connections, etc. As a result, the new challenges and

gains of projects financed by exogenous actors are the solidification of an address book (repertory) with the maximum number of focal points in foreign African countries.

Moreover, this pan-African networking can have high-level impacts. On other occasions, it can export the Pan-African identity to the West in order to gain international influence and to establish a strategy of African cultural diplomacy. The example of the Kubuni exhibition in 2021 in France is illustrative. It is the result of a partnership between the International City of Comics and Image of Angoulême, the French Institute of Congo and the Bilili BD Festival of Brazzaville to showcase a panorama of African comics (Cité BD, 2021). It brings together the artworks of more than 50 African comics authors in France on the occasion of the exhibition. On the occasion of this artistic initiative, even if the cartoonists are not physically present or sponsored classically (travel, etc.), the virtual grouping of the 50 African participants is already performative and significant. In this case, Pan-Africanism refers to virtual participation and engagement for international outreach. This influence is made possible in fact because the event is broadcast by the Western media, and then taken up and hyper-mediatised by the local African media. The strategy is therefore to have used the international channel to strengthen the reputation of the event in Africa. In short, the new governance of African comics festivals leads to identical and topical impact, which is the African Renaissance. It has created new narratives and has decolonialized the artistic practices through interactions.

### **5. Conclusion and reflections on African development futures**

Following the logic of the constructivist theory, it is appropriate to highlight the obvious effects and representations that the pandemic has on the reality and the artistic governance of African comics festivals. The deviations from their trajectories, according to their respective experiences, can be analyzed from three main milestones: the analysis of governance and resilience contextualized by the dynamics of digitalization and then, the diagnosis of the identical impacts constructed. At the end of this study, it is necessary to confirm the absolute reorganization in festival practices in the face of the pandemic. First, the e-governance is applied through managerial change and the digitization of artistic products. This reform in no way excludes the disappearance of negative externalities or the emergence of new binding challenges. Secondly, the e-resilience is carried out in order to avoid the deletion, erasure and disintegration of the comics market. This e-resilience of festival-goers is based on communicational and virtual endurance outside the temporalities of the festival concerned, followed by the avoidance of its ephemeral nature. Added to this is the impossible stagnation of the stakes over time. African festival experiences are converging towards a renewal of objectives, in particular professionalization, e-influence and mass production. In short, in view of the pandemic, the overall movement and the artistic governance of festivals in Africa obeys a logic of dependence and global tendency which has repercussions on the continental and the local, given the almost similarity of experiences and digitizing practices. The differences lie rather in the time constraints of each African country in relation to their programming, hence the cancellation or holding of festival events. Thirdly, the e-governance and e-resilience have created, in their turn, the consolidation of a pan-African identity. Directly or indirectly claimed and applied, the practices have gradually turned towards intra-African interactions and interests, hence a trend renewal, namely the African Renaissance via artistic micro-projects as comics festivals.

In sum, this research has demonstrated that the African Renaissance is not only a political will but that it passes through culture. As a result, the renewal of intra-African artistic practices could boost cultural industries. It is also obvious that cultural products are means of mass influence and education. The challenge would therefore be to multiply initiatives to create interest in African comics (awareness of reading, advertising promotion, creation of characters and printings on derived products, etc.). The experience of *Japanese manga* would be an interesting reference model. In addition, the enhancement of the technicality of the drawings would also be interesting. It is common to connote African drawing with very detailed and uncoloured portraits. Therefore, the call for the modernization of drawing styles would also be welcome (digitalization, less inks and lines, rejuvenation of characters). The objective here is to rekindle the interest of young Africans, often lovers of manga and video game characters. By enhancing the aesthetic qualities of the products, cartoonists could also attract key promoters who are publishers and cinematographers.



Indeed, as cartoonists mostly master scriptwriting techniques (storyboard and narration), they would gain by collaborating in the film industry and transforming their work into animated movies. This line of thought could guarantee their professionalization. Moreover, several comics festivals invite multidisciplinary. Gasy Bulles involves publishers and bookstores' owners, painters and illustrators, this can develop the comics market. Mboa BD includes programs for video gamers and cosplay contests, which can boost relationships between stylists, event hosts, video game experts, etc. By combining all these reflections, festival-goers and cartoonists could, in the long term, contribute to the "cultural and tourist economy" component of the African Continental Free Trade Area (AfCTA) and concretize the African Renaissance.

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## Hybrid Learning for Enhanced Acquisition of Transversal Competencies in Higher Education

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### Abstract

Blended higher education involves both face-to-face and online learning, which implies the use of educational technologies in the teaching-learning process. It provides multiple advantages in terms of access to and appropriation of knowledge and the development of students' competencies. Educational technologies offer an environment and digital tools that enable the acquisition of disciplinary and transversal competencies to promote creativity and collaboration among students and facilitate access to the labor market. However, the acquisition of transversal competencies presupposes an adapted pedagogy to the specific needs of students. The aim of this quantitative study is to identify the relationship between university hybrid learning and the acquisition of transversal skills. A questionnaire reflecting learning practices was distributed to students at the Faculty of Education in Rabat, and a correlational analysis was carried out between the learning practices in hybrid courses and mastery of transversal competencies. The results revealed that hybrid learning optimizes the acquisition and development of transversal skills, and a positive and significant causal relationship exists between hybrid courses and mastery of these competencies. As a result, our work can contribute to innovate university teaching practices and optimize the educational system's performance.

**Keywords:** Hybrid learning, Learning practices, Educational technologies, Educational innovation, Transversal competencies

### Introduction

Higher education in Morocco is undergoing a process of transformation, linked on the one hand to technological advances in the academic world, and on the other hand to the reform envisaged by official texts. In the second part of its report, the Special Commission on the Development Model (2021) highlights the importance of strengthening human capital through education and training, thereby stating the central role of knowledge as a factor in economic and social growth. In the digital era, higher education is undergoing changes that are altering its relationship with time and space, as well as its relationship with others. This certainly implies a renewal of skills and the introduction of new teaching methods such as learning by doing or design thinking, which is based essentially on appropriating and using technological tools and resources (Barabel and Meier, 2021). These active teaching methods place the learner at the heart of learning, which, according to Giordan (2016), is "a matter of interaction" between the learner's mental activities and their environment, following a system of thought based on their conceptions. Indeed, perceptions are changing due to the use of educational technologies involving digital environments and impacting the development of disciplinary and transversal competencies. Several studies and organizations around the world have noted employers' interest in mastering cross-disciplinary skills such as leadership, communication, collaborative work, analytical skills, creativity, change management, and adaptability. They are seen as essential for access to the labour market and guarantee professional and personal fulfilment that can lead to a successful professional career (Calero López and Rodríguez-López, 2020). Transversal competencies present a major challenge in terms of their acquisition and development, as they are very general, and their degree of mastery depends on the specific learning pathway of each learner.

The Brussels training reference framework (2013) defines transversal skills as professional skills, necessarily technical skills, required for the exercise of a profession. They require personal involvement on the part of the worker within a contractual framework and in a professional context. This professional aspect implies the need to build and develop these competencies through education and academic training in a formal way through internships and study diplomas (Gómez-Gasquet et al., 2018). Various international organizations have carried out many studies on the development and construction of transversal skills, recently referred to as 21st-century skills, emphasizing the emotional dimension and digital skills (Martínez-Bravo et al., 2022).

Recent studies suggest that face-to-face teaching is not conducive to the acquisition of cross-disciplinary skills by students, whereas hybrid training, which alternates face-to-face and distance learning courses, is beginning to gain ground, especially after the sudden change imposed by the COVID-19 health crisis, prompting us to ask the research question: Does hybrid university learning have an impact on the development of students' cross-disciplinary skills? We hypothesize that hybrid university learning promotes the development of transversal competencies. The aim of the study is to analyse the relationship between blended learning practices and degrees of mastery of transversal competencies, and to identify blended learning practices that promote the acquisition of these key skills through a quantitative study, thus contributing to the improvement of teaching practices in higher education and the construction of cross-curricular skills by students. Practitioners and researchers have been interested in the definition of competence, and it has not been possible to limit it to a single definition, given its complexity and the nature of its acquisition. Thus, according to Le Boterf (1994) "Competence does not reside in the resources (knowledge, skills, etc.) to be mobilized, but in the mobilization of these resources. Competence is a matter of 'knowing how to mobilize'". This definition is supplemented by that of Tardif (2006) as "A complex know-how-action based on the effective mobilization and combination of a variety of internal and external resources within a family of situations". In other words, it is "a combination of knowledge, know-how, experience, and behavior exercised in a specific context" (Zimmermann, 2000). Skills fall into two categories: disciplinary or specific skills and transversal or general skills.

According to Coulet (2016), transversal competencies are "very general competencies, which certainly need to be built up, but whose presence can be identified in each of the competencies used in professional and personal life", such as communication, analytical skills, creativity, teamwork. In defining hybrid systems, Peraya (1999) defines the term "system" as "a social place of interaction and cooperation with its own intentions, its own material and symbolic functioning, and its own modes of interaction". A system, therefore, combines, through a "structured organization, material, technological, symbolic, cognitive and relational resources". These can help to influence the behavior and social (affective and relational), cognitive, and communicative behaviors of subjects (ibid.). A system, at the time of its design and instantiation, therefore, creates the conditions for the emergence of some of these behaviors and behaviors which will, to varying degrees, be (re) actualized by the players as a function of their experience of it (Peeters and Charlier, 1999). The Anglo-Saxon literature defines courses based on the hybrid model as face-to-face courses that incorporate online resources and information to share content that is usually delivered face-to-face or to improve its accessibility. The face-to-face model then focuses more on the interactions between the learners (peers among themselves) and the teacher. The term blended refers to a harmonious and balanced mix of presence and distance supported using digital technologies and the network (Osguthorpe and Graham, 2003; Lim, 2002). From a more explicit and broader perspective: "Blend of learning approaches in their strategies to get the right content in the right format to the right people at the right time." (Singh, 2003). A blended learning course could therefore combine one or more dimensions: online/offline, individual/collaborative, formal/informal content, theory/practice, etc., thus enriching "traditional" training methods and offering reasonable value for money (Singh, 2003).

Osguthorpe and Graham (2003) include the following objectives in favor of the teacher setting up such

a system: access to resources, social interaction, self-directed learning, and ease of regulation. (Linder, 2017) insists that hybridization requires a pedagogical paradigm shift: «The transition to a hybrid classroom often necessitates a shift from teacher-centered to learner-centered methods and techniques ». The flipped classroom is a practical hybrid system that presents a working method to enable the development of disciplinary and transversal competencies liberating pedagogical creativity away from the "fossilization of practices" (Lebrun and Lecocq, 2015, p. 24) through the deployment of technologies and social networks. Thus, teachers can innovate their practices and motivate learners, making them more creative and autonomous in many activities and debates in the classroom, documentary research, projects, fieldwork, and work presentations.

## **Methods**

The researchers developed a questionnaire covering students' learning practices in the context of blended learning, as well as their perception of their degree of mastery of transversal competencies, and administered it online to students in the Faculty of Education at Mohammed V University in Rabat. 154 students were solicited, and 90 responses were obtained with a return rate of 58.44%. The questionnaire includes 10 items that concern the identification of the respondents' profile (3 items: gender, field of study, level), the learning practices in hybrid learning (3 items: debates activities in the classroom; documentary research, projects, and fieldwork; work presentations) identified in our theoretical framework in order to experiment it in the Moroccan context, according to a binary scale with 2 modalities ( yes – no ) and finally (4 items) on the perception of students on their degrees of mastery of the four transversal competences verbal, written and public speaking communication; critical and analytical thinking; initiative, creation and adaptation to change; and collaborative work, conflict resolution and joint construction of knowledge according to a 6-modality Likert scale ranging from not at all mastered to very well mastered. We performed a statistical treatment of the collected data with SPSS version 26 to ensure the reliability and internal consistency of the data collection tool, and obtained a Cronbach's Alpha value of 0.826, which indicates a good internal consistency of our questionnaire.

## **Results**

### **1. Frequency Analysis**

#### **1.1 Student Profile**

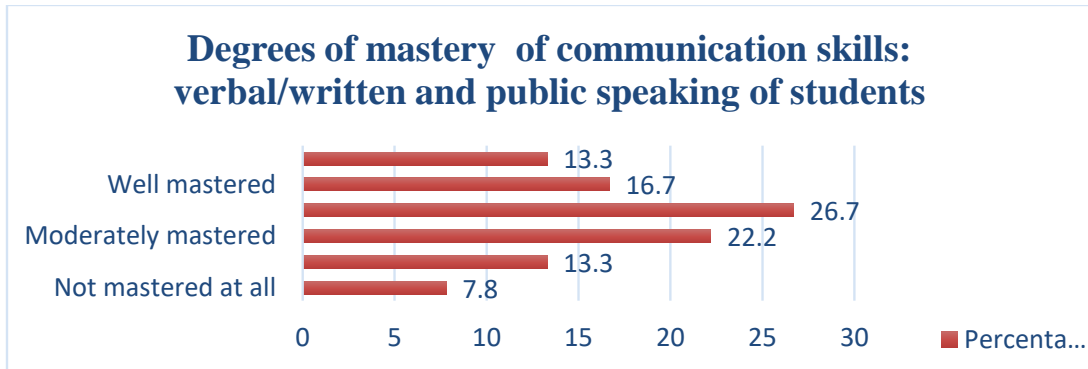
The sample of students is composed of 70% women and 30% men. The average age of the students is 25 years, with a minimum of 18 years and a maximum of 50 years. 61.1% are between 18 and 25 years old.

#### **1.2 Transversal skills**

In this study, we have chosen to deal with four transversal skills: oral and written communication and public speaking; critical and analytical thinking, initiative, creation, and adaptation to change; and collaborative work. The results of the frequency analysis based on students' perceptions of their degrees of mastery at six modalities cluster as follows:

#### **Oral, written communication, and public speaking**

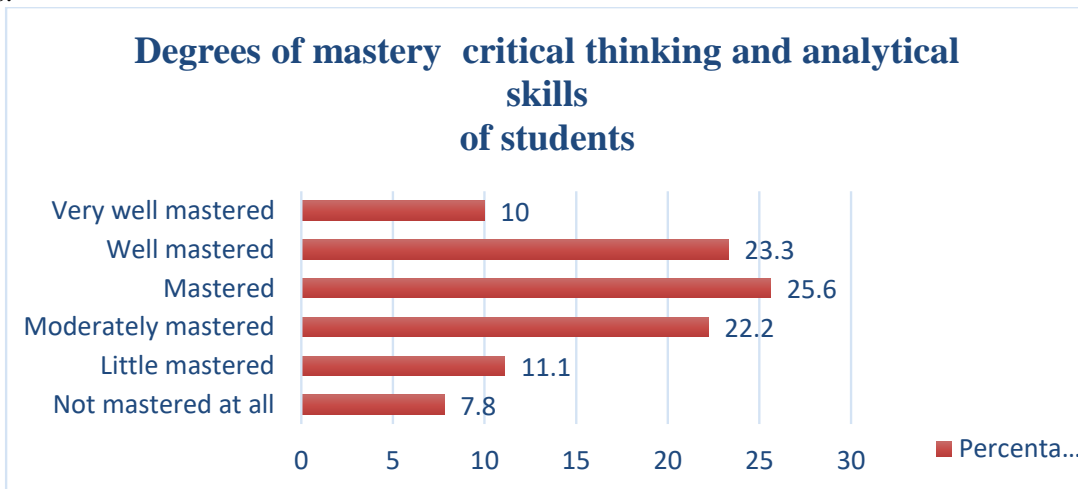
The results are illustrated in Fig. 1, with 56.7% of respondents reporting high levels of proficiency in oral, written communication and public speaking skills.



**Figure 1:** Degrees of mastery of communication skills: verbal/written and public speaking of students

### Critical thinking and analytical skills

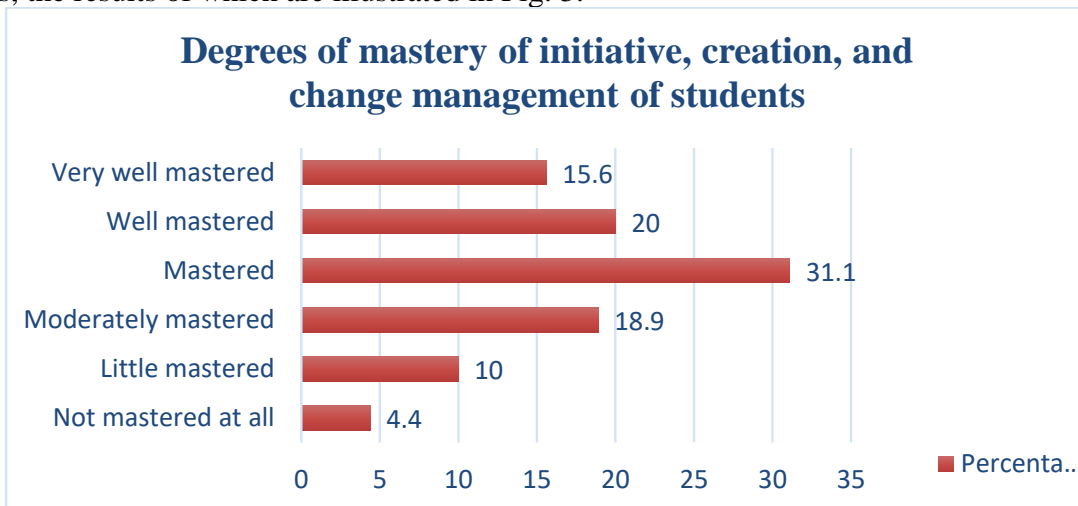
Figure 2 shows that 58.9% of respondents report high levels of mastery in critical thinking and analytical skills.



**Figure 2:** Degrees of mastery of critical thinking and analytical skills of students

### Initiative, creation, and change management

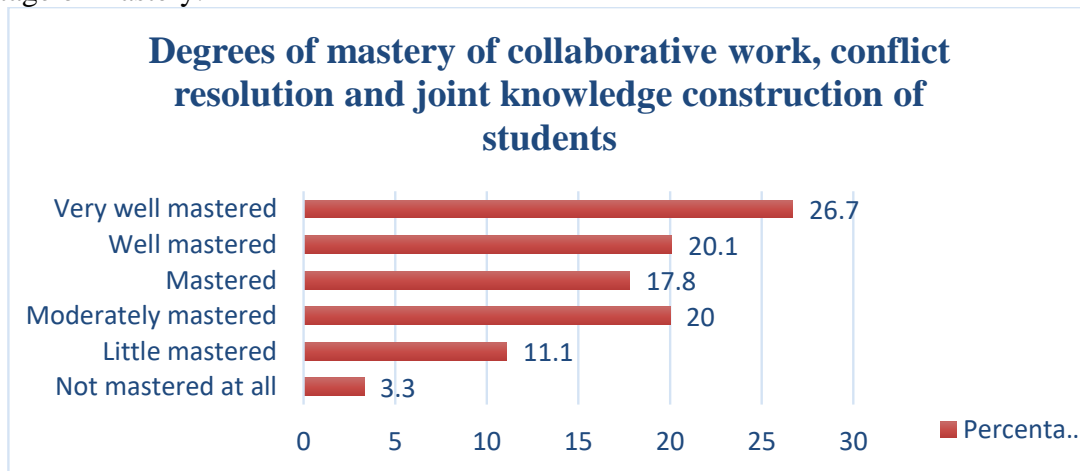
66.7% of respondents report high levels of mastery of initiative, creation, and change management skills, the results of which are illustrated in Fig. 3.



**Figure 3:** Degrees of mastery of initiative, creation, and change management of students

### Collaborative work (in groups), conflict resolution, joint construction of knowledge

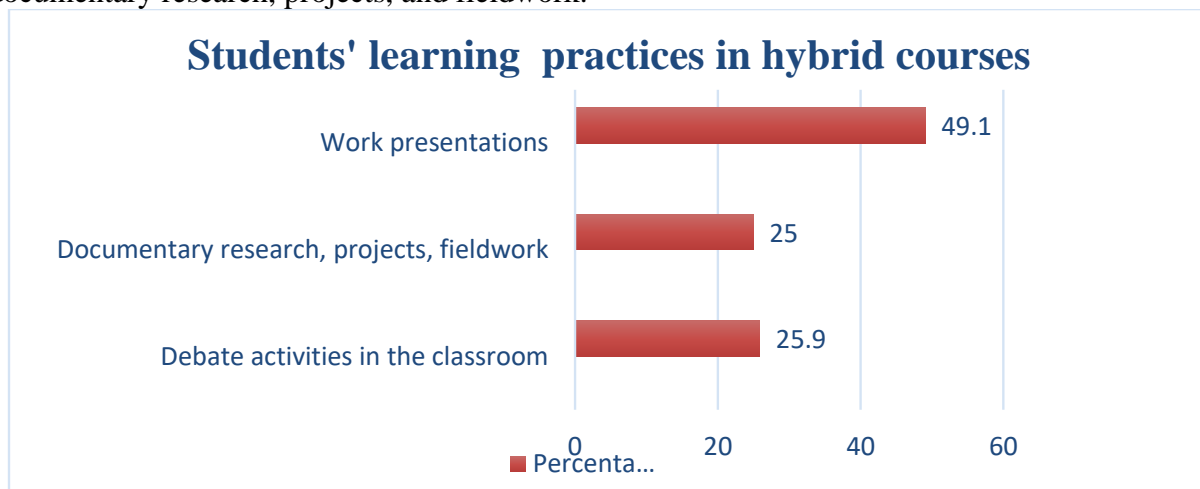
Figure 4 reveals that 65.6% of the respondents claim to have a high mastery of collaborative work (in groups), conflict resolution, and joint construction of knowledge, thus showing the highest percentage of mastery.



**Figure 4:** Degrees of mastery of Collaborative work (in groups), conflict resolution, joint construction of knowledge of students

### 1.3 Learning practices in hybrid courses

Figure 5 shows the percentages of students' learning practices in hybrid courses. 49.1% of them make work presentations, 25.9% take part in debate activities in the classroom, and 25% realize documentary research, projects, and fieldwork.



**Figure 5:** students' learning practices in hybrid courses

## 2. Analysis of correlations

A correlational analysis was performed between the three learning practices and the four cross-cutting competencies retained by the study to confirm or refute the previously mentioned hypothesis. Since the questionnaire includes ordinal qualitative variables that are measured by two scales: The binary scale to assess university hybrid learning practices perceived by students, as well as the Likert scale to assess students' perception of their degrees of mastery of transversal competencies, the researchers calculated Kendall's Tau-B correlation coefficient that measures the association between the variables and allows them to perform the significance test to test the null

hypothesis that assumes no association relationship between the pairs of variables tested. The results are presented in Table 1.

**Table 1:** Bivariate correlation of perceived mastery of transversal competencies and hybrid learning practices

			<b>Communication: verbal/written - public speaking</b>	<b>Critical thinking: feedback (reflection on your actions) and analytical thinking</b>	<b>Initiative, creation, and change management</b>	<b>Collaborative work (in groups), conflict resolution, joint construction of knowledge</b>
	<b>Debate activities in the classroom</b>	Correlation coefficient	0,230*	0,221*	0,297**	0,179
		Sig. (Bilateral)	0,014	0,020	0,002	0,059
		<b>N</b>	<b>90</b>	<b>90</b>	<b>90</b>	<b>90</b>
	<b>Documentary research, projects, fieldwork</b>	Correlation coefficient (Bilateral)	0,147	0,149	0,153	0,209*
		Sig. (Bilatérale)	0,118	0,115	0,107	0,027
		<b>N</b>	<b>90</b>	<b>90</b>	<b>90</b>	<b>90</b>
<b>Kendall's Tau-B</b>	<b>Work presentations</b>	Correlation coefficient	0,088	0, 113	0,179	0,246**
		Sig. (Bilateral)	0,349	0,233	0,059	0,009
		<b>N</b>	<b>90</b>	<b>90</b>	<b>90</b>	<b>90</b>

\*Correlation is significant at the 0.05 level (two-tailed).

\*\* Correlation is highly significant at the 0.01 level (two-tailed).

Therefore, we find significant and highly significant correlations between the three components of learning practices and the four transversal competencies, stating a correlation and an association relationship between these variables. Thus for:

**Debate Activities in the Classroom:**

Verbal/written communication and public speaking have an almost positive association relationship and significant correlation with a correlation coefficient ( $r=0.230$ ) with debate activities in the classroom. For critical thinking and analytical thinking, we find a weak positive association and significant correlation relationship: the correlation coefficient has an R-value of 0.221. For initiative, creation, and management of change ( $r = 0.297$ ) which attest to a highly significant correlation. The results reveal no correlation ( $r = 0.179$ ;  $p\text{-value} > 0.05$ ) between collaborative work in groups, conflict resolution, and joint construction of knowledge and debate activities in the classroom.

**Documentary research, projects, and fieldwork:**

Verbal/written communication and public speaking; critical thinking and analytical thinking initiative, creation; and change management don't have a positive association relationship and correlation with documentary research, projects, and fieldwork ( $p\text{-value} > 0.05$ ). The results of collaborative work (in groups), conflict resolution, and joint construction of knowledge reveal a positive association and a significant correlation ( $r = 0.209$ ).

**Work Presentations:**

Verbal/written communication and public speaking; critical thinking and analytical thinking initiative, creation; and change management don't have a positive association relationship and correlation with work

presentations ( $p\text{-value}>0.05$ ). The results of collaborative work (in groups), conflict resolution, and joint construction of knowledge reveal a positive association and highly significant correlation ( $r = 0.246$ ).

### **Discussion**

The results reveal that the transversal competencies studied allow us to note the positive impact of university learning practices on acquiring and developing key competencies. The main learning practice is the presentation of work, which may explain the use of a learner-centered paradigm rather than teacher-centered teaching (Linder, 2017). In a hybrid environment, oral and written communication and public speaking can be solicited through classroom debates, and it can also encourage documentary research using technological tools. Hybrid learning generates interaction, collaborative activities, and communication as stated in the literature (Peraya, 1999), and promotes critical thinking as well as the spirit of initiative and creation. According to the correlational analysis, debating can develop the three transversal competencies cited above. Collaborative work makes it possible to carry out field research and projects and present work. The correlation thus underlines more precisely the transversal competence and the learning practices that enable it to be acquired or built. Depending on the nature of the skill and the context in which it is to be used, know-how and interpersonal skills can form the core of cross-disciplinary skills. They are general and common to several disciplines. Each cross-disciplinary skill must be mobilized in a pedagogical situation during the learning process thus enhancing the acquisition of transversal competencies in an academic context (Gómez-Gasquet et al., 2018), however complex it may be. We thus obtain a differentiation and distinction between competencies and students' work methods, which teachers can consider when designing courses and assessing them. Indeed, the planning phase identifies and specifies the disciplinary competencies targeted by the modules taught and must also target cross-curricular competencies often neglected in the learning and assessment process, as well as remediation and self-regulation. The research reveals original results that can contribute to the innovation of teaching-learning processes and the acquisition and construction of cross-disciplinary skills that are in high demand on the job market and enable better professional integration.

Therefore, as stated in the literature review, active pedagogies put the learner in situations of mobilization of competencies that promote the development and mastery of transversal competencies through experiences (Coulet, 2016).

### **Conclusion**

Transversal competencies are essential for better integration into the job market and are highly sought-after by recruiters. These skills can be developed through education and training, precisely in a university context. Indeed, the results of our research show that hybrid university learning encourages the development of cross-disciplinary skills since they are called upon and mobilized during learning assisted by new technologies, which is perfectly in line with the literature consulted. Learning practices based on active pedagogies lead to active involvement in hybrid courses, as well as the mobilization of learners' technological skills such as information retrieval, the use of digital tools or supports like platforms or applications, which promotes self-learning and autonomy, communication, creativity...etc. In fact, it's a vast range of generic or transversal skills that can be the object of construction, learning, and assessment. In this way, our research can contribute to improving teaching practices and students' mastery of transversal skills, guaranteeing high-impact pedagogical innovation. The Researchers recommend the mobilization of digital skills in hybrid courses to facilitate the acquisition and development of transversal competencies.

### **Acknowledgments**

We would like to sincerely thank the respondents for their active participation and cooperation during the data collection process.

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## **Illegal Oil Bunkering Activities: Implications on Women in Technology Education in South-South Zone of Nigeria.**

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### **Abstract**

Well-meaning individuals have raised serious concern on the proliferation of illegal oil bunkering activities in South-South zone of Nigeria due to its impact on the economy, environment, security and educational development of individuals living in that zone. This is evident in high rate of poverty, insecurity, criminality, tension, acquisition of sophisticated weapons and increase in the number of dropout from schools, especially in tertiary institutions. The study therefore, examined the implications of illegal oil bunkering activities on women participation in technology education in South-South zone of Nigeria. It focused on women interest, enrollment, participation and acquisition of technical skills through technology education programmes offered in universities at the undergraduate level. The study adopted survey research design. The population of the study comprised 104 women educators in technology education programmes in South-South Nigerian Universities. Findings from the study revealed that woman educators in technology education agreed that illegal bunkering activities influenced women interest, participation and acquisition of technical skills through technology education programmes to a great extent. The study concluded that, the proliferation of illegal oil bunkering activities in South-South zone of Nigeria exerts negative influence on women interest, enrollment, participation and enthusiasm in technology education.

**Keywords:** illegal oil bunkering, women, interest, technical skills, technology education

### **Introduction**

The discovery of crude oil and its exploration in South-South zone of Nigeria brought a good fortune not only to the people of that region but also to the entire nation. The harnessing, utilization and exportation of this natural resource became a major source of income and revenue to the country. The oil sector according to Garuba (2010), accounts for over 85% of national revenue and 90% of foreign exchange earnings. The sector is regarded as the treasure base of all economic, social and technological developments that are experienced in the country.

The economic, social and technological developments taking place in the country as opined by Adams (2018), are not really felt by both the indigenous people and other inhabitants of this oil rich zone. This is evident in the lack of substantial infrastructural development and high level of poverty, deprivation, unemployment and environmental pollution and degradation in the area. Those ugly situations have generated entrenched feelings of exploitation, marginalization and intermediation by government and multinational oil exploration industries. The unpacified feeling of long years of neglect despite various intervention initiatives of government such as the establishment of Ministry of Niger Delta Affairs and Niger Delta Development Commission (NDDC), gave rise to militancy which has now metamorphosed to the 'new normal' called 'illegal oil bunkering'.

The term illegal oil bunkering according to Campbell (2015) encompasses all acts involving oil theft, including diversion and smuggling of oil and unauthorized loading of it in ships. One of the common

processes involves the tapping of oil from a pipeline and transporting it elsewhere; either to be sold internationally or refined locally. In order to access the oil, a small group of welders usually puncture a pipeline at night, establishing a tapping point from which the group can operate. In the opinion of Jakpor (2022), illegal oil bunkering; popularly known as illegal oil refining or oil theft, involves the siphoning off of crude fuel from pipelines often belonging to foreign companies, then transporting it to makeshift refineries hidden in bushes and forests several miles away. The stolen goods are boiled in large metal containers by local refiners and distilled into products such as kerosene, diesel, and petrol. Once cleaned, it is sold around the country or exported abroad. To Ozogu et al. (2023), illegal bunkering of crude oil includes stealing crude oil as well as its derivatives through diverse mechanism without the permission of the Federal government.

The issue of illegal oil bunkering started attracting public knowledge in 1993 when oil companies' workers began conniving with foreign crude oil burgers in operating well heads and accessing them. The 'bunkerers' tap directly from the pipelines of oil companies' facilities and connect barges that are hidden in forests, bushes and creeks. The act of illegal bunkering also involves forged bills (Ozogu et al., 2023; Asuni, 2009). The proliferation of this unlawful business has its attendant negative consequences.

One of the negative consequences is the loss of revenue derived from the sale of crude oil. The practice has dealt a big blow on the national economy. The report from Ozogu et al. (2016), revealed that Nigerialosses revenues that are valued at ₦2.184 trillion per annum, as a result of illegal bunkering of crude oil. Also, the report from Mangan (2017) shows that every day, oil companies in Nigeria loses between 300,000 and 400,000 barrels of oil to illegal theft. Theft accounts for roughly 15 percent of Nigeria's 2.4 million barrels per day produced. In a similar report by Nigerian Upstream Petroleum Regulatory Commission, between January 2021 and February 2022, Nigeria lost more than 115,000 barrels to oil bunkering, totaling \$3.27 billion worth of crude oil (Jakpor, 2022). According to Jakpor, a report from the Nigeria Extractive Industries Transparency Initiative, Oil and Gas industry showed that more than \$270 million was lost to theft between 2016 and 2020. According to another report by the local media outlet Dataphyte (2020), the country lost more that 39 million barrels and at least \$1.6 billion to crude oil theft and sabotage.

Another negative consequence of illegal bunkering activities is explosions that are not uncommon at illegal refining sites in communities in the South-Southzone of the country's petroleum-rich region. Explosions as a result of oil spills are a regular occurrence in the zone. Pipeline vandalism from bunkering leaves pipes especially vulnerable to leaks, spills, and major accidents. The lost of human and animal lives in the explosions are always the resultant effect. For instance, the explosion that rocked Imo state in 2022 as a result of illegal oil bunkering activity;which wasdisseminated across various media platforms, threw the nation into shock and trauma. The lost of countless number of human lives in the incident was described as a catastrophe and a national disaster (Emdi et al., 2022; Jakpor, 2022). The environmental impact of that explosion remains monumental.

The environment is another area worst hit by illegal oil bunkering activities. According to Bodo and Gimah (2020), the United Nations Environment Program in 2011 found out in Ogoniland, located in Rivers State, that oil pollution as a result of illegal oil bunkering activities has devastated mangroves, contaminated soil and groundwater, destroyed the fish habitat, and posed a serious threat to public health. The study concluded that, it could take up to thirty years to restore Ogoniland. The degradation of the environment has reduced land arable for farming and has devastated fishing communities (Ozogu, 2023). Two thirds of the South-South Nigerian population does not have access to clean drinking water and many have reported the existence of oil in drinking water sources (Ozogu et al., 2023; Albert et al., 2009). Also, a 2020 study by researchers at Newcastle University, United Kingdom and Niger Delta University, Bayelsa State, Nigeria, shows that host communities are severely harmed by the activities of local illegal oil refiners, with the highest impacts on farmlands, estuaries, and rivers. The study indicates that those involved in the activities ignore principles of environmental protection in refining the crude oil and empty the residue after cooking the crude into nearby rivers and water bodies (Bebetidoh, 2023). The measures the government is taking

to stop this nefarious act are also contributing to environmental hazards in the zone. According to Onyenwe (2022), the Nigerian Navy in 2011 destroyed 260 illegal refineries by burning the site and, in some cases, pouring out the stolen oil into the creeks; exacerbating environmental damage. Bebetidoh worried that the decades of environmental damages caused by oil activities in the Niger Delta region may be difficult to reverse. The negative environmental impacts of this illegal oil bunkering activities include too many health issues and challenges faced by the people living in the zone.

The most negative impact of illegal oil bunkering in South-South zone of Nigeria include high rate of poverty, insecurity, criminality, tension, acquisition of sophisticated weapons and increase in dropouts from schools, especially pupils and students in primary, secondary and tertiary institution (Ozogu et al., 2023; Amnesty International Publication, 2009; Forest and Sousa, 2006). This unlawful business is mostly carried out by youths (young men and women) of school age. Akpan (2019) asserts that the engagement of youths in this act may not only effect their interest in acquiring basic education but also in the acquisition of vocational and technical skills through Technology Education.

Technology Education as described by Ogundu (2023) is a combination of practical art education, pre-vocational, full vocational education and technical education. Practical arts education is an aspect of technology education offered in elementary schools. It consist of course such as agriculture, domestic science and handicraft. Ogundu revealed that those courses are offered as general education courses and are valuable for general character development of the individual. In practical arts courses, pupils learn various occupations and acquire general skills in the use of hand tools.

The pre-vocational aspect of technology education is offered in Junior Secondary Schools. This stage of technology education enables students to explore a number of occupations before making a choice of a vocation. Pre-vocational educations include courses in woodwork, metalwork, technical drawing, applied electricity, electronics, typewriting, shorthand, accounting, home management, textiles and clothing and agriculture (Ogundu, 2023). Full vocational education is offered at Senior Secondary School level. Students at this stage concentrate on one occupational area of pre-vocational courses (in addition to their general study courses) in order to develop sufficient skill that will enable them to obtain employment on leaving secondary school. Regarding technology education at this level, United Nations Educational, Scientific and Cultural Organization (UNESCO, 2013) posited that it is designed at upper secondary and lower tertiary levels to prepare middle level personnel and technicians for lower management.

The last facet of technology education is technical education. Technical education courses are offered in college of technology, Polytechnics and some universities. UNESCO (2013) stated that at the university level, technology education prepare engineers and technologists for higher management positions. In the context of this study, technology education was restricted to technical education programmes offered in universities. The aim of technology education at this level is to provide skilled manpower for industries and institutions (Ijebu, 2016). It is a type of education that prepares manpower for sustainable national development. Smith (2015) defined Technology education at this level as the training that enables one to succeed in a socially useful occupation. Toby (1990) defined Technology education not only as the types of education designed for the training or preparation of individuals who are interested in specific occupations than in another, but also as education for the world of employment. It equips individuals with competencies for securing jobs in the world of work.

The Federal Republic of Nigeria (FRN, 2013), in the national policy on Education defines Technology Education as that aspects of education which lead to the acquisition of practical and applied skills as well as basic scientific knowledge. This definition emphasized a general theme of preparing trainees for opportunities to acquire practical skills, attitudes, interest and knowledge competent enough to perform determined tasks on employment to the benefit of the individual involved and to the society at large. Technology Education is education for work. It prepares individuals for gainful employment. In the same vein, Okoro (2004) identified technology education as a form education whose primary purpose is to prepare persons for employment in recognized occupations. Here, technology education is seen as a

precursor of skills, knowledge and attitudes necessary for effective employment in specific occupation. Technology education is the only form of education that equips individuals with a balanced work behavior embracing cognitive, affective (socio-psychological), psycho-productive and perceptual skills for the world of work. The hallmark of technology education is the acquisition of technical skills for paid or self-employment.

The technical skills inherent in technology education programmes include Building Technology; which consists of surveying, architecture, building and woodwork, Automobile Technology; which consists of auto-electricity, panel beating, vulcanizing, auto mechanic and autotronics, Mechanical Technology; which consists of metalwork, welding, fabrication, foundering, air-conditioning and mechatronics and Electrical and Electronics Technology; which comprises; power and electronics. The acquisition of those technical skills through Technology Education Programmes, which prepares and opens large doors of employment opportunities and over 1,200 careers in different sectors of the economy is diminishing among youths in South-South zone of Nigeria (Nwakanma, 2015).

Their loss of interest in technology education in recent times is evident in students' enrollment in the undergraduate programmes in technology education. In South-South Nigerian Universities for example, available data show a steady decline in the number of students' enrollment in technology education as shown in table 1.

**Table 1: Number of Enrollment in Undergraduate Programmes in Technology Education by Gender in South-South Nigerian Universities (2016-2021)**

<b>Gender</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
<b>Female</b>	41	38	35	32	25	17
<b>Male.</b>	147	134	129	111	108	101
<b>Total</b>	188	182	164	143	133	118

*Source:* Admission Office UNIBEN, AAU, NDU, RSU, IAUE and UNIUYO (March, 2022)

The data in table 1 reveals that a total of 188 students consisting of 41 females and 147 males were admitted into Technology Education programmes in south-south Nigerian Universities in 2016. However, the number of students' enrollment or participation in the programmes significantly reduced to 118 students; consisting of 17 female and 101 male students in 2021. The data in that same table shows that the most adversely affected is the women enrollment in technology education. This consistent decrease in female students' enrollment sends a wrong signal towards their interest in acquiring technical and employable skills.

More so, the non completion of technology education programmes within the stipulated 4 years of academic sessions and the attrition rate of students in the programmes leave much to be desired. According to Nwakanma (2021), out of 242 students admitted into technology education undergraduate programmes in South-South Nigerian universities in 2013/2014 session, 39 (16%) graduated within the stipulated time. Their report also shows that out of 225 students that were admitted into the same programmes in 2014/2015 sessions, only 32 (14%) graduated within the stipulated time. The same report indicated that the attrition rate within the period under review increased from 15% to 26%. This report not only shows a decline in graduation of students in technology education programmes, but also a lack of interest and enthusiasm to complete the programmes. This situation could be predicated by some determinants.

Obi (2015) stated that societal view of Technology Education is one of the major determinants factor in students' choice of occupation and career in the programme. The feeling that technical skills are only meant for males discourages females from pursuing such careers (Nwakanma and Anigbogu, 2019). There is also a feeling by the society that technical skills development processes are difficult for females. Others according to Akpotohwo and Ehimen (2014) believed that technical skill acquisition were incompatible with mother's role at home and that girls who take to such careers have slim chances of getting married; as these negative thoughts may influence the interest, self-confidence among the female folk and reduce their ability and motivation to take up careers in technical skills acquisition programmes.

Parental interference in the choice of career in university education may be another determinant factor. While some female children may desire to acquire a technical skill through technology education Programmes, most parents restrain them from doing so; after all, they are their sponsors (Nwakanma and Anigbogu, 2019; Olanka, 2015; Steve, 2014). It is repugnant to most parents and guardian to allow their children and wards to acquire technical skills.

Furthermore, prospective universities students' related factors have been identified as another determinant of choice in technology education. Zhao (2016) revealed that prospective students' demographic variables such as gender, age, background, language and ethnicity were significant prospective students' related factors that determine their interest and participation in technology education programmes. Roche and Stronger (2013) stated that prospective students' age could predict their interest and choice in technology education programmes. David (2015) also agreed that prospective students' age, gender and cultural background played a significant role in their choice of career in technology education programmes.

Martin (2016) noted that the physiological nature of prospective universities students and students already in the programme is another factor that determines their interest and attrition in technology education programmes. Martin stated that male students usually complete their programmes earlier than their female counterparts owing to the peculiar nature of female students. The motherly responsibilities of some female students such as, pregnancy, child-birth, child-care and home management usually interfere with their programmes (Nwakanma, 2021).

Also, Nduka (2016) observed that, only female students that are single or have passed child-bearing age show more commitment to their studies.

Dyner (2016) also identified motivation, psychological status of students and students' personality as students' related determinants lead attrition among students in technology education programmes. Psychological factors such as self-sabotaging behaviour due to over-commitment, procrastination and perfectionism were listed as factors that hinder completion technology education programmes. Lack of motivation on the other hand leads to lack of enthusiasm, optimism and dedication to complete programmes within the stipulated time (Kennedy, 2016; Kearners, 2015). Motivation helps individuals to remain both proactive and focused in accomplishing a given task. Most students who start their course of studies highly motivated often find it challenging to be motivated throughout the duration of their studies. Abiodun (2016) observed that, it is lack of motivation among students occasioned by problems such as poor health, financial difficulties, criticism, family issues that encourages attrition.

Early marriage has also been identified as an obstacle for enrollment and participation in technology education programmes. Wodon (2017) lamented that early marriage among men and women makes completing technology education almost impossible for them. The relationship between early marriage and educational attainment for girls is strong. In most developing countries, it is extremely difficult for girls to remain in school once they get married. As a result, early marriage reduces the likelihood that girls will complete their education. According to Wodon, marriage often emerges clearly as the main cause of adolescent girls drop out of school. A similar conclusion was reached after modelling the relationship between early marriage and educational attainment econometrically. The effect was large. Every year that a girl marries early is associated with a reduction in the likelihood of completing her technology education programme (Nestour and Comba, 2023).

Geographical location of the universities also has been identified as determinants of lack of interest and low students enrollment and attrition in technology education programmes. Some students have abandoned their studies due to difficulties they experience while transiting to and from the schools. To such students, the money and time lost in transit have become unbearable (Slade, 2013). The communities in which the schools are located seem to have an influence on both the interest and participation of prospective students and students already in the programmes. Okwelle (2014) observed that, the community where the school is located is influential to teaching and learning process. Okwelle opined that the community can positively influence the objectives of the educational programmes by being supportive and friendly to the school

environmental condition. Salako (2014) in a study, observed that in Nigeria of today, institutions of learning are often forced to close down due to crises caused by secret cults and intra-commercial crisis; which normally arise as a result of urge for chieftaincy titles by some elites and chiefs and also leadership and power tussle by cultic youths. According to Salako this makes the communities where the schools are located uncomfortable for the inhabitants; and in turn influence students' interest, academic performance, and attrition and completion time of programmes. Ezegbe (2015) opined that no institution could graduate students within the record time in an atmosphere of war, bicker and rancor. In corroborating the above, Mbia(2015) opined that, for proper and meaningful teaching and learning to take place, some minimum comfort and safety is required in the communities hosting academic institutions. When the reverse is the case, it will automatically cause a set-back to the school system, as syllabus are hardly covered or rushed to be covered and academic calendars are truncated or sometimes the whole academic season are cancelled and lost.

Other scholars and researchers alluded that the misconceptions surrounding Technology Education, religious beliefs, programmes' policies, teaching and supervision factors could be other determinants or factors responsible for low interest, enrollment, participation and completion of technology education programmes among women, that is, females within the ages of 18 to 35 years (Nwakanma and Mbato, 2022; Akue and Nwakanma, 2021; Eze et al., 2020; Eze et al., 2020; Nwakanma and Anigbogu, 2019; Ekpeoyong, 2011). However, no study has considered the implications of illegal oil bunkering activities on women participation and engagement in technology education in South-South Nigerian zone; hence this study.

In terms of theory, the study was anchored on Haulestein theory of skill acquisition. Haulestein theory of skill acquisition was propounded in 1966. The theory holds that acquisition of psychomotor skills is in sequence and organized in order as shown in the figure1 below:

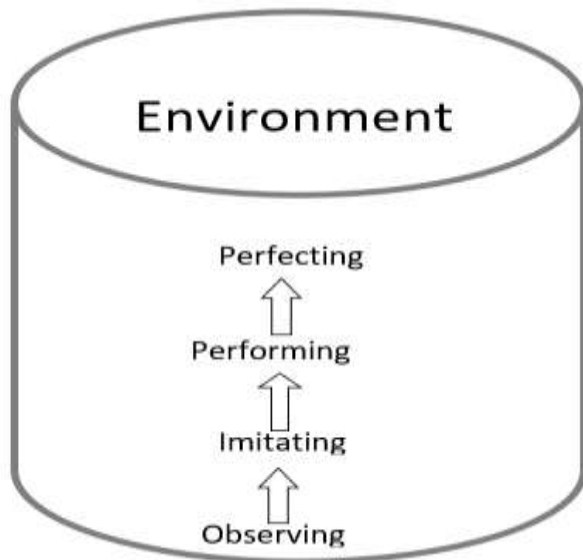


Fig.1: **Diagrammatic representation of Haulestein theory.** Source: Okala, (2015)

Haulestein stated that to acquire skill, one should observe with interest those possessing and applying the skill, seek to imitate them as they apply the skill, be willing to control or move body parts into correct position for applying the skill, be consistent in applying the skill and through repetitive exercise or action, become proficient and efficient in applying the skill in as much as the environment serves as a catalyst (Okala, 2015). The theory indicates that acquisition of technical skills sometimes require manual dexterity

through the repetitive performance of operation. The theory also shows that keen observation by individuals seeking to acquire technical skill is essential especially during the application of such skill by persons that possess it. Such observation should be propelled by interest shown by the individuals seeking to acquire the skill. Another feature of this theory is the willingness of individuals that seeks to acquire technical skills to imitate those applying it. This consistent effort makes skill acquisition possible. Hence through repetitive practice, proficiency and efficiency in application of technical skills is achieved.

Haulestein theory of skill acquisition also revealed the major role environment plays in acquisition of technical skills. Skill acquisition; a product of teaching and learning process is enhanced as long as the environment in which it takes place serves as an accelerator. It is believed that behaviour and learning are reactions to the environment. Individuals develop and learn new skills in reaction to items they find around the environment. The theory indicates that the teaching and learning environment should be altered in such a way that students should be able to observe, imitate, manipulate, perform and perfect in any chosen field of skills. This theory is related to the present study since technology education programmes are geared toward skill acquisition. The theory is also related to the present study in that, the study considered how the activities going on within the environment could influence the acquisition of technical skills.

The findings of the study will be of immense benefits to women, students, educators, school administrators, National Universities Commission, government and the society at large; owing to high premium attached to Technology Education by developed nations and international organizations and the huge benefits inherent in it.

## **Method**

The study adopted survey research design. Two research questions and one hypothesis (tested at 0.05 level of significance) guided the study. The population of the study comprised 104 women educators in technology education in South-South Nigerian Universities namely; University of Benin (Edo State), Ambrose Ali University (Edo State), Niger Delta University (Bayelsa State), Rivers State University (Rivers State), Ignatius Ajuru University of Education (Rivers State) and University of Uyo (Akwa-Ibom State). The entire population was used for the study since it was not too large and was manageable. Hence, the study did not adopt any sampling technique. The instrument for data collection for this study was a structured questionnaire developed by the researcher based on the review of related literature and the research questions that guided the study. The questionnaire was titled: Illegal Bunkering and Women in Technology Education (IBAWITE). It has sections A and B. Section A contains two items on demographic data of respondents which were name of institution and location. While Section B contains 25 items in two clusters of B1 to B2 on a four-point rating scale of Very Great Extent (VGE), Great Extent (GE), Small Extent (SE) and Very Small Extent (VSE).

To ascertain the validity of the research instrument, the researcher submitted draft copies of the instrument alongside with the research topic, purpose of the study, research questions and hypothesis to two experts from the Department of Technology Education in Ignatius Ajuru University of Education Port Harcourt and one expert in measurement and evaluation from the Department of Educational Foundations in Nnamdi Azikiwe University, Awka. The experts scrutinized the instrument with regards to the appropriateness of the structure, items statements, and content coverage and make modifications as they deem fit to enhance the validity of the instrument. Their inputs were used in modifying the items to acceptable standard; thereby making it appropriate for data collection. The reliability of the instrument was established using a pilot test involving 5 female technology educators and 15 female technologists in Technical Education Department of Adekunle Ajasin University, Akungba Akoko, Ondo State; which was outside the area of study. The area was chosen because it has similar features with the area of study, since illegal oil bunkering activities also take place in the area as a oil producing state. Data collected for the pilot study were analyzed with Cronbach alpha. The reliability coefficient values of 0.75 and 0.76 were obtained for the sections respectively. The overall reliability coefficient of the instrument was 0.76; which indicates a high reliability. The researcher collected WhatsApp numbers of technology educators from their department in the various universities after much persuasion and perseverance. The researcher then sent 100 copies of the questionnaire to the



respondents' WhatsApp numbers through google form after notifying them through phone calls and text messages. The researcher through phone calls and text messages verified the receipt of the questionnaire from the respondents. Upon confirmation of receipt, the respondents were informed to return the instruments containing their responses by submitting the google form within two weeks. This gave them sufficient time to study the questionnaire before completion. The researcher through phone calls and text messages reminded the respondents to submit the completed questionnaire before the expiration of two weeks in order to facilitate a high response rate. By the end of the two weeks, 104 completed google forms of questionnaire representing 100 percent were returned and used for analysis. Descriptive statistics (mean and standard deviation) were used to answer the research questions and determine the closeness of the responses. Decision on the questionnaire items and research questions were based on mean rating of 2.50 points. Therefore, items with mean ratings of 2.50 points and above were regarded to have influenced technology education to a great extent while items with mean ratings below 2.50 points were regarded to have influenced it to a small extent.

The t-test statistical tool was used to test the null hypothesis at 0.05 level of significance. A null hypothesis was rejected where the calculated p-value was less than the 0.05 level of significance; it meant that there was a significant difference between mean responses. Conversely, where the calculated p-value was greater than or equal to the level of significance 0.05; it meant that there was no significant difference and the hypothesis was accepted.

The study was conducted in the South-South Nigeria covering Edo, Delta, Bayelsa, Rivers, Akwa-Ibom and Cross Rivers States. Generally, these states share land borders with Ondo, Anambra, Imo, Abia, Ebonyi, Kogi, Benue States and the republic of Cameroon. Geographically, the South-South states are located along the distributaries of Niger River and the Atlantic Ocean. A predominant feature of these states is the existence of tropical rain forests filled with mangroves and the huge deposit of mineral resources such as crude oil and gas. The states thrive economically due the activities of multinational cooperation, industries and companies involved in oil exploration, drilling and exportation and agriculture. In order to provide high level skilled manpower for these organizations, the states have educational institutions that offer technology education programmes. Hence the choice of south-south Nigeria as the area of study is appropriate.

## Results

Data analyzed for research questions and hypothesis were presented in tables 1 to 3.

**Research Question 1:** To what extent do illegal oil bunkering activities influence women interest and participation in technology education programmes?

Data collected in respect of research question were analyzed and presented in table 1

**Table 1:**

**Mean ratings and standard deviation on influence of illegal oil bunkering on women interest and participation in technology Education** N = 104

S/N	Technology Education Programmes	Mean	SD	Decision
1.	Automobile Technology	3.93	0.32	Great Extent
2.	Building Technology	3.11	0.40	Great Extent
3.	Electrical/Electronics Technology	3.27	0.36	Great Extent
4.	Computer Technology	3.78	0.51	Great Extent
<b>Cluster Mean</b>		<b>3.52</b>	<b>0.40</b>	<b>Great Extent</b>

Table 1 shows that all the items have mean ratings ranging from 3.11 to 3.93 and a cluster mean of 3.52. This implies that women technology educators agreed that illegal oil bunkering activities influence women interest and participation in Technology Education in South-South zone of Nigeria to a great extent. The standard deviations from 0.32 to 0.51 and the cluster standard deviation of 0.40 of all items, show that the respondents were homogenous in their responses.

**Research Question 2:** To what extent do illegal oil bunkering activities influence acquisition of technical skills among women?

Data collected in respect of research question 2 were analyzed and presented in table 2.

**Table 2.**  
**Mean ratings and standard deviation on the influence of illegal oil bunkering on acquisition of technical skills**  
**N = 104**

S/N	Technical Skills	Mean	SD	Decision
1.	Foundry skill	3.00	0.45	Great Extent
2.	Welding and fabrication skill	3.30	0.46	Great Extent
3.	Machining skill	3.30	0.78	Great Extent
4.	Block laying/bricklaying/concreting skill	3.80	0.40	Great Extent
5.	Plumbing and pipe fitting skill	3.10	0.54	Great Extent
6.	Furniture making skill	3.20	0.40	Great Extent
7.	Carpentering and joining skill	3.30	0.64	Great Extent
8.	Auto-mechanic maintenance skill	3.20	0.87	Great Extent
9.	Automobile body repair/spraying/ painting skill	3.80	0.75	Great Extent
10.	Auto-electrical and maintenance skill	3.10	0.54	Great Extent
11.	Air conditioning and refrigeration skill	3.00	0.45	Great Extent
12.	Satellite dish installation skill	3.00	0.45	Great Extent
13.	Close-circuit television camera installation skill	3.43	0.34	Great Extent
14.	Electrical design and drafting skill	3.30	0.46	Great Extent
15.	Public address system maintenance skill	3.30	0.78	Great Extent
16.	Household electrical appliances repair skill	3.80	0.40	Great Extent
17.	Office equipment maintenance skill	3.10	0.54	Great Extent
18.	Mobile phone maintenance skill	3.20	0.40	Great Extent
19.	Computer repair skill	3.42	0.21	Great Extent
20.	Computer processing skill	3.51	0.20	Great Extent
21.	Electrical installations skill	3.56	0.19	Great Extent
<b>Cluster Mean</b>		<b>3.47</b>	<b>0.49</b>	<b>Great Extent</b>

Data from table 2 shows that all the items have mean ratings ranging from 3.00 to 3.80 and a cluster mean of 3.47. This means that the respondents are of the opinion that illegal oil bunkering activities influenced acquisition of technical skills among women in south-south zone of Nigeria to a great extent.. The standard deviations from 0.19 to 0.87 and the cluster standard deviation of 0.49 of all items show that the respondents were homogenous in their opinions.

**Hypothesis 1:** There is no significant difference in the mean responses of women educators on the extent at which illegal oil bunkering activities influence women interest in technology education based on location (rural and urban areas).

Data obtained in respect of hypothesis 1 were analyzed and presented in table 3.

**Table 3.**  
**Summary of z-test comparison of the mean ratings on the influence of illegal oil bunkering activities on women interest in technology education.**

Location of Educators	N	X	SD	$\alpha$	df	t-cal	p-value	Decision
Urban	66	3.51	0.51	0.05	102	0.39	.071	Not Significant
Rural	38	3.54	0.52					

Data in Table 3 shows that the respondents do not differ significantly in their mean ratings on the extent at which illegal oil bunkering activities influenced women interest in technology education in South-South zone of Nigeria irrespective of their locations, with mean scores of 3.51 and 3.52 and their corresponding standard deviations of .51 and .52. The table also indicated a t-value of 0.39 and a p-value of 0.71 at degree of freedom of 102. Testing at alpha level of 0.05, the p-value is not significant since the p-value is greater than the alpha value (0.05). Therefore, the null hypothesis was not rejected.

### **Discussion**

The findings of the study revealed that illegal oil bunkering activities influenced women interest and participation in technology education programmes in south-south zone of Nigeria to a great extent. The study shows that, it influenced their interest and participation or enrollment in Automobile Technology, Building Technology, Electrical and Electronics Technology and Mechanical Technology Programmes in South-South Nigerian Universities. This finding is in agreement with Nwakanma (2021) who reported that, there is a growing trend of lack of interest and enthusiasm in technology education among youths in south-south area of Nigeria. This thus implies that, illegal oil bunkering activities is not only a hindrance to women interest and participation in technology education but is also a factor responsible for high rate of attrition in the programmes. The findings of the study also corroborate the reports from various admission offices in south-south Nigerian universities that, there is a steady decline in students' enrollment especially, the feminine genders in technologically inclined educational programs. This is a reality because most women in south-south zone see the illegal oil bunkering activities as a lucrative venture, business and meaningful source of livelihood. They like their males counterparts are very busy bagging, transporting, selling, buying and hawking illegally acquired crude oil and its substandard refined products. These unlawful activities have become a major source of distraction from the pursuit of technology education.

The findings of the study also indicate that illegal oil bunkering activities influenced the acquisition of technical skills among women in south-south Nigerian zone to a great extent. The study shows that the acquisition of technical skills such as foundry, welding and fabrication, machining, block laying/bricklaying/concreting, plumbing and fittings, furniture making, carpentry and joining, auto-mechanic maintenance, automobile body repair/spraying/painting, auto-electricity and maintenance, air-conditioning and refrigeration, satellite dish installations, close-circuit television cameras installation, electrical design and drafting, public address system maintenance, household electrical appliances repair, office equipment maintenance, mobile phone repair, computer processing and domestic and industrial electrical installation by women in south-south are negatively influenced by illegal oil bunkering activities. The finding of the study is in consonance with Haulestein theory of skill acquisition, which states that the environment serves as a catalyst in either promoting skill acquisition or discouraging it (Okala, 2015). The proliferation of illegal oil bunkering activities in south-south environment of Nigeria is a catalyst that is discouraging and inhibiting the growth and development of technology education among youths, especially the women. This implies that the environment instead of accelerating technology education among women is speedily promoting this illegality. The findings of the study also support the field report from admission offices of universities in the south-south Nigeria offering technology education that, there is a consistent decrease in female students enrollment and attrition in the programmes. This therefore, sends a wrong signal towards acquisition and development of technical and employable skills in the zone where the women population is on the increase. The findings of the study further revealed that women educators irrespective of their locations are of the view that illegal oil bunkering activities influenced women interest in technology education in South-South zone of Nigeria to a great extent.

### **Conclusion**

Based on the findings of the study, it was concluded that the continuous proliferation and thriving of illegal oil bunkering activities in south-south zone of Nigeria exerts a negative influence on women interest, enrollment, participation and enthusiasm in technology education. Owing to the prospects technology education holds for national development, it was therefore recommended that:

1. Government at all levels should try their best possible to put a stop to illegal oil bunkering activities in south-south zone of Nigeria.
2. Through enlightenment campaigns and programmes, government should encourage technology education among women
3. Technology Education Programmes should be made lucrative in place of illegal oil bunkering activities by making the study of technology education programmes tuition free especially for women; providing scholarship for women in the programmes and providing gainful employment for female graduates of the programmes.
4. An office in the Ministries of Niger Delta Affairs and Women Affairs and Niger Delta Development Commission should be created to promote, oversee, and monitor the enrollment, progress and attrition of women in technology education programmes.
5. A blueprint to attract attention and motivate, promote and sustain women interest in technology education programmes should be developed by experts in the field and implemented by government at all levels.

### Acknowledgments

The researcher gives the utmost thanks to Almighty God, for giving him the strength, knowledge and wisdom to successfully completing this work. The researcher's special gratitude goes to Prof. I. Ogundu; Dean Faculty of Vocational and Technical Education, Dr. J.U.A Uka; Head of Department Technical Education, for their constructive criticism and contributions to the success of this work.

The researcher sincerely acknowledge his academic colleagues Dr. P. Emenu, Engr. Dr. J.O. Amaechi, Dr. D.O. Chiorlu, Dr. R. N. Robinson, Dr. A. Ibekwe, Dr. Mrs. S.N. Igweagbara, Dr. A. Nwala, Dr. C.C.R. Wordu, Mr. P.N. Akue, and Mr. J. A. Ijok for their moral support.

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## Internal Revenue Generation (IRG) and the Sustainability of University Education in South-East Geopolitical Zone of Nigeria

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### Abstract

The purpose of the study was mainly to assess the Internal Revenue Generation (IRG) and sustainability of University Education in the South-East Geopolitical Zone of Nigeria. To fulfill the study's goal, two research questions were posed and two hypotheses were developed to lead the investigation. A survey research design was used for the investigation. Three hundred and thirty (330) top university administrative staff at eleven (11) universities in the South-East Geopolitical Zone of Nigeria were used as the population of the study. The 41-item questionnaire titled "Internal Revenue Generation and the Sustainability Questionnaire (IRGSQ)" was used for data collection. Descriptive statistics, bar charts, radar graphs, bar graphs, and independent t-test statistics were used to analyze the data collected for the study. The findings revealed that the primary sources of internal revenue generation are utilized for revenue generation; the university's management utilized Internal Revenue Generation (IRG) for the sustainability of university education in the south-East Geopolitical Zone of Nigeria, and there was a significant effect on IGR and the university's sustainability. It was concluded that internal revenue generation plays a vital role in the operations of any university in the southeast geopolitical zone of Nigeria. It was recommended that there should be a comprehensive reorientation and awareness of the university management's IRG and its usage for sustainable education, especially in the South-Eastern Geopolitical Zone of Nigeria.

**Keywords:** Internal, Revenue, Generation, Sustainability and University education.

### Introduction

In recent times, high-profile government officials have lamented that the federal government can no longer finance education because of the costs associated with education sponsorship. Even in academia, we have colleagues who believe that education, particularly at the tertiary level, should be self-funded. The Vice Chancellor of the University of Benin, Professor Lilian Salami, stated in a keynote speech at the first Higher Education Summit headlined 'Fresh Ideas for Overhauling Nigeria's Tertiary Education Complex' that the country's higher education requires a comprehensive makeover. Salami (2013) argued that the Federal Government could no longer fund tertiary education and that parents must carry the burden of educating their children. Salami (2023) asserted that the Federal Government could no longer support tertiary education. Salami cited Nigeria's education budget's low financial allocation to education as striking evidence of the government's incompetence or reluctance to fund education. In consonance with Suleiman (2022), since President Buhari released his first budget proposal in 2016, Nigeria's yearly public spending on education has ranged between 5.68 percent and 8.8 percent of the entire budget. In 2016, Buhari dedicated 7.9 percent of the entire budget to education; in 2017, 7.4 percent; in 2018, 7.04 percent; and in 2019, 7.05 percent. Allocations declined to 6.7 percent in 2020, then to 5.68 percent in 2021, before increasing to 7.2 percent in 2022. However, in 2023, education will get 8.2% of Nigeria's budget, which will amount to N1.08 trillion.

Globally, South Africa received R133.8 billion with an average annual increase of 5.3% for the education sector, while Ghana received 22.9 billion in the 2023 budget for education, or roughly 12% of the MoE allocation that is devoted to capital expenditure (CAPEX) for the year. Furthermore, as requested by the

Finnish government in Europe, the Finnish Ministry of Education and Culture got a total of EUR 7.7 billion. In 2022–2023, the UK invested over 105.5 billion British pounds in education. The 2023 budget included \$417 billion for education in Mexico and \$79.6 billion for the US Department of Education. For instance, India received Rs 68,805 crore from the 2023 budget for education on the Asian continent. Additionally, China's budget for 2023 included 290.000 RMB billion for education. I think we can see the value of each country's educational system by looking at the analysis above.

Currently, in a careful analysis of President Bola Ahmed Tinubu's May 29, 2023, inaugural address on his key priorities concerning the welfare of Nigerians, one would be tempted to believe that the leaders of Nigeria have no interest in the educational sector in Nigeria. In his view, his current administration would include security, economy, agriculture, infrastructure development, monetary policy, foreign policy, and fuel subsidy removal. In a critical view, education is not among the top priorities of the present administration. Again, in a critical look at the judgment of the National Industrial Court of Nigeria (NICN) that upheld the judgment suit filed against the Academic Staff Union of Universities (ASUU) delivered by Kanyip (2023), one may begin to have second thoughts about the Federal Government of Nigeria's role in sponsoring the educational system.

In light of the above scenario, university administration should consider what may be done to continue the institution's education without relying entirely on government funding. Of course, internal revenue generation might be a viable option for universities to pursue in order to ensure the sustainability of tertiary education, particularly in a developing nation like Nigeria (Ofem, Akeke, and Ameh, 2021). It is worth noting that certain organizations, such as banks, are self-sustaining. They are self-sufficient due to the revenue generated by their operations. The banks are not established to be supported by government or agency subsidies; they are thus business enterprises that earn revenue in order to survive. Now that banks can sustain themselves from the income generated, university management should take note that the federal government of Nigeria is moving the university system toward self-sufficiency, and universities should consider internal revenue generation along with adequate utilization as the best option. (Akeke, 2019).

Internal revenue generation is the development of potentially intangible or tangible assets within the bounds of one business. Internal revenue generally refers to monies realized via the effort or operation of the entity itself. Internal revenue generation also refers to any funds received inside an organization through statutory budgeting or intervention. Atah (2018) asserted that IRG is excess money made and spent locally by the university that is obtained and utilized independently of statutory allocations; it is typically unbudgeted. Internally produced revenues are funds raised within the educational system by institution management through the enactment of school levies, tuition fees, earnings from investments, grants, donations, endowments, and advisory firms, as compared to funds raised outside of the educational environment. Since raising money is now the norm in both private and public institutions of higher learning to sustain the institution's needs, management of revenue generated internally could help supplement the yearly budgeted required costs if the sources of internal revenue generation are used to generate and utilize source funds.

The promotion of high tertiary educational standards, the upkeep of physical infrastructure, the training of lecturers, and the funding of research in the nation, among other things, have all been severely hampered by the funding of public higher education, especially in the Southeast, for a long time. These difficulties have strained relations between government officials and university workers, which has impeded academic progress. Strike actions have frequently been used by higher education institutions in southeast Nigeria to press their demands for better working conditions and educational financing. Inadequate finance is the main issue that the governing body of the university system in Nigeria's southeast geopolitical zone is now experiencing. Even if there is a problem with paying for tertiary education in particular, the Tertiary Education Trust Fund Establishment Act of 2011 (TETFund ACT) established TETFund as an intervention body. Its focus areas involve paying for educational institution construction and renovation, encouraging innovative and imaginative approaches to learning, providing higher education books and libraries, and providing learning resources. It also supports lecturers with advanced degrees. Regrettably, the South-East Geopolitical Zone of Nigeria's public universities has been impacted by the issue of inadequate finance,



which was made necessary by an industrial strike by some of the Zone's public universities. Because the government was never willing to assume responsibility for sponsorship, including the payment of university teacher salaries and other incentives, the state-owned university system in the area suffered the most in terms of funding. Interestingly, the engagement of internal revenue generation has abruptly changed the scenario in the Southeast educational system.

The primary sources of university internal revenue generation considered in this study are income from hotel business, income from campus business registration, income from the university agriculture farm, income from student semester registration, income from university staff schools, income from school fee charges, income from the university bookshop, income from university CES programs, income from research and consultant services, income from manufacturing and processing services, income from gifts and donations, income from the university clinic, income from the university microfinance bank, and income from student hostel accommodation for the sustainability of Nigerian universities.

There is a considerable association between internal revenue creation and the sustainability of university education in southern Nigeria. Afutu (2015) observed that a steady growth in enrollment and the commercialization of departmental operations such as the printing and publication section and the apparel service department can sustain the university's sources of internal revenue-generating funding. According to Adesoji and Chike (2013), the benefits of affiliation with domestic income generation and building infrastructure contribute to educational continuity. Aja-Okorie (2017) opined that internal income-generating measures such as efficient implementation of electronic payment for tuition charges and internet-based enrollment boost the university's internal revenue and sustainability. According to Wordu (2018), federal and state institutions require major sources of internal income creation, and there is no doubt that the university education revenue-generating project is viable for its long-term sustainability. According to Akinsolu (2012), internal income-generating utilization has a positive influence on internal efficiency and the sustainability of university education. It also concurs with the findings of Omodere and Ihendinihu (2018), who observed that internal income generation has a strong and significant positive influence on the sustainability of education, especially in the 21<sup>st</sup> century. The study therefore sought to investigate internal revenue generation and the sustainability of university education in the southeast geopolitical zone of Nigeria.

### **Statement of the Problem**

Many students at public institutes of learning are spotted standing outside classrooms since their numbers have outnumbered the allotted classroom spaces. Because of funding restrictions, the infrastructure of these organizations is insufficient. As a result, students endure challenging learning environments. It is not unusual to see students perched on Windows to get instruction, and it is common to see up to 40-seat capacity halls with 70 students managing themselves with the intention to learn. The situation has gotten to the point where university education administrators are expected to seek other means of financing tertiary education in Nigeria. As a result, this study focuses on internal revenue generation and the sustainability of university education in the southeast geopolitical zone of Nigeria.

### **Objective of the Study**

The major goal of this research was to assess the internal revenue generation and sustainability of university education in the southeast geopolitical zone of Nigeria. Specifically, the study sought to:

1. Identify the primary sources of internally generated revenues in the universities in the South East Geopolitical Zone
2. Examine the extent to which utilization of IGR affect university education sustainability in the South East Geopolitical Zone
3. Assess the effects of IGR on University education sustainability in the South East Geopolitical Zone

### **Research Questions**

The following research questions were posed to lead the study:

1. What are the primary sources of internally generated revenues in the universities in the South East Geopolitical Zone
2. To what extent does utilization of IGR affect university education sustainability in the South East Zone
3. To assess the effects of IGR on University education sustainability in the South East Geo-political zone

### **Research Hypotheses**

The following study hypotheses were established and tested at a significance level of 0.05.

1. There is no significant difference in the mean rating of Federal and State institutions on the primary sources of internal revenue generation and the sustainability of university education in Nigeria.
2. There is no significant difference in the mean rating of Federal and State institutions on the extent to which utilization of internal revenue generation affects the sustainability of university education in the South-East Region of Nigeria.
3. There is no significant difference in the mean rating of Federal and State institutions on the effect on IGR and sustainability of university education in the South East Region.

### **Literature Review**

#### ***Theoretical framework***

This study revolves around Baddeley's efficiency theory postulate, which maintains that an action is most beneficial when the marginal social costs and benefits of its resource allocation are equal. The objective is to develop desirable products at the lowest feasible cost, avoiding wasteful resource usage or deadweight loss. The efficiency principle provides the theoretical framework for cost-benefit analysis, which is used to allocate resources in the majority of cases. The Nigerian educational system could only serve humanity and become more effective when funding for education was proportionate to the challenges facing education. There is an immense requirement for universities in the South East geopolitical zone to consider IRG and have used it to enrich the physical surroundings of the institutions, while others are still struggling to keep up with the goal because the allocation to educational institutions is not in accordance with the need in the educational sector.

### **Conceptual Framework of the study**

#### ***Revenue***

Revenue can be viewed through the lens of more than one discipline or topic of study. More so, revenue is described in the accounting industry as the money earned by a company's ordinary business operations, which frequently involve the sale of products and services to clients. It could additionally symbolize overall business revenue or the amount of money earned over an extended period. Non-profit revenue can be described as gross invoices, assistance, and donations received during a specific time period. According to Angenge-Ouma and Cloete (2008) and Okojie (2013), certain tertiary institutions succeeded successfully in their quest for significant IRG and used funding to positively improve the environs of the schools, while others did not. Operating revenues can include contributions from individuals and groups, government funding, money from activities linked to the organization's mission, and income from donations, efforts, and dues from members. Otemewo (2018) defines revenue as "any revenue (i.e., taxes and fees) obtained from sources other than the government body." Most big administrations entrust a bureau or ministry with receiving revenue for the government from firms and individuals.

### **Methodology**

#### ***Research Design***

Survey research design was used for this assessment. Survey data collection, according to Idaka and Anagbogu (2012), is a type of descriptive research that tries to gather both small and large samples from communities in order to investigate the distribution, occurrence, and interrelationship of educational and social occurrences. It is a research method that is aimed at gathering data about an audience of individuals who share similar characteristics using written or oral methods of data collection which include questionnaires, in-person interviews, phone conversations, correspondence, and the internet pertaining to

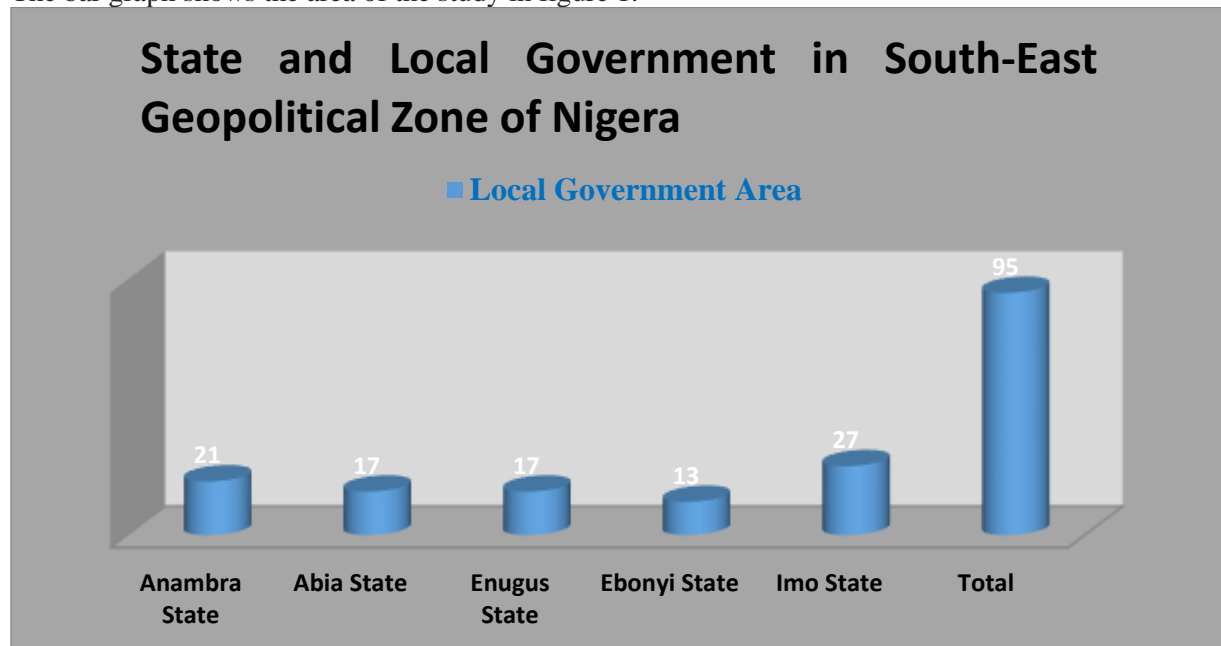
participants' responses upon facts, beliefs, mindsets, and so on, in order for the investigator to investigate them as an entire population. Survey research is cost-effective because a study of adequate numbers of respondents allows conclusions from generalization to groups that would be too expensive to examine in their entirety. Survey design is suited for survey confidentiality, which permits participants to provide more frank and valid responses. When the survey was performed anonymously, it also provided the researcher with an opportunity to obtain honest and clear replies from the respondents.

**The area of the Study**

The study was carried out in Nigeria's southeast geopolitical zone. However, the primary administrators of all public and state universities in the zone were the intended audience. The South-East is one of Nigeria's six geopolitical zones, comprising five states that include Abia, Anambra, Ebonyi, Enugu, and Imo State. The zone is bounded on the west by the Niger River, the south by the riverine Niger Delta, the north by the flat North Central, and the east by the Cross River. Culturally, the vast majority of the zone lies inside Igboland, the indigenous cultural heartland of the Igbo people, the southeastern region's largest ethnic group, accounting for over 90 percent of the overall population.

Notwithstanding being Nigeria's smallest geopolitical zone, the South East contributes significantly to the Nigerian economy through oil and natural gas resources as well as a booming industrial sector. The area is home to nearly 22 million people, accounting for roughly 10% of the country's total inhabitants. Aba and Enugu are the South East's most populated cities, as well as the tenth and fourteenth fastest-growing cities in Nigeria, respectively. In that order, Onitsha, Umuahia, Owerri, Nnewi, Awka, and Abakaliki are among the other prominent southeastern cities.

In the zone, there are 95 administrations of local government regions, with a population of almost 20 million people. The zone has around eleven commercial cities. Aside from the agricultural industry, the zone is also regarded as a commercial and trade zone, with numerous small and medium-sized indigenous firms producing desired items and services. The main agricultural products of the zone include yam, cassava, rice, cocoyam, and others. Natural gas, crude oil, bauxite, iron ore, sandstone, lignite, clay, coal, tin, and columbine are among the solid minerals and resources of natural origin found in the zone. The South East was formed as a result of Alex Ekwueme's proposals, but it had previously been known as Eastern Nigeria. The bar graph shows the area of the study in figure 1.



**Figure 1.** Bar graph showing the area of the study

**Study Population**

This study's population consisted of 330 principal officers in the administrative cadre of the university's management. The distribution of the study Population is shown in figures 2 and 3, respectively.

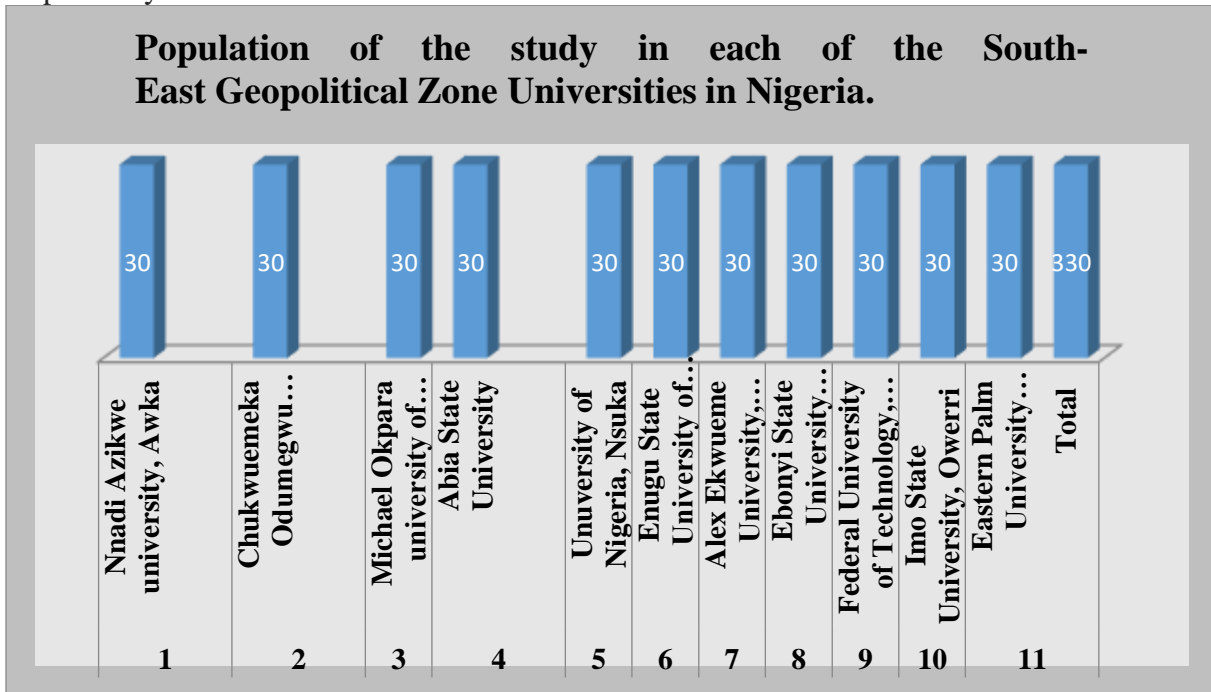


Fig. 2: A cylinder bar graph showing the number of respondents in each university

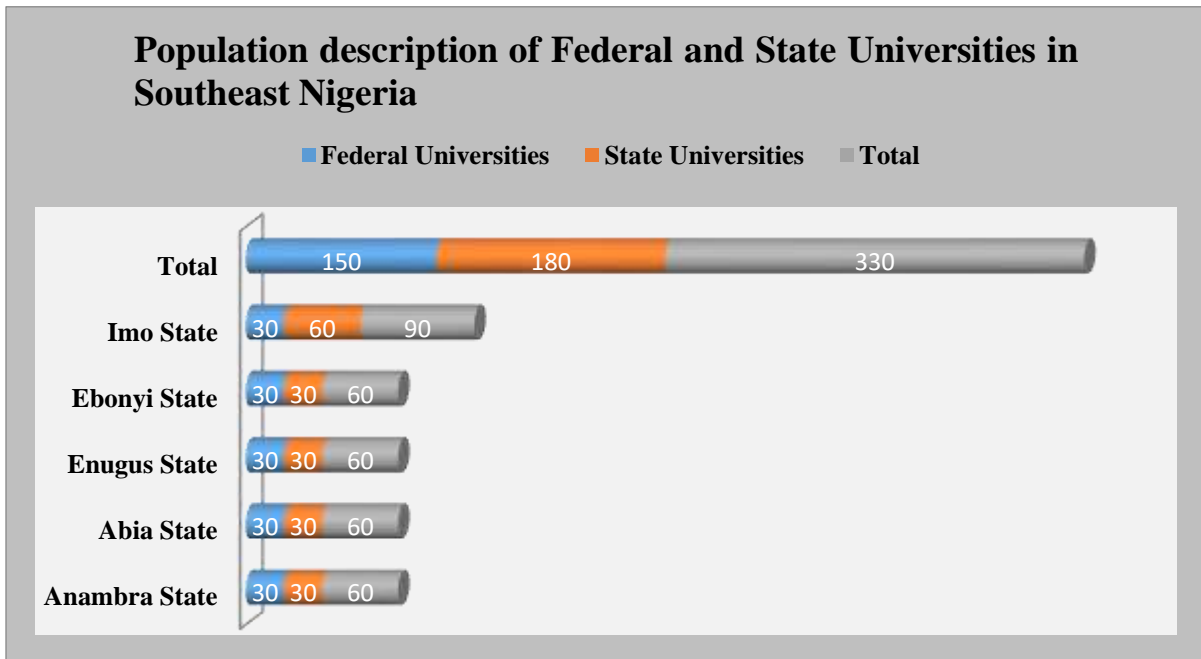


Fig. 3: A bar graph depicting the population of federal and state universities.

### ***Sample and Sampling technique***

The south-east zone houses eleven (11) Public and State universities. However, the respondents who responded to the research instrument were 330 principal officers in the eleven (11) Public and State universities in the South East Zone. The researchers used only 30 principal officers from each university in the study area. The universities and the sample population are shown in Fig. 2 using a cylinder bar graph.

### ***Instrumentation***

A systematic questionnaire termed "Internal Revenue Generation and Sustainability Questionnaire (IRGSQ)" was utilized for the investigation. The instrument was divided into three sections. Part one was used to collect demographic information about the respondents. Part two had fifteen (15) items that requested information on the key sources of internal income generation. Part three, with fifteen (15) items, and part four, with eleven (11) items, solicited information on the use of internal revenue generation and the effect of the IRG on the sustainability of institutions in Nigeria. The instruments add up to a total of thirty-one (41) items.

### ***Instrument Validation***

Three specialists from Ebonyi State University's Faculty of Education in Abakaliki—two from the Business Education Department and one from the Science Education Department—validated the instrument. The experts were provided the instrument, which comprised the study's purpose, research questions, and hypotheses, and were asked to rate it on appropriateness, language and clarity, general test structure, and the extent to which the questionnaire items addressed the subject. Following validation, the instrument was changed to incorporate the experts' perspectives and contributions to the instrument's usefulness in achieving the study's objectives. The comments, critiques, and recommendations of the experts were included in the final draft.

### ***Reliability of the instrument***

A trial test involving fifty (50) administrative management personnel at the University of Uyo in Akwa Ibom State, Nigeria, was conducted to determine the instrument's dependability. The data obtained from the pilot study respondents was utilized to calculate the instrument's reliability. The internal consistency of the instrument was determined using the Cronbach's alpha Special Package for Social Science (SPSS) statistical technique. The reliability coefficient was determined by the analysis findings at .84, indicating that the instrument has good internal consistency and is appropriate for the study.

### ***Method of Data Collection***

The researchers administered three hundred and thirty (330) copies of the questionnaire with the assistance of six (6) research assistants. The research assistants were briefed on the method and methodology for administering and collecting the questionnaire on the spot. Three hundred and thirty (330) copies of the instrument were gathered and analyzed.

### ***Method for Data Analysis***

Descriptive statistics, a bar chart, a radar graph, and a bar graph were used to assess the data collected from participants. For both  $H_{01}$ ,  $H_{02}$ , and  $H_{03}$ , independent t-test statistics were used to assess the hypotheses. Mean responses of Very Sufficiently Generated (VSG), Sufficiently Generated (SG), Insufficiently Generate (IG), and Very Insufficiently Generate (VIG) for primary sources of internal revenue generation and Very Adequately Utilized (VAU), Adequately Utilized (AU), Inadequately Utilized (IU); Very Inadequately Utilized (VIU) for the utilization of internal revenue generation and Positive Effect (PE), Negative Effect (NE) A mean score of 2.50 or more was regarded as constituting the use of primary sources of internal income creation, while a mean score of less than 2.50 was deemed unnecessary. At the 0.05 level of significance, the null hypotheses were tested. The study's decision criterion was to reject the hypothesis if the computed value exceeded the table value; otherwise, do not reject. The null hypotheses were accepted when the t-calculated value was smaller than the table value at a particular degree of freedom. The hypotheses, on the other hand, were rejected.

## Result of the Findings

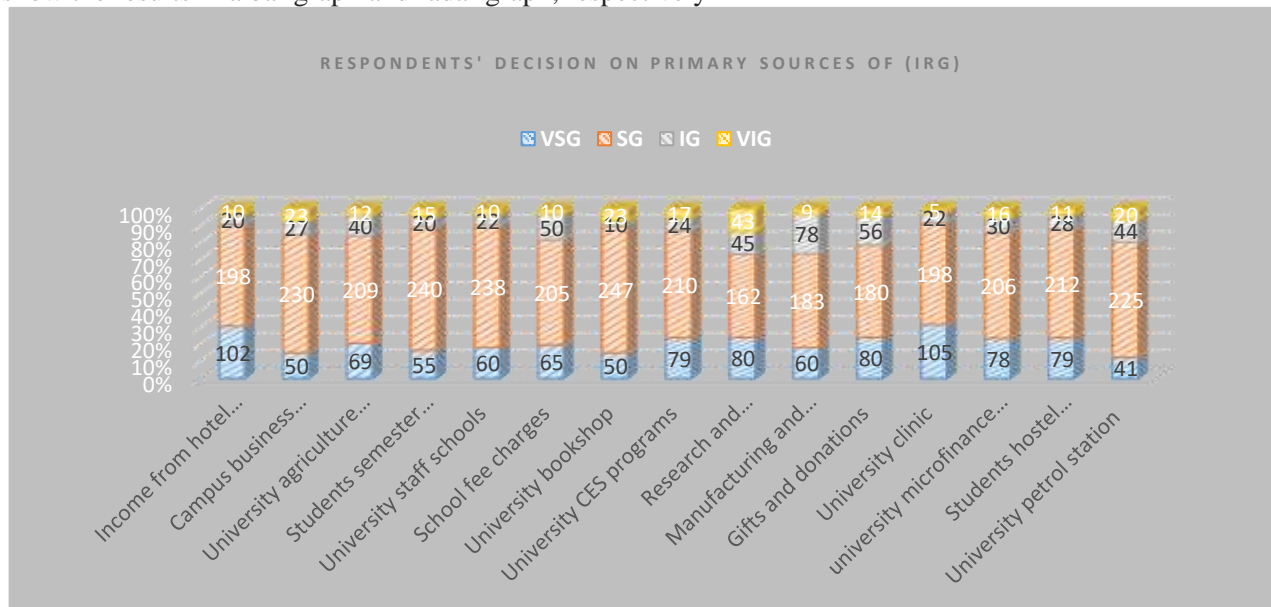
Research question one

What are the primary sources of Internal Revenue Generation (IRG) from university education in the southeast geopolitical zone of Nigeria?

**Table 1: The mean rating of respondents' responses on the Internal Revenue Generation (IRG) and the sustainability of university education**

S/No.	Primary Sources of Internally Revenue Generation (IRG)	N	Mean	SD	Decision
1	Income from hotel business	330	3.19	1.24	SG
2	Campus business registration	330	3.19	.90	SG
3	University agriculture farm	330	3.35	.74	SG
4	Students' semester registration	330	3.15	1.22	SG
5	University staff schools	330	3.34	.94	SG
6	School fee charges	330	3.36	.67	SG
7	University bookshop	330	2.78	.95	SG
8	University CES programs	330	3.35	.82	SG
9	Research and consultant services	330	3.19	1.15	SG
10	Manufacturing and processing services	330	2.95	1.04	SG
11	Gifts and donations	330	3.09	1.03	SG
12	University clinic	330	2.93	1.03	SG
13	university microfinance bank	330	3.30	.99	SG
14	Students hostel accommodation	330	2.93	1.05	SG
15	University petrol station	330	3.15	1.13	SG
	<b>Grand Mean</b>	<b>330</b>	<b>3.15</b>	<b>0.99</b>	<b>SG</b>

In Table 1, all the items 1 to 15 have a mean rating ranging from 2.76 to 3.36, respectively. This indicated that the respondents are of the opinion that internal revenue generation is generated in Nigerian universities, ensuring the sustainability of education in the south-east geopolitical zone of Nigeria. More so, the grand mean of 3.15 is above the cut-off point of 2.50. As a result, primary sources of internal revenue generation (IRG) are critical for the sustainability of university education in Nigeria. The standard deviation varied from 0.67 to 1.24, showing the respondents' opinions on items 1 to 15 were consistent. Figures 4 and 5 show the results in a bar graph and radar graph, respectively



**Fig. 4.** Bar graph showing the respondents' decision

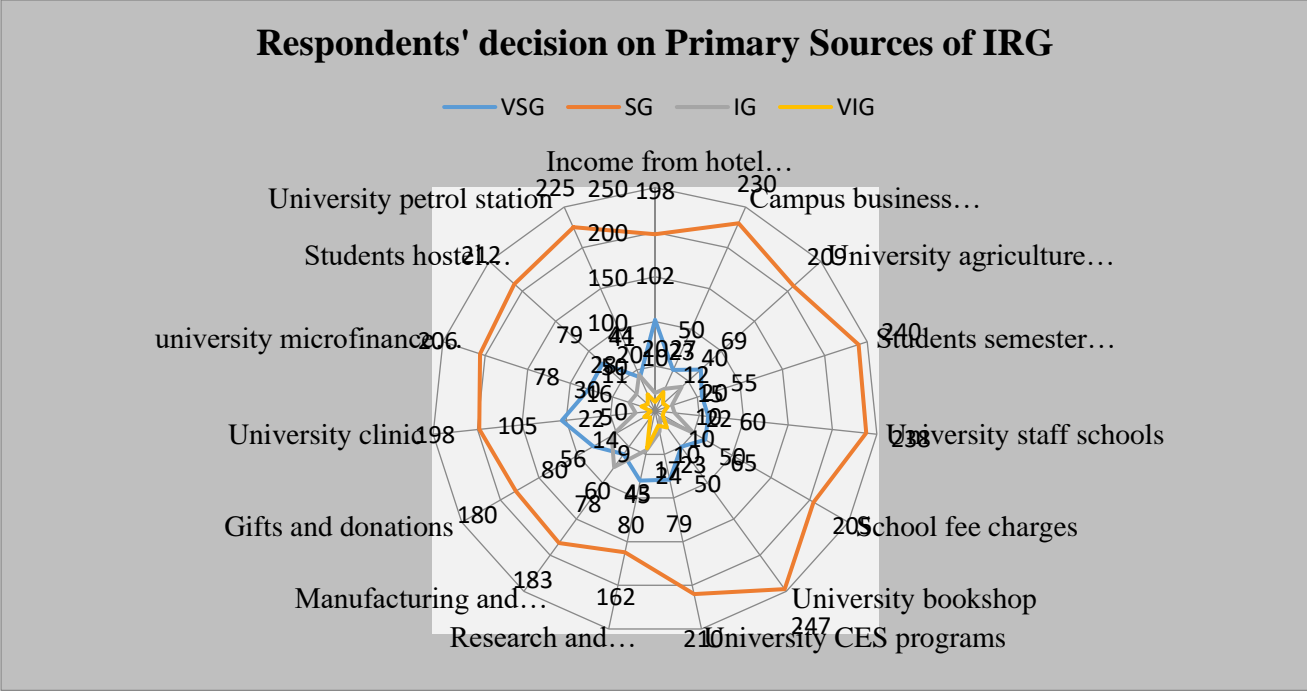


Fig. 5: radar graph shown the respondents' decision

**Research question two**

To what extent does IGR utilization affect the sustainability of university education in the south-east region of Nigeria?

**Table 2: Mean rating of responses of respondents on the utilization of internal revenue generation on the sustainability of university education**

S/No.	Utilization of Internal Revenue Generation (UIRG)	N	Mean	SD	Decision
16	Payment of staff salaries	330	3.14	.89	AU
17	Research and development	330	2.99	.92	AU
18	University staff welfare package	330	3.15	.99	AU
19	Students' welfare	330	3.10	.94	AU
20	Capital project development	330	3.04	.95	AU
21	Staff development program	330	3.58	.81	AU
22	Furnishing of staff offices	330	3.10	.64	AU
23	Maintenance of school facilities	330	3.52	.67	AU
24	Maintenance of school equipment	330	3.41	.59	AU
25	Payment of school electricity bills	330	3.30	.86	AU
26	Staff periodic gifts and bonuses	330	3.47	.81	AU
27	Postage and telephone	330	3.57	.59	AU
28	Provision of free Wi-Fi	330	3.37	.80	AU
29	Social responsibility	330	3.05	.82	AU
30	Security issue	330	3.20	.83	AU
	<b>Grand mean</b>	<b>330</b>	<b>3.27</b>	<b>0.81</b>	<b>AU</b>

Note: SD = Standard deviation; AU = Adequately utilized

According to the data in Table 2, the mean rating for items 16 to 30 ranges from 2.99 to 3.57. This demonstrated the respondent's opinion that internal revenue generation (IRG) is utilized in the south-east geopolitical zone of Nigeria for the sustainability of university education in Nigeria. Furthermore, the grand mean of 3.27 is greater than the cut-off points of 2.50. As a result, the utilization of internal income generation has a positive impact on the sustainability of university education in Nigeria. The standard deviation ranged from .59 to .89, indicating that the respondents' views on items 16 through 30 were consistent. Figures 6 and 7 depict the results in the form of a bar graph and a radar graph, respectively.

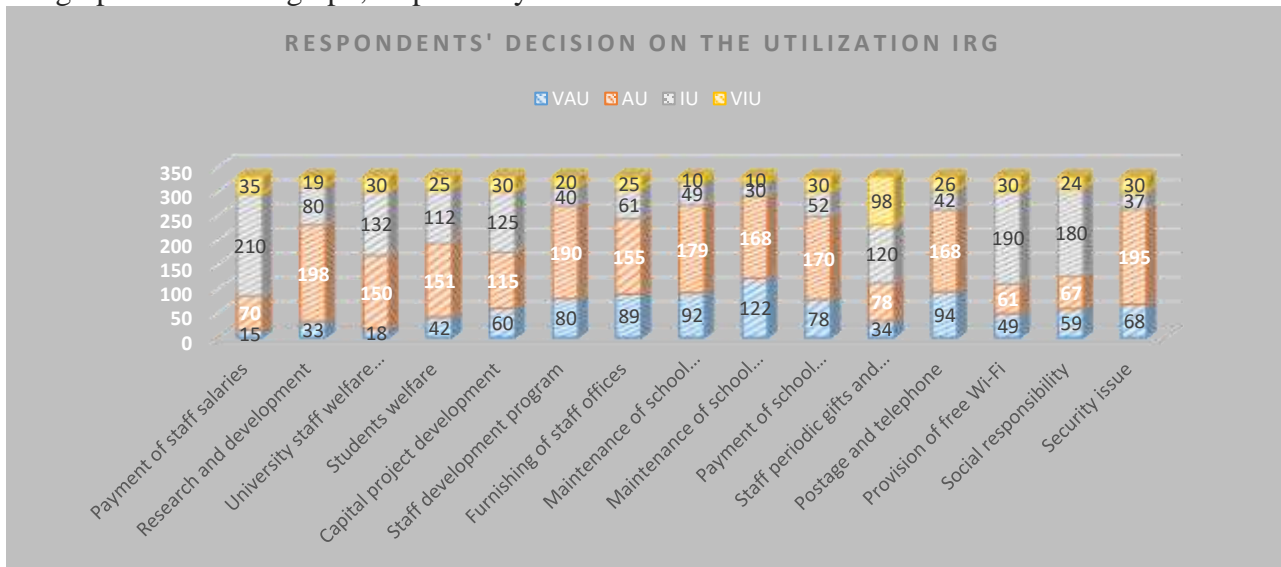


Fig. 6: Bar graph showing the respondents' decision

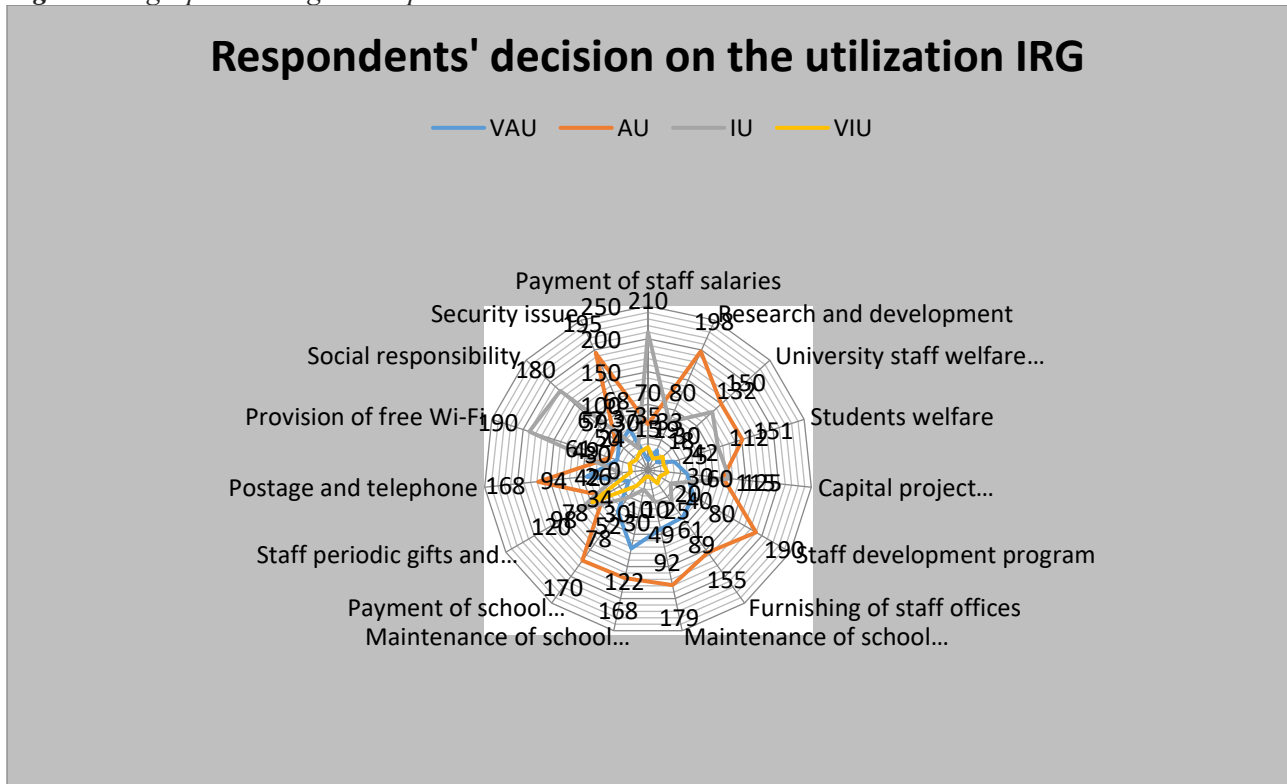


Fig. 7: Radar graph showing the respondents' decision



### Research Question Three

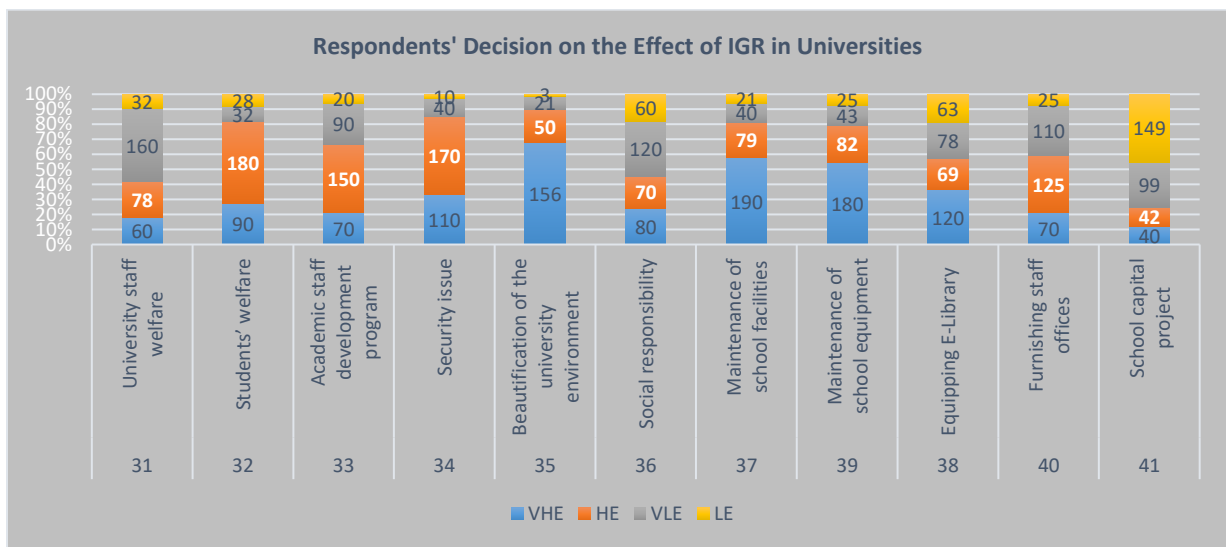
To assess the effects of IGR on University Education sustainability in the Southeast geopolitical zone

**Table 3: The mean rating of respondents' responses on the Effects of IGR on University Sustainability of University Education**

S/No.	Items on the effect of IGR on University sustainability	N	Mean	SD	Decision
31	University staff welfare	330	3.20	.83	PE
32	Students' welfare	330	3.03	1.2	PE
33	Academic staff development program	330	3.30	.91	PE
34	Security issue	330	3.28	.88	PE
35	Beautification of the university environment	330	3.16	1.05	PE
36	Social responsibility	330	3.02	1.15	PE
37	Maintenance of school facilities	330	2.97	1.02	PE
38	Maintenance of school equipment	330	3.18	.89	PE
39	Equipping E-Library	330	3.00	1.07	PE
40	Furnishing staff offices	330	3.14	1.09	PE
41	School capital project	330	2.86	.97	PE
	<b>Grand Mean</b>	<b>330</b>	<b>3.11</b>	<b>1.01</b>	<b>PE</b>

*Note: SD = Standard deviation; PI = Positive Effect*

The information in Table 3 shows that the mean rating for items 31 to 41 varies from 2.86 to 3.30. This showed that the respondent believed there was a beneficial impact on IGR and the sustainability of higher education in Nigeria. The grand mean of 3.11 is also higher than the cutoff value of 2.50. The sustainability of higher education in Nigeria is consequently enhanced by the IGR, especially in the southeast geopolitical zone. According to the standard deviation, which ranged from .83 to 1.15, the respondents' opinions on items 31 to 41 were consistent. Figures 8 and 9 show the outcomes as bar graphs and radar graphs, respectively.



**Fig. 8: Bar graph showing the respondents' decision**

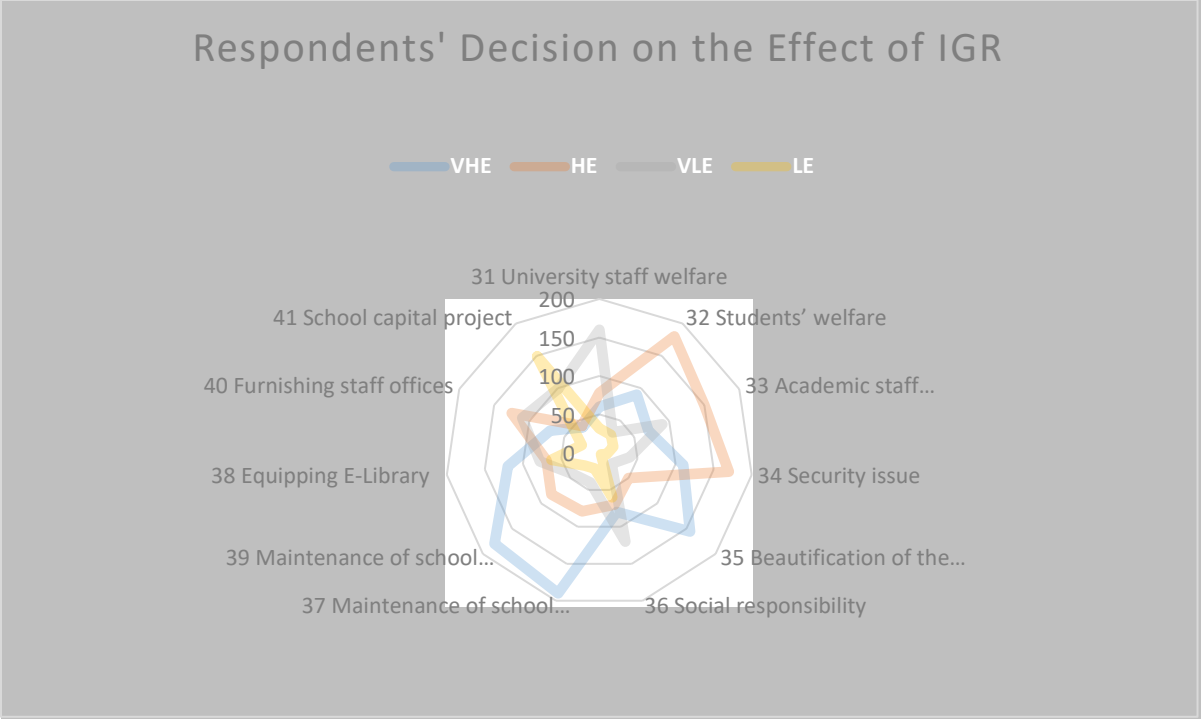


Fig. 9: Radar graph showing the respondents' decision

**Hypothesis one**

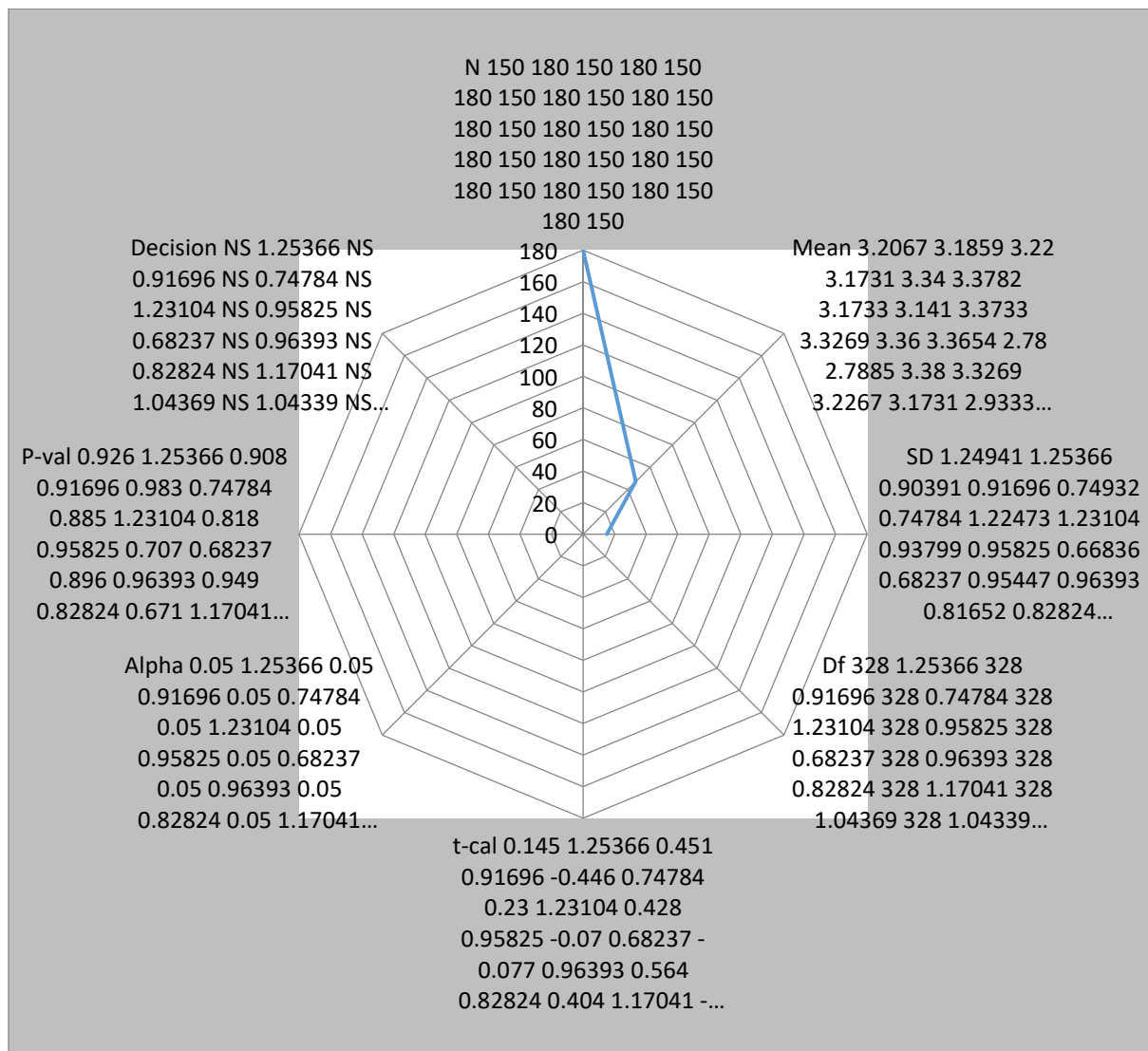
There is no significant difference in the mean rating of Federal and State institutions on the primary sources of internal revenue generation and the sustainability of university education in Nigeria.

**Table 4: Independent t-test of mean rating of responses on the federal universities on the internal revenue generation and the sustainability of university education**

Items	Institutions	N	Mean	SD	Df	t-cal	Alpha	P-val	Decision
1	Federal Universities	150	3.2067	1.24941	328	.145	0.05	.926	NS
	State Universities	180	3.1859	1.25366					
2	Federal Universities	150	3.2200	.90391	328	.451	0.05	.908	NS
	State Universities	180	3.1731	.91696					
3	Federal Universities	150	3.3400	.74932	328	-.446	0.05	.983	NS
	State Universities	180	3.3782	.74784					
4	Federal Universities	150	3.1733	1.22473	328	.230	0.05	.885	NS
	State Universities	180	3.1410	1.23104					
5	Federal Universities	150	3.3733	.93799	328	.428	0.05	.818	NS
	State Universities	180	3.3269	.95825					
6	Federal Universities	150	3.3600	.66836	328	-.070	0.05	.707	NS
	State Universities	180	3.3654	.68237					
7	Federal Universities	150	2.7800	.95447	328	-.077	0.05	.896	NS
	State Universities	180	2.7885	.96393					
8	Federal Universities	150	3.3800	.81652	328	.564	0.05	.949	NS
	State Universities	180	3.3269	.82824					
9	Federal Universities	150	3.2267	1.14778	328	.404	0.05	.671	NS
	State Universities	180	3.1731	1.17041					
10	Federal Universities	150	2.9333	1.05338	328	-.289	0.05	.852	NS
	State Universities	180	2.9679	1.04369					
11	Federal Universities	150	3.1000	1.02813	328	.087	0.05	.859	NS
	State Universities	180	3.0897	1.04339					

12	Federal Universities	150	2.9718	1.03103	328	.652	0.05	.681	NS
	State Universities	180	2.8926	1.04067					
13	Federal Universities	150	3.3067	.98271	328	.104	0.05	.779	NS
	State Universities	180	3.2949	1.00462					
14	Federal Universities	150	2.9267	1.06875	328	-.182	0.05	.657	NS
	State Universities	180	2.9487	1.04601					
15	Federal Universities	150	3.1600	1.14739	328	.096	0.05	.847	NS
	State Universities	180	3.1474	1.13481					
	<b>Federal Universities</b>	<b>150</b>	<b>47.5764</b>	<b>14.97626</b>	<b>328</b>	<b>0.139</b>	<b>0.05</b>	<b>0.83</b>	NS
	<b>State Universities</b>	<b>180</b>	<b>47.2003</b>	<b>15.00659</b>					

The results of the t-test analyses provided in Table 3 reveal that there is no significant difference in the mean rating of federal and state universities on internal income generation and the sustainability of university education in Nigeria. This is because the p-value of 0.83 in Table 3 is greater than 0.05. Because all of the p-values are larger than .05, the null hypothesis that there is no significant difference in the mean evaluation of federal and state institutions on the level of internal income creation and the sustainability of university education in Nigeria is maintained. Figure 8 shows the same results on a radar graph.



*Fig. 10: Radar graph showing the respondent decision*

**Hypothesis two**

There is no significant difference in the mean rating of Federal and State universities on the utilization of internal revenue generation and the sustainability of university education in the south-East Geopolitical Zone of Nigeria.

**Table 5: Independent t-test on the mean rating of responses from federal and state universities on the utilization of internal revenue generation and the sustainability of university education**

Items	Category of Respondents'	N	Mean	SD	Df	t-cal	Alpha	P-val	Decision
16	Federal Universities	150	3.1533	.88033	328	.184	0.05	.874	NS
	State Universities	180	3.1346	.90223					
17	Federal Universities	150	2.9800	.93025	328	-.189	0.05	.960	NS
	State Universities	180	3.0000	.92283					
18	Federal Universities	150	3.1467	1.01258	328	-.063	0.05	.684	NS
	State Universities	180	3.1538	.98475					
19	Federal Universities	150	3.1600	.94180	328	.235	0.05	.893	NS
	State Universities	180	3.1346	.94416					
20	Federal Universities	150	3.0667	.93885	328	.435	0.05	.922	NS
	State Universities	180	3.0192	.96701					
21	Federal Universities	150	3.5867	.82076	328	.104	0.05	.986	NS
	State Universities	180	3.5769	.81152					
22	Federal Universities	150	3.1067	.64659	328	-.031	0.05	.944	NS
	State Universities	180	3.1090	.63828					
23	Federal Universities	150	3.5267	.68244	328	-.069	0.05	.878	NS
	State Universities	180	3.5321	.67604					
24	Federal Universities	150	3.4267	.59468	328	.334	0.05	.997	NS
	State Universities	180	3.4038	.59870					
25	Federal Universities	150	3.2867	.88490	328	-.407	0.05	.648	NS
	State Universities	180	3.3269	.84367					
26	Federal Universities	150	3.4667	.84874	328	-.219	0.05	.484	NS
	State Universities	180	3.4872	.79097					
27	Federal Universities	150	3.5667	.60664	328	-.246	0.05	.502	NS
	State Universities	180	3.5833	.57875					
28	Federal Universities	150	3.3467	.81912	328	-.548	0.05	.789	NS
	State Universities	180	3.3974	.80064					
29	Federal Universities	150	3.0400	.85042	328	-.255	0.05	.671	NS
	State Universities	180	3.0641	.80064					
30	Federal Universities	150	3.2067	.84581	328	-.051	0.05	.601	NS
	State Universities	180	3.2115	.81920					
	<b>Federal Universities</b>	<b>150</b>	<b>49.0667</b>	<b>12.30391</b>	<b>328</b>	<b>0.052</b>	<b>0.05</b>	<b>0.789</b>	<b>NS</b>
	<b>State Universities</b>	<b>180</b>	<b>49.1346</b>	<b>12.07939</b>					

There is no significant difference in the mean rating of Federal and State universities on the usage of internal income production and the sustainability of university education in the South-East of Nigeria, according to the findings of the t-test analyses given in Table 4. This is because the p-value of 0.789 in Table 4 is greater than 0.05. The null hypothesis that there is no significant difference in the mean rating of federal and state universities on the utilization of internal revenue generation and the sustainability of university education in Nigeria's South-East Geopolitical Zone is maintained because the p-values for all of the items are greater than 0.05. Figure 9 shows the same results on a radar graph.

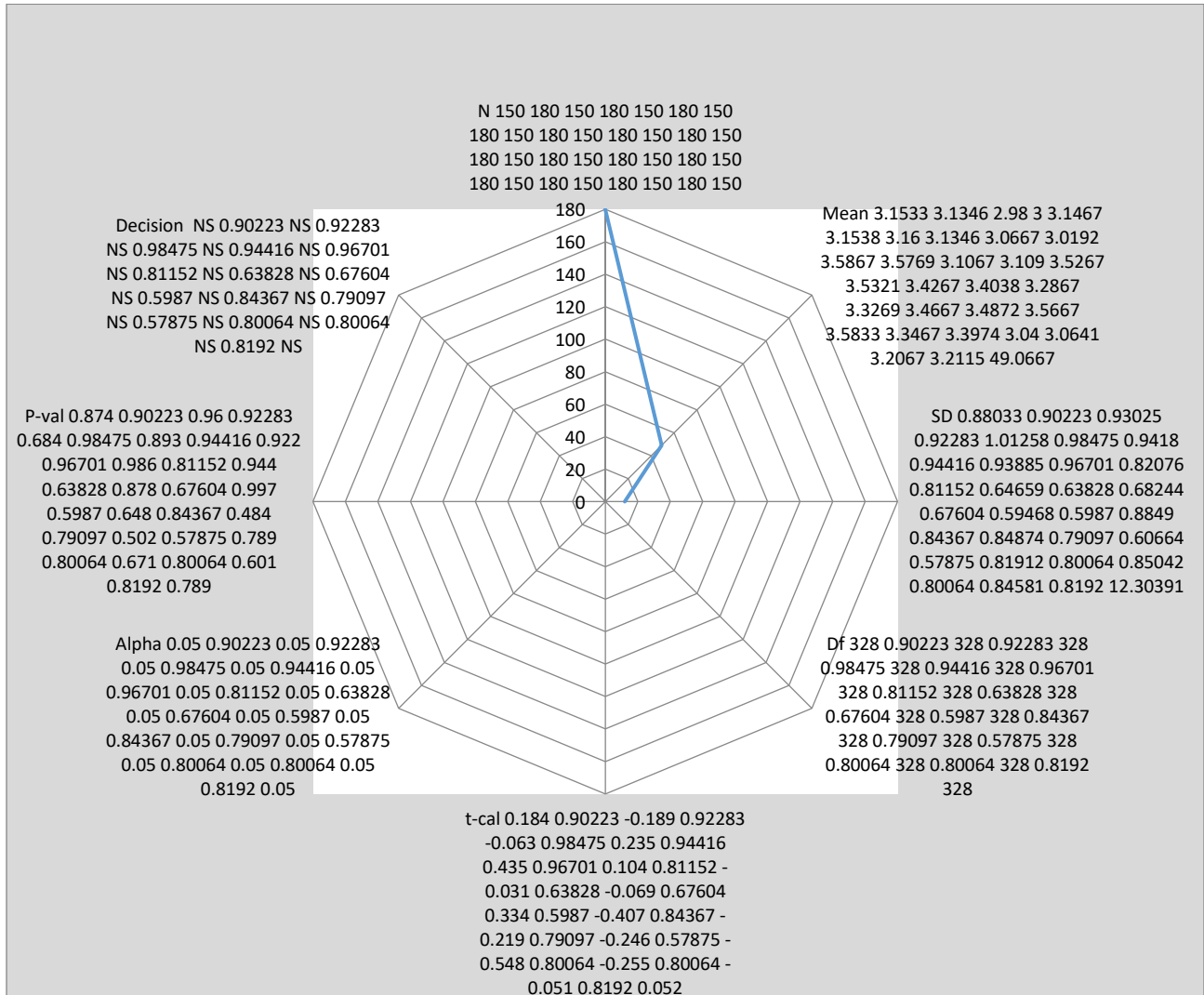


Fig. 11: Radar graphs showing the respondents decision

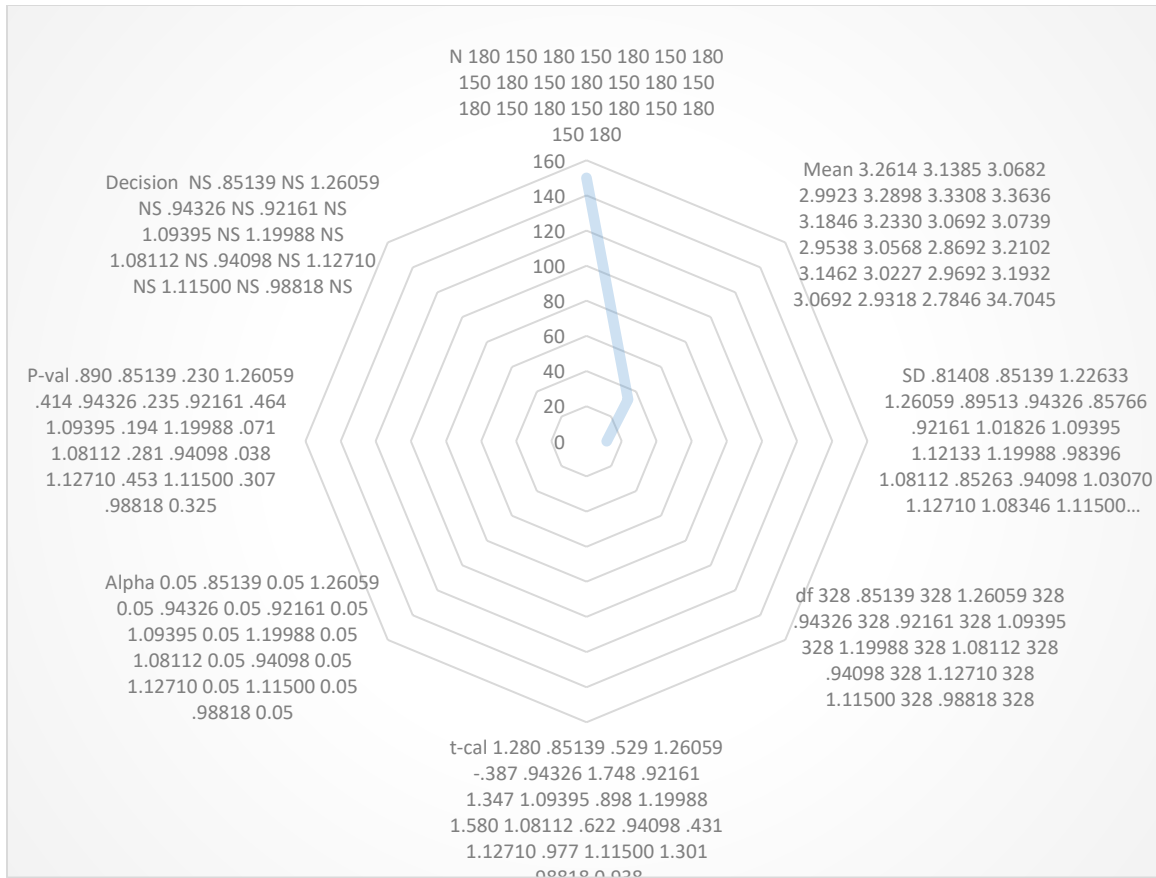
### Hypothesis three

There is no significant effect on IGR and the sustainability of university education in the South East Region based on Institutional type.

**Table 6: Independent t-test on the mean rating of responses from Federal and State Universities on the effect IGR and University Sustainability**

Items	Institutions	N	Mean	SD	df	t-cal	Alpha	P-val	Decision
31	Federal University	180	3.2614	.81408	328	1.280	0.05	.890	NS
	State University	150	3.1385	.85139					
32	Federal University	180	3.0682	1.22633	328	.529	0.05	.230	NS
	State University	150	2.9923	1.26059					
33	Federal University	180	3.2898	.89513	328	-.387	0.05	.414	NS
	State University	150	3.3308	.94326					
34	Federal University	180	3.3636	.85766	328	1.748	0.05	.235	NS
	State University	150	3.1846	.92161					
35	Federal University	180	3.2330	1.01826	328	1.347	0.05	.464	NS
	State University	150	3.0692	1.09395					
36	Federal University	180	3.0739	1.12133	328	.898	0.05	.194	NS
	State University	150	2.9538	1.19988					
37	Federal University	180	3.0568	.98396	328	1.580	0.05	.071	NS
	State University	150	2.8692	1.08112					
38	Federal University	180	3.2102	.85263	328	.622	0.05	.281	NS
	State University	150	3.1462	.94098					
39	Federal University	180	3.0227	1.03070	328	.431	0.05	.038	NS
	State University	150	2.9692	1.12710					
40	Federal University	180	3.1932	1.08346	328	.977	0.05	.453	NS
	State University	150	3.0692	1.11500					
41	Federal University	180	2.9318	.97154	328	1.301	0.05	.307	NS
	State University	150	2.7846	.98818					
	<b>Federal University</b>	<b>180</b>	<b>34.7045</b>	<b>10.8551</b>	<b>328</b>	<b>0.938</b>	<b>0.05</b>	<b>0.325</b>	<b>NS</b>
	<b>State University</b>	<b>150</b>	<b>33.5077</b>	<b>11.5231</b>					

The results of the t-test analyses provided in Table 6 reveal that There is no significant effect on IGR and sustainability of university education in the South East Region based on Institutional type. This is because the p-value of 0.325 in Table 6 is greater than 0.05. Because all of the p-values are larger than.05, the null hypothesis that there is no significant effect on IGR and sustainability of university education in the South East Region based on Institutional type is maintained. Figure 12 shows the same results on a radar graph.



**Figure 12:** Radar graph showing the respondents' decision

**Discussion of the findings**

In line with the data in Table 1, all the items 1 to 15 have a mean rating ranging from 2.76 to 3.36, respectively. This indicated that the respondents are of the opinion that the primary sources of internal revenue generation are generated in the south-East Geopolitical Zone of Nigeria for the sustainability of university education. More so, the grand mean of 3.15 is above the cut-off point of 2.50. As a result, primary sources of internal revenue generation (IRG) are critical for the sustainability of university education in Nigeria. The standard deviation varied from 0.67 to 1.24, showing the respondents' opinions on items 1 to 15 were consistent. The results indicate that the primary sources of internal revenue generation (IRG) are income from hotel business, income from campus business registration, income from the university agriculture farm, income from student semester registration, Income from university staff schools, Income from school fee charges, income from the university bookshop, Income from university CES programs, income from research and consultant services, Income from manufacturing and processing services, income from gifts and donations, income from the university clinic, income from the university microfinance bank, and Income from student hostel accommodation are sources of funds generated in various universities for the sustainability of university education in Nigeria. This could be due to the fact that state universities are not only depending on federal and state government funds for their survival but equally on internal revenue generation (IRG) for their sustainability. This study's findings are consistent with those of Ofoegbu and Alonge (2016), who discovered a substantial association between internal revenue generation and the sustainability of university education in southern Nigeria. In agreement with Afutu (2015), whose study discovered that the university's sources of internal revenue generation funds are potentially resilient through an unaltered increase in enrollment and the industrialization of operations within departments such as the publishing and printing subsection and the apparel assistance field, Similarly, the findings support Adesoji

and Chike's (2013) finding that there is a beneficial association between domestically produced revenue and infrastructure development for educational sustainability.

According to Aja-Okorie (2017), internal revenue production measures such as effective usage of electronic payment of school charges will assist and enhance the university's internal revenue generation and the sustainability of the Nigerian educational system. The result is equally in consonance with Wordu (2018), whose findings revealed that all key sources of internal revenue creation are required by federal and state universities, and there is no doubt that the university education revenue-generating project is viable for educational sustainability. According to the findings of the hypotheses investigated, there is no significant difference in the mean rating of federal and state universities on internal income production and the sustainability of university education in Nigeria's South-East Geopolitical Zone. This could be because both federal and state universities require internal revenue generation (IRG) for sustainability, particularly at a time when the federal government cannot fund Nigeria's university educational system and universities should be working toward self-sufficiency.

The findings of the study in Table 2 show that the mean rating for items 16 to 30 ranges from 2.99 to 3.57. This demonstrated that respondents agree that the universities in the South-East Geopolitical Zone utilize internal revenue generation (IRG) for the sustainability of university education in Nigeria. Furthermore, the grand mean of 3.27 is greater than the criterion means of 2.50. As a result, the utilization of internal revenue generation has a significant impact on the sustainability and long-term viability of university education in Nigeria. The standard deviation ranged from .59 to .89, indicating that the respondents' views on items 16 through 30 were consistent. This is to say that the university's management utilizes funds generated from internal revenue generation to pay staff salaries, research and development, staff welfare packages, student welfare, capital project development, staff development program, furnishing of staff offices, maintenance of school facilities, maintenance of school equipment, payment of school electricity bills, staff periodic gifts and bonuses, postage and telephone, provision of free Wi-Fi, social responsibility, and security issues. This finding is based on Line Akinsolu's (2012) finding that internal income-generating utilization has a favorable impact on internal efficiency and the lifelong value of university education. This emphasized the significance of resources in the production and functioning of the education system. It also agrees with Omodere, Ekwe, and Ihendinihu (2018), who discovered that internal revenue generation has a solid and substantial beneficial effect on sustainability, with a significance level of 0.000 0.05 showing that internal revenue generation has an important and beneficial effect on the advancement and sustainability of Nigeria's educational system.

The reasoning beneath this discovery might lead one to believe that the administration's share of institutionally generated revenue stems from intangible resources derived from business opportunities, studies, consulting amenities, tool fabrication, and other sources of revenue generated within the institution that assist the university in accomplishing an actual or discernible evolution in the quality of teaching, learning facilities, and the built environment. The hypothesis tested shows that there is no significant difference in the mean rating of Federal and State universities on the utilization of internal revenue generation and the sustainability of university education in Nigeria. This might be because both federal and state universities require internal revenue generation and utilization for the efficient operation of their day-to-day operations and their long-term sustainability.

### **Conclusion**

Internal income creation is critical to the success and efficient operation of university education; it bridges the funding gap and assures university education's long-term viability in Nigeria. It is critical for the institution to increase internal income creation through commercialization operations while also developing novel advertising techniques to encourage the public to invest in its commercial and other revenue-generating activities. The studies indicated that the key sources of internal income creation for the sustainability of university education are generated in Nigeria's southeast geopolitical zone. The fact that institutions in the South-East Geopolitical Zone are adopting internal revenue generation (IRG) for the long-term viability of university education is also encouraging.



## Recommendations

The following recommendations were made:

1. The university management should ensure that a central account is maintained to avoid IRG deposits in the wrong account.
2. The university's internal auditors should carry out audit quality assurance quarterly and annually to ensure control over fraud.
3. The university management should ensure that approval is always given before any expenditure of IRG is made.
4. University officials in Nigeria should guarantee that a bigger proportion of their internal revenue is spent on conducting regular staff training sessions and conferences that will improve employee productivity and the general growth of the country's institutions.
5. There should be a comprehensive reorientation and awareness of the university management's IRG and its usage for sustainable education in Nigeria.

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## Leveraging Science, Technology and Innovation for Africa's Development: The Role of Africans in Diaspora

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### Abstract

Today as never before, humanity is faced with the challenge of contending with the ravages of endemic threats to man's life such as terrorism, climate change, and overpopulation, etc. Africa in addition, is specifically encumbered by a multitude of development challenges ranging from lack of capital and technical know-how to deficits in political leadership. This paper interrogates the utility of science, technology and innovation as means through which Africa can achieve sustainable development. Using survey research design, the paper employs qualitative method of data collection and analysis. The paper notes that African leaders are aware of the continent's development deficits and are out to do the needful in order for Africa to develop. It is the discovery of the study that science, technology and innovation are veritable tools with which the development of Africa can be engendered and that Africans in the Diaspora are catalysts to the promotion of science, technology and innovation in Africa. The study recommends that leaders of Africa should mobilize the Diaspora to assist the homeland in the promotion and deployment of science, technology and innovation for Africa's development.

**Keywords:** Africa, Diaspora, development, science, technology, innovation.

### Introduction

Africa is encumbered by enormous development challenges and there is a celebrated case of poverty in the continent to the extent that half of its population lives on less than US \$1 per day. The rate at which children less than 5 years of age die (UNICEF, 2019) is lamentable and life expectancy at birth is only 54 years, an indication that Africa does not have any reliable healthcare system, (Oleribe, 2019). People die daily in their numbers of avoidable diseases. Most of the population has no access to safe water. The rate of illiteracy and conservatism for a greater percentage of the people over 15 years is high. There is acute shortage of food and the people are really suffering. The worse is that political leaders in Africa are wicked and myopic. They embezzle money meant for the welfare of the people (Transparency International, 2019) and yet the people defend them and clap for them.

Upon this dismal reality of the standard of living of people of African descent, the economic growth in Sub-Saharan Africa dropped from 4.1 percent in 2021 to 3.6 percent in 2022 and is expected to further drop by 3.1 percent by the close of 2023 (Beegle, 2016). By the end of the 21<sup>st</sup> century, Africa will host 40 percent of the global population, a remarkable rise from 9 percent in the 1950s, (UN, 2015) and the population of Africa is estimated to reach an outrageous level by 2050. This situation portends more poverty and suffering for the people.

The picture painted above speaks volumes of the development crises rocking Africa. African development deficit is not without a root cause. Africans were disorganized by slavery and colonialism, (Amin 1972; Rodney 1972; Daron Acemoglu, Simon Johnson and James A. Robinson, 2001; 2002). By the trappings of slavery and colonialism, Africans were deprived the privilege of being masters of their own destiny. All

their actions were dictated to them and they were made to abandon their original ways of life, both politically, socially, economically, religiously and otherwise. The implication was that they were no longer themselves having been forced to abandon whatever they were known for. They then started learning everything about development anew. They were forced to discard their economic systems and to become part of the international economic system which was a capitalist system. They were neither prepared for this nor did they have the means to compete favorably with other nations in the world capitalist economy. Other nations of the world had the ability to produce refined goods and services which they marketed in the world market while Africa had only raw materials and labour which the western nations bought cheaply; refined and brought back to sell to Africans at exorbitant prices. This was tantamount to the draining of Africa's resources rather than their use for the continent's development. Today, Africa the most richly endowed region of the world remains the poorest continent.

Unfortunately, when Africans incidentally got their independence, colonialism was resurrected in the form of neocolonialism to continue the subjugation of the people and their way of life. The consequences of slavery, colonialism and neocolonialism as well as Africa's joining the world economic system at a time they were not prepared and at a value they were disadvantaged among other things include, the wanton disorganization and disarticulation of Africa with the ripple effect of abandoning their traditional modes of production to sheepishly following, copying and imitating the developed world. It was a costly mistake of their life that will hunt their generations yet unborn. Western scholars and practitioners capitalized on these lapses to dictate and prescribe development strategies for Africa; most of which were favourable to the Western world but had been the Achilles heel of Africa's development.

However, Africans seeing the deepening of their poverty even after implementation of several development strategies recommended for them by Western scholars and policy makers, most especially the Structural Adjustment Program (SAP) have no option than to look for home grown strategies of development. They felt they needed to work together as a people and with other peoples of the world in order to move Africa forward. They adopted the New Partnership for Africa's Development, NEPAD as a development strategy. This partnership is there but Africa is yet to achieve sustainable development.

Be that as it may, in recent years, African leaders have come to grips with the reality of their existence and appear committed to a new African continent anchored on robust governance, inclusivity, accountability and transparency in governance and the need to maintain peace and security on the continent. This paradigm shift in development thinking has been the basis for the change in the nomenclature of the defunct Organization of African Unity (OAU) to the African Union; it has also been the basis for the formation of New Partnership for Africa's Development (NEPAD), creation of Peer Review Mechanisms as well as other initiatives. In 2015, the AU adopted the UN Global Agenda 2030 and 2063 as strategic frameworks for the transformation of the African continent. Agenda 2030 covers about 17 sustainable development goals and emphasizes such indicators as inclusive socio-economic development, accountable institutions, peaceful and secured societies, environmental sustainability, respect for human rights and rule of law, and continental integration amongst other indicators (AUC, 2015). Agenda 2063 hosts 7 aspirations covering inclusive growth and sustainable development, continental integration and Africa becoming an influential partner and global player (AUC, 2015).

Above all, Africans have discovered a missing link in all the strategies for development which they have been propounding and implementing. They discovered that without science, technology and innovation, all their efforts will come to naught; hence, all development efforts are now geared towards the African scientific revolution. Today the African Union places science, technology and innovation at the epicentre of Africa's socio-economic development and growth, (AUC, 2014).

But how can Africa leverage science, technology and innovation for her development? This paper explores the roles which Africans in the Diaspora can play towards the success of this important agenda.

## **The Utility of Science, Technology and Innovation in Development**

The importance of science, technology and innovation in the development of any nation cannot be overemphasized. No wonder, today as ever, every discourse on development centres on science and technology and more recently; innovation; which has been added to the duo. It is often difficult to separate science from technology, hence, whenever the word, science is used, technology invariably comes in; it is always science and technology. Science and technology are therefore, words used interchangeably.

The impact of science cannot be felt without the corresponding role of technology. They complement each other. However, while science aims at the pursuit of knowledge for knowledge sake, technology aims to create products that solve man's problems and improve human life. Technology as a matter of fact is the practical application of scientific knowledge to the solution of societal problems. It is from technology that man invents and produces all the good things that have made the life of man on earth easy, better and comfortable but it is also from technology that man invents and produces all the things that have been deployed to destroy man's life sometimes.

Innovation on the other hand means to bring out a new idea. It means to improve upon or replace something already in existence. It means applying one's knowledge in doing anything differently from the ways it was done before. Just as science and technology are related and complement each other, innovation is the deployment of science and technology in the invention and production of goods and services for the good of humanity.

No nation can move forward in today's world without the utilization of science, technology and innovation as they hold the key to the present and future development of the world. Technology plays a fundamental role in wealth creation and in the improvement of the quality of life and real economic growth and transformation in any society, (Anaeto, et. al., 2016). For nations in Africa to escape from poverty and underdevelopment, they must invest in science and technology, Egbogah (2012). Essentially, technology unlocks the keys to the wonders of nature. It is only through technology that man can overcome nature. It is through technology that man can mow down mountains to harvest goodies down the soil, It is through technology that man can dive deeper into the ocean to harvest the gifts that nature bequeath to humanity. Most breakthroughs in the world are products of science, technology and innovation,

In science, technology and innovation lies the engine of economic growth, poverty reduction and human development (Anaeto, et.al, 2016). This is because science and technology convert raw materials to finished products which invariably improve the economy. In technology lies the key to the production of goods and services for the good of mankind. Production means converting raw materials to finished products. When they are produced, they are sold and money comes into the coffers of a nation and the economy improves. Science and technology are the essential ingredients needed for the development, advancement or growth of any society because it is through their deployment that the problems of the society are solved. Lack of knowledge of science and technology is tantamount to poverty. The difference between the levels of development of nations in the world is occasioned by their levels of acquisition of scientific and technological knowledge. It is because of lack of adequate knowledge of science and technology that almost all nations in the African continent are classified as underdeveloped.

The major problem of Africa is that Africans are mainly consumers and not producers; they have not been producing much goods and services and this is because they lack the requisite knowledge that is acquired through science and because they lack this knowledge, they cannot make use of technology because technological knowledge comes from scientific knowledge and because they lack the knowledge occasioned by science and technology, they cannot innovate. When there is no technological knowledge, there is no production of goods and services which comes from the conversion of natural resources to material resources needed and used by man.

Deployment of science and technology brings about great transformation in the economic performance and social well-being of any nation. Also, the ability to create, distribute and exploit knowledge which is the after effect of science and technology is a major source of competitive advantage, wealth creation and improvements in the quality of life of citizens of a nation (OECD, 2000). Today, there is a growing impact of information and communications technologies (ICT) on the economies and lives of people in the society; there is rapid application of recent scientific advances in new products and processes; there is a high rate of innovation across countries of the world and there is a shift to more knowledge-intensive industries and services; and rising skill requirements for overcoming nature (OECD, 2000). All these are transformations engendered by the impact of science, technology and innovation.

However, much as science, technology and innovation are keys to the improvement of economic performance and social well-being of a people, government has to create the enabling environment for fostering scientific and technological progress through the formulation of relevant policies and implementation strategies (OECD, 2000). Therefore, a major means of transforming Africa for the future is the deployment of scientific and technological knowledge to the management of natural resources like forests, rivers, and lakes; climate change threats; and health quandaries (Agoro, 2018).

Nonetheless, Africans have always known their development problems and have always planned for their solution but the problem has been the adoption of adequate development strategies. Currently, the African Union (AU) has a fifty-year plan which aims at transformation of Africa from dependence on natural resources to durable economies driven by manufacturing, effective participation in the global value chain, and science and technology leadership. In particular, the agenda calls for expertise in areas such as biotechnology, genetic engineering, space exploration, and deep-sea mining (Agoro, 2018). These are areas meant for the conquering of nature for the positive transformation of society and these are knowledge based areas that require the deployment of science, technology and innovation.

### **Africa's Response to Science, Technology and Innovation**

A combination of science, Technology and Innovation (STI) has proven to be the cornerstone of developed economies in the world and this explains why the UN Agenda 2030 and 2063 focused extensively on maximizing STI for bridging the gap between the developed economies and under-developed economies of the world. Throughout history, STI have been the major drivers of development and economic growth and industrialization. Africa is composed of fragile states on account of conflicts, wars and governance deficits but she is now awake from her existential slumber and has been able to establish a response framework to address the issue of STI. In 2013, the African leaders came together to create the AU Agenda 2063 as a response to establishing long term goals for stimulating STI on the continent (AU, 2014).

This is contained in the AU Document on STI Strategy for Africa (2024), which places STI at the center of the continent's socio-economic development and progress. The STISA-2024 is the first of ten-year incremental phasing strategies designed to meet the demand for science, technology, and innovation to have an impact on vital industries such as water, mining, agriculture, energy, the environment, and other key sectors. The approach also outlines four inter-connected pillars that should exist in order for the agenda to succeed. The expansion of research infrastructures, the improvement of professional and technical skills, the encouragement of entrepreneurship and innovation, and the creation of favorable conditions for STI growth on the African continent comprise these pillars.

Research and Development (R&D) are the means through which science and technology manifest in any society but unfortunately, in spite of Africa's laudable dreams, continental and country-level investments in STI have been very low, accounting for only 2 percent of global scientific innovations (UNESCO, 2015). This lack of STI infrastructure and investment has driven away African science students and even skilled STI professionals to other developed economies creating the brain-drain syndrome (Agoro, 2018). Africa cannot make the desired leap forward if the requisite STI infrastructures and incentives are not provided for our scientists and intending ones by investing heavily in the areas of research and development (R&D). Again, Africa is reputed to be home to about 15.4 percent of the world population (PRB, 2013); yet despite

this huge population the continent accounts for less than 2 percent of global expenditure on R&D in contrast to other regions of the world. Most countries in Africa spend less than one percent of their GDP on R&D and there is no way this can drive STI and economic growth on the continent. The AU Agenda 2063 envisages that Africa must transition away from reliance on natural resources to resilient economies that are supported by manufacturing, effective involvement in the global value chain, and S&T leadership (Agoro, 2018)..

Moving Africa forward to her desired destination - a break with poverty and underdevelopment, requires that Africa must have a good number of scientists trained specifically in areas of biotechnology, genetic engineering, space exploration, deep-sea mining and artificial intelligence. These are people who together with professionals from other fields, will transform Africa's relationship with nature, reverse her rising inequality and build resilience against the next crisis of conflict, natural disaster or future pandemic, (Agoro, 2018). They will also drive the continent's general growth and power her overall development. This explains the need for Africa to leverage her Diaspora communities in Europe and North America and indeed, all over the world, to drive science, technology and innovation on the African continent.

### **The African Diaspora**

People in their efforts to better their lots in life migrate to countries other their own; to live, work and earn their living. Some live there temporarily; make their fortunes and go back to countries of their origin while others live in such countries permanently and acquire their citizenships. All those who leave their countries of origin for permanent settlement in other countries are classified as the Diaspora. In the case of Africa, many Africans were forced to migrate; while many migrated on their own accord to Europe, America and indeed, other countries of the world and have settled in these countries permanently. We cannot forget in a hurry the slave trade which led to the outright selling of Africans to merchants from Europe and America as if human beings were products for sale. Those Africans sold under the slavery programme never returned to Africa. They got integrated into those countries and became part and parcel of them. However, even though they got integrated, they still united with those in Africa through blood ties, cultural affinity and shared history and to some extent; a common destiny (Akukwe and Jammeh, 2004) and they continue to remember their roots and try to contribute to the development of Africa in one way or the other.

We also know that as a result of underdevelopment of the African continent, many educated Africans on their own migrated to other continents. Some of them no longer return to Africa while many of them even though are residing permanently in these countries have their souls and minds in Africa. They are ever concerned about the happenings in Africa. They are in constant touch with their relatives back home and they send money to them. The bonding is still there. Such people who are obsessed with the problems of their brothers and sisters back home and who contribute to the development of their communities are described as the African Diaspora.

Apart from those who migrated to Europe and America against their will, those who migrated on their own are no mean persons. They can be described as the elites of the African continent. It takes a fortune to migrate to the Western world from Africa and any person who is able to migrate can be described as a resourceful person. The West does not just accept any person to migrate to their countries; they only accept those who will contribute to their development. They do not accept liabilities; rather, they accept only assets. Through migration, Africa lost as well as gained. Migration studies occasioned the brain drain paradigm (Bhagwati and Hamada, 1974; Miyagiwa, 1991; Haque and Kim, 1995) which has been a subject of discourse in development literature before the brain gain era. Some of these people who on their own migrated to these western countries were Africa's very best minds in terms of education and technical knowledge. They migrated in search of greener pastures. If this is the case as it is, then it is obvious that most of them are the scientists and technologists making waves in Europe and America by their contributions to Western development. By virtue of African bonding, it is obvious that if they are well mobilized, they will be handy to contribute to the advancement of science and technology in Africa.



At any rate, even though the meaning and implication of the concept of the African Diaspora is complex, contested and evolving (Kamel 2011; Rahier et al 2010; Zeleza 2010; Okpewho and Nzegwu 2009), the diversity and extent of African Diaspora around the world are enormous and recognized by scholars (Pitts 2019; Alves 2018; Winders 2007; Gilroy 1993). The African Union defines the African Diaspora as "Consisting of people of African origin living outside the continent irrespective of their citizenship and nationality and who are willing to contribute to the development of the continent and the building of the African Union," (ICD, 2020). The UK House of Commons (2006) defines the Diaspora as international migrants who, although dispersed from their homelands, remain in some way part of their community of origin. Dina Ionescu (2006) says this definition captures the following important points: individuals are dispersed, possibly across several countries, but they maintain an interest and an affiliation to their home country, either "real" or "imagined".

A profile of Africans in the Diaspora especially in the United States of America shows the amazing stock of quality human beings Africa has in other countries of the world. There are 34,658,190 African-Americans in the United States and of the 35 million people that claimed Hispanic heritage in the 2000 US census, (Schmidley, 2001) at least one third are likely to have African ancestry and about 0.6% of all people living in United States (1,781,877) identified themselves as Sub-Saharan Africans, (Akukwe and Jammeh, 2004). Among immigrants living in the United States, at least 50 million individuals have African ancestry and most people in the Caribbean and significant proportions of individuals in Latin America have African ancestry, (Akukwe and Jammeh, 2004). The International Office of Migration (IOM), a United Nations agency, estimates that the African Diaspora population in France is 1,633,142 and another 1.5 million African Diasporas live in other European countries.

According to (Akukwe and Jammeh, 2004), the IOM also provides a picture of an affluent African Diaspora indicating that about 22% of African Diasporas are in the teaching, education and research professions; 20% in finance, investments and economics; 20% in public health; 15% in engineering; 9% in agriculture; 5% in information technology; 5% in legal sciences; 3% in administration, and; 1% in natural sciences. The 2000 US census indicates that foreign-born Sub-Saharan Africans (recent immigrants) have the highest proportion of foreign-born individuals 25 years and over who have bachelor's degrees (49.3%) compared to Europe (32.9%) and Asia (44.9%) and at least 38.2% of Sub-Saharan householders in the US own their own homes, (Schmidley, 2001). The average median household income of foreign-born households headed by Sub-Saharan Africans was \$36,371, according to the 2000 US census. For the period 2000 through 2002, the median household income for African Americans was \$29,483 according to the US Census. Home-ownership for African Americans was 48% in 2003. Black-owned business in 1997, the latest period for which data is available, employed 718,300 persons and generated US\$71 billion in revenues, according to the US Census, (Akukwe and Jammeh, 2004).

Remittances by Africans in the Diaspora to their countries of origin are substantial. According to the IOM, Nigerians in the Diaspora remitted US\$1.3 billion in 1999, equivalent to 3.71% of the country's GDP and 55% of overseas development assistance. This increased by 5.2 percent in 2022 with Nigeria alone received the highest portion, \$168.33 billion between 2015 and 2022, (World Bank, 2022).

The profile of the African Diaspora above shows that Africa has a good stock of its people of various professions in the Diaspora. Many of these people have undergone a lot of studies and trainings in advanced countries of the world; many are scientists and technologists of first class order. Many of them are working in important offices in the world that have the capacity to change Africa for good and they can leverage their knowledge and connections to change the fortunes of Africa with regard to science, technology and innovation, if well harnessed.

### **How Can Africa Leverage Her Diasporas' Assistance to Drive Science, Technology and Innovation for Africa's Development?**

There is an urgent need to establish African Diaspora Scientists' Federation as suggested by Agoro (Agoro, 2018) in order to mobilize African scientists in the Diaspora to help Africa leverage science, technology



and innovation in her development efforts. Africans in the Diaspora are in very good positions to assist the boosting of science, technology and innovation in Africa. Many of them are scientists and they acquired scientific and technological knowledge in advanced countries of Europe and America where they also work and contribute to their host countries' development. They belong to, and also participate in scientific, technological and innovation networks in the developed countries where they live. The essence of belonging to a network is to avail one of information about happenings in the group's area of competence. Having the African blood, they are always disposed to help Africa; but they must be mobilized by the home governments. They have the opportunity of helping their homelands advance their science, technology and innovation projects; they could look out for opportunities offered by such networks to advance the cause of science, technology and innovation in Africa by disseminating such information. They could specifically be looking out for technology transfer programmes among other things and they would actually be involved in technology transfers in respect of innovations conducive to African development. They must be organized and mobilized in order to play this role.

One major problem of Africa's development is the dearth of research infrastructure, (Fayomi *et al* ,2018) just as increasing research capacity, knowledge production and preparing future generations of scientists are also parts of the problem. Other challenges include limited research and technology infrastructure, shortage of well-trained faculty, inadequate facilities and equipment, as well as lack of financial capital to support and sustain research. Resource constraint is the obvious reason for these challenges. However, one of the best known contributions of the Diasporas to homeland development is remittances as discussed on the section on the African Diaspora above. Even though these remittance payments are usually sent home for necessities like food, healthcare, and educational costs, Africans in the Diaspora can deliberately channel their remittances towards the promotion of science, technology and innovation by providing research infrastructure and sponsoring research, knowledge production and training of future generation of African scientists. The Diasporas could be mobilized to individually use their remittances to sponsor at least one African in any area of science and technology. They could be mobilized to use part of their remittances to fund research or provide equipments for research, etc. By so doing, they will be preparing Africans for the scientific and technological revolution needed for Africa's development.

Again, these remittances can also be deliberately channeled towards human capital development and this can begin with knowledge transfer from the Diasporas back to the home country through collaboration, mentoring and trainings. Africans in the Diaspora can determine what funds they send home in form of remittances should be used for. If they are very well mobilized towards science, technology and innovation promotion, they individually and collectively will give instruction that their remittances should be channeled towards human capital development. When this is done individually, the collective impact on the boosting of science, technology and innovation in Africa will be enormous.

Brain drain, which means the loss of human capital, is a significant issue for African countries; and over the past five years, 450,000 tertiary-educated Africans migrated to OECD countries (UN-DESA & OECD, 2013). This loss has impacted negatively on many areas of Africa's economy and overall development but particularly in areas of health-care, science and technology. Through the phenomenon of brain drain, Africa lost much and is still losing much in funds they invested in the education of the lost diasporas, revenue that would have accrued to her coffers from the lost people and in a skilled labour-force that would have advanced Africa's development through innovations, investments, governance, management of agencies and institutions, and participation in a globalized knowledge-based economy. However, brain drain has today become brain gain since those who were lost to other countries can come home more equipped to contribute from what they have learnt and acquired from their host countries. Therefore, Africans in the Diaspora are called upon to come home in spite of the inconveniences, to help boost and propagate the wonderful import of science, technology and innovation in Africa by taking faculty positions in African universities and other higher institutions of learning, or by working in African science and technology related agencies or by establishing science and technology related enterprises where the youth can be gainfully employed back home in Africa. This is one practical way through which the Diaspora Africans

can help Africa leverage science, technology and innovation in her development efforts. This initiative is a practical demonstration of patriotism by any African Diaspora who decides to do that; and they are called upon to consider this option for the good of the homeland. They would come home to make a difference; they would come home to work where their impacts will be felt more. It may not be easy for any of them but it is an adventure worth taking for the good of the fatherland.

The Diaspora can indeed help Africa leverage science, technology and innovation through strengthening public institutions in Africa. Development experts working in, and with Africa over the past three decades have discovered a lacuna in African development efforts, namely, lack of solid public institutions. It is a truism that poor government and declining institutional capacity are at the core of the African predicament, notes (Richard Joseph, 2004). The problem with Africa is that instead of having strong institutions that are meant to make things happen in Africa, they have strong individuals who work for themselves. Instead of investing in the education and training of the youth in science and technology related programmes, the leadership embezzles funds meant for the advancement of education. Therefore, in order to boost science, technology and innovation in Africa, the African Diaspora can help to strengthen public institutions in Africa by deliberately looking into what is happening with governments in Africa and through science and technology advocacy with African leaders and development partners.

Another way through which the Diaspora can help Africa leverage STI for Africa's development is by building synergies between their home and host countries. There have been regional efforts at diplomatic integration, but it is germane for African countries to become more involved in trans-national, trans-regional, and continental integration, which will ensure free movement of goods and people across borders. This free movement of goods and people will boost STI activities, (Hartzenberg, 2011). No doubt, genuine and thorough-going African integration could have several impacts on STI in Africa by enabling greater mobility of scientists, innovators, technicians and entrepreneurs; promoting collaboration between research institutions, experience-sharing and encouraging a shared trans-national R&D infrastructure. Such integration efforts can also improve public-private partnerships across national boundaries and create financial instruments for innovation and also help in the harmonization of technical standards and research regulations.

Establishing schools and agencies to advance the cause of science and technology for Africans by the Diaspora is also a potent way of helping the continent leverage science, technology and innovation in her development efforts. The annual African Diaspora Summer School (ADSS) established by the African Development Bank in partnership with other relevant international and regional stakeholders as a channel for the transfer of knowledge, technology and experience have been and would further strengthen the role of the Diaspora in Africa's economic development. Establishing other schools and agencies that promote science, technology and innovation in Africa by the Diaspora will help Africa in her quest for science revolution in the continent.

Again, Africans in the Diaspora can also help in fostering science, technology and innovation by establishing Non Governmental Organizations (NGOs) whose work will be aimed at advancing STI in various ways in their bid to promote science, technology and innovation in Africa. Such ways include mobilizing school children in Africa for science, technology and innovation by awarding scholarships to those who excel in science subjects; by providing scientific and technological equipments to schools and by organizing quiz and debates for school children thereby infusing in them scientific literacy and critical thinking. They can also sponsor workshops and conferences on science and technology related issues.

In order to help Africa leverage science, technology and innovation in her development efforts, the Africa Union and national governments should explore the possibility of Diaspora Science Diplomacy framework through which African scientists in the Diaspora can become advocates for science, technology and innovation in Africa and outside Africa as a means of driving development on the continent. To further make this initiative possible, the AU could create a functional platform for her Diaspora scientists, technologists and innovators which will facilitate or enhance professional networking. An entity that might

emerge from this kind of framework is the African Diaspora Scientist Federation (ADSF) as suggested by Agoro (2018) and which according to him, could include the following elements:

1. An African Diaspora Scientist Rolodex based on a strong professional network, along with a meeting and conference infrastructure and an active promotional wing
2. Clear classification for Diaspora scientists by fields
3. A series of projects rooted in intra- and interdisciplinary collaborations, (Agoro, 2018).

To achieve the objective of fast tracking African development through science, technology and innovation, the ADSF should explore the deployment of diplomacy tools such as collaboration and partnership. The essence of this initiative is to achieve scientific cooperation by African Diaspora scientists and African governments and this might improve intra-African relations and integration toward ensuring safety and security, thereby achieving the needed cooperation and the synergy necessary for African development. As experts in their different science and technology fields, the Diaspora scientists through the ADSF could offer professional counsel at various governmental and societal levels in the context of a globalized world, (Agoro,2018).

Lastly, the African Diaspora scientists could also foster partnerships between African countries and multinational corporations in respect of science, technology and innovation. The African Diaspora scientists, being members of the international science community could serve intermediary roles in creating public-private partnerships to accelerate technology-transfers which is the needed tonic for the African science and technology revolution urgently needed for Africa's development.

### **Conclusion**

This paper contends that for Africa to develop, she must leverage science, technology and innovation as they remain the keys needed to unlock Africa's untapped resources for her development. These are attributes which advanced countries of the world have more than Africa. Africa may have the natural resources in quantum but they lack the technological know-how needed for today's knowledge based economy. An un-cracked palm kernel is as good as nothing until it is cracked; raw material is not very useful until it is converted into finished goods. Africa needs science and technology to convert her raw materials to finished goods which will give her competitive advantage in the global market-place.

In order to acquire the technical know-how needed for success in today's world, Africans in the Diaspora come handy to help Africa in many ways. The greatest asset for which the African Diaspora is known is raking remittances for the African continent; some of these funds must be deliberately channeled towards the promotion of science, technology and innovation based projects.

For Africa to have the needed revolution in science, technology and innovation, it is recommended that African governments must create the enabling environment for that 'untapped pool of oil' - the African Diaspora - (World Bank, 2011) to play their roles in the development of the African continent through promotion of science, technology and innovation in various ways as discussed in this paper.

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## Rabbit Farming: A Means of Mitigating Almajiri System in Northern Nigeria – A Review

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### Abstract

This paper explores the viability of using rabbit farming to address the challenges posed by the *Almajiri* system in northern Nigeria. The *Almajiri* system, characterized by sending underprivileged children to Quranic schools without adequate care or education, has resulted in various pressing societal issues. This study suggested that integrating rabbit farming into *Almajiri* educational curricula will equipped the children with valuable skills and knowledge and effectively bridge the educational gap experienced by *Almajirai* (plural). Additionally, rabbit farming offers a sustainable income source, thus reducing reliance on the *Almajiri* system and empowering marginalized communities economically. Furthermore, rabbit meat's nutritional benefits can contribute to improved nutritional security in affected regions. Besides economic and educational aspects, rabbit farming fosters social integration, cooperation, and empowerment among community members. To fully harness the potential of rabbit farming, collaborative efforts from government agencies, non-profit organizations, and local communities are essential. By investing in rabbit farming as an alternative livelihoods, Nigeria can create a more inclusive and prosperous society while mitigating the challenges posed by the *Almajiri* system.

**Key words:** Challenges; Almajiri; mitigation; Education; Rabbit farming

### Introduction

Northern Nigeria comprises three geo-political zones: the Northeast, North-Central, and Northwest, encompassing 19 states known for their underdevelopment (Morgan, 2008). The region's backwardness is closely associated with persistent poverty, with the North-East suffering the most (National Bureau of Statistics, 2019; Presidential Initiative on North-East, 2019). Agriculture forms the backbone of Northern Nigeria's economy; however, its reliance on traditional methods and manual labor hinders its potential to uplift the region's socioeconomic status (Salihi, 2012).

The predominant ethnic group in Northern Nigeria is the Hausa-Fulani, the majority of whom Muslims, thus making Islam the dominant religion alongside Christianity and traditional beliefs. While there are various minor ethnic groups present, the cultural and linguistic influence of the Hausa-Fulani remains prominent (Muzan, 2014; Peter and Ian, 1984). The *Almajiri* system, deeply entrenched in Northern Nigeria, reflects the complex interplay between religion and poverty (Sani, 2011). Originally intended to groom future Islamic teachers (Powell and Abraham, 2019), the *Almajiri* system has evolved due to the



arrival of Western education and the changing socio-political landscape, leading to its exploitation by elites and fundamentalists (Roger, 2018). This exploitation has given rise to societal malaises, leaving the children of the poor and ill-informed parents vulnerable to various challenges, including involvement in criminal activities and substance abuse (Sidi, 2015; Umaru, 2015).

To address the pressing issue of the *Almajiri* system and its consequences, exploring alternative livelihood opportunities becomes imperative. Among these, rabbit farming, a sustainable and profitable aspect of agriculture, holds significant potential (Lukefahr *et al.*, 2022; Bello *et al.*, 2020). Rabbits are resilient animals with short gestation periods, capable of thriving in diverse environments, and offer opportunities for employment, income generation, and enhanced food security (Mpundu and Bopape, 2022).

By focusing on rabbit farming, this paper aims to review the current *Almajiri* system in Northern Nigeria and propose it as a means of mitigating the problems arising from abuse and neglect faced by *Almajiri* children. Through this review, the paper intends to shed light on the practicality of adopting rabbit farming as a strategy to empower *Almajirai* children, providing them with sustainable livelihoods, educational prospects, and a path away from social challenges. By understanding the potential benefits of rabbit farming and its impact on the *Almajiri* system, stakeholders can work toward implementing effective and holistic solutions to address the root causes of poverty and deprivation in the region. Additionally, this paper will recognize potential limitations in the proposed approach, ensuring a comprehensive understanding of the challenges and opportunities for mitigating the *Almajiri* system in Northern Nigeria.

### **Concept of *Almajiri* System in Northern Nigeria**

The *Almajiri* system is a prevalent practice in northern Nigeria, which involves sending of young children to Quranic schools for religious education (Lawson, 2021). Over the years, this system has faced criticism due to the lack of adequate care, social integration, and educational opportunities provided to these children (Powell and Abraham, 2019). Consequently, it has been associated with several societal challenges, including poverty, illiteracy, child labor, and an increased risk of radicalization (Umaru, 2015).

To fully understand the *Almajiri* system, it is essential to explore its historical and cultural roots. Historically, the system served as an important means of transmitting Islamic knowledge and values in the region. It represented a strong cultural tradition that promoted religious education, moral upbringing, and community cohesion (Magashi, 2013). However, societal changes, economic challenges, and inadequate governance have contributed to the system's transformation and challenges it faces today (Hansen *et al.*, 2016).

The *Almajiri* system in Northern Nigeria faces multiple challenges, including poverty, lack of access to quality education, child exploitation, health issues, social stigma, and limited future opportunities (Imoudu, 2020). To improve the well-being and future prospects of these children, a comprehensive approach is needed. This includes support from government, NGOs, communities, and religious leaders. Potential interventions through comprehensive education reform, poverty alleviation programs, healthcare initiatives and community sensitization should also be considered. Northern Nigeria can create a more inclusive and supportive environment for *Almajirai*, provide them with better opportunities for a brighter future by addressing the above issues and implementing the identified solutions.

Numerous studies have highlighted the negative socioeconomic impact of the *Almajiri* system (Lawson, 2021; Abdullahi, 2018; Shittu and Olaofe, 2015; Wara, 2015; Aghedo, 2013). The lack of comprehensive education and vocational training often leaves *Almajirai* unprepared to enter the modern workforce, perpetuating the cycle of poverty. Furthermore, this vulnerable group is prone to exploitation and child labor, which is a widespread issue in sub-Saharan Africa (Julie, 2018; Magashi, 2013).

### ***Almajiri* Welfare and Child Abuse:**

One of the major criticisms of the *Almajiri* system is the neglect and abuse experienced by these children. Most of the *Almajirai* are abandoned by their parents and left to fend for themselves on the streets, resorting to begging for survival (Wara, 2015; Magashi, 2015; Aghedo and Eke, 2013). This exposure to street life

puts them at risk of various forms of abuse, including physical, emotional, and sexual exploitation (Abdullahi and Bakabe, 2020; Kawugana and Faruna, 2018). Some scholars have raised concerns about the potential link between the *Almajiri* system and an increased risk of radicalization (Sarkingobir *et al.*, 2019; Hansen *et al.*, 2016). The lack of adequate supervision and guidance, combined with exposure to extremist ideologies, could make certain *Almajirai* susceptible to recruitment by terrorist groups.

While acknowledging the challenges, it is crucial to consider potential pathways to reform the *Almajiri* system. Policymakers and stakeholders need to collaborate to address the systemic issues that perpetuate its shortcomings. Some possible strategies include: comprehensive education, vocational training, family and community support, regulation and oversight.

It is clear from the above discussion that the *Almajiri* system in northern Nigeria presents complex challenges that demand thoughtful analysis and comprehensive solutions. By acknowledging its historical significance while addressing the contemporary issues it faces, there is an opportunity to transform the system into a more inclusive, supportive, and effective form of religious education, better serving the needs and future of the *Almajirai* and the broader Nigerian society.

### **Rabbit Farming for Economic Empowerment**

The rapid population growth, urbanization, and high youth unemployment rates in Nigeria have created significant socio-economic challenges, with over 10 million children out of school, whose majority belong to the *Almajiri* system in the northern region (United Nations Children's Fund (UNICEF), 2021). Rabbit farming as a means of promoting economic empowerment and skill acquisition for the *Almajiri* community, is considered a novel approach to address these challenges.

Rabbit farming presents numerous advantages that positioned it as an excellent source of animal protein. Rabbits exhibit fast growth rates, have a short gestation interval, attain early sexual maturity, and efficiently convert forages and low-quality feed into high-quality meat (Bello *et al.*, 2020). Unlike other conventional meat sources, rabbit meat is rich in high-quality protein, low in calories, cholesterol, and fats. Its high vitamin B content and low sodium levels make it a life-saving protein source for individuals with diabetes, hypertension, and malnourished children (Iheukwumere *et al.*, 2018).

The ever-widening gap between demand and supply of animal protein in Nigeria presents lucrative opportunities in the livestock industry. Rabbit farming, with its minimal space and resource requirements, offers a profitable and economically feasible venture (Padmanabha, 2018). Rabbits can be raised in remote areas, reaching marketable weight (1.5-2.5 kg) in 8-12 weeks, making them a viable option for small-scale farming (Bello *et al.*, 2020).

Introducing rabbit farming as a skill acquisition program could lead to tangible improvements in the *Almajiri* system, and incorporating rabbit farming into the curriculum of *Almajiri* child could develop valuable agricultural and entrepreneurial skills. Moreover, engaging in rabbit farming would provide an alternative livelihood for the *Almajiri*, potentially reducing the risks of neglect and child abuse they often face. However, while promoting rabbit farming, it is crucial to address potential socio-cultural factors that might impact its acceptance within the *Almajiri* community. Sensitivity to cultural beliefs and practices, as well as involving community leaders and stakeholders in the implementation process, will enhance the success and sustainability of this initiative.

Rabbit farming should be integrated into a broader economic empowerment strategy that encompasses diversified income-generating activities and vocational training. This comprehensive approach will ensure a more sustainable and holistic upliftment of the *Almajiri* community and instructors alike. In recognition of potential challenges in implementing rabbit farming as an economic empowerment strategy, further research on market access, technical training, and the development of supportive policies are encouraged. Lessons learned from successful pilot projects could guide the scaling up of this intervention to benefit a larger number of *Almajiri* children and their communities.



Rabbit farming presents a promising opportunity for economic empowerment and skill development within the *Almajiri* community. By leveraging the unique benefits of rabbit farming, this initiative can contribute to mitigating the challenges faced by the *Almajiri* system in Northern Nigeria, providing a pathway towards a more sustainable and inclusive future.

### **Education and Skill Development**

Education and skills development are vital for any society's progress, shaping individuals and nations into knowledgeable and self-reliant entities (Sowjanya and Hans, 2019). The *Almajiri* system in Northern Nigeria has brought attention to the need for comprehensive solutions to empower neglected children and youths. In this paper, we propose the integration of rabbit farming into Quranic school curricula to address the *Almajiri* system's challenges effectively. Education not only fosters national development but also empowers individuals to actively participate in the development process (Sowjanya and Hans, 2015). Skill training plays a crucial role in promoting gender equality, economic prosperity, and social well-being (Sowjanya and Hans, 2019). As a responsible nation, Nigeria should focus on educating its children and youth, ensuring that education becomes an essential right for everyone (Sharma and Mishra, 2019).

Designing a comprehensive *Almajiri* education curriculum involves balancing religious teachings with essential secular education (Idris, 2016). An example curriculum includes Quranic studies, Islamic studies, Arabic language and secular education in math, English, and science, vocational training, cultural studies, physical education, and character development. This curriculum should aim at equipping *Almajirai* with knowledge and skills for personal and socio-economic development. Policymakers and educators can customize and expand this framework to meet local needs, fostering inclusive and holistic education for *Almajirai*.

The *Almajiri* system has faced challenges, including political barriers to previous attempts to establish *Almajiri* schools (Abua, 2021; Taiwo, 2014). To address this issue, harnessing the potential of *Almajirai* in the livestock industry, particularly through rabbit farming will be a good approach. Rabbit farming offers a range of entrepreneurial skills, such as livestock management, production, sales, and repairs, as well as feed processing using locally available materials (Mpundu and Bopape, 2022).

The difficulties faced by *Almajiri* education system in Nigeria due to inadequate infrastructures for teaching and learning process could be attributed to the underprivileged backgrounds of *Almajirai* (Idris, 2016). The absence of proper classrooms, libraries, and learning materials has hindered the students' academic development and access to quality education. However, the efforts government and NGOs through different initiatives such as the Basic Education Service Delivery for All (BESDA), National Board for Arabic and Islamic Studies (NBAIS) and education for all (EFA) and Islamic world Educational Scientific and Cultural Organization (ICESCO, formerly, ISESCO), which aims to enhance access to basic education, including *Almajiri* child, by constructing schools, teacher training, and the provision of learning materials have improved the system (Idris, 2016). Despite all efforts, *Almajiri* child is still left as a street beggar and alleged with the menace of social vices (Edinyang, *et al.*, 2020).

To improve the *Almajiri* education system in Nigeria, it is essential to address poor professionalism within the government and Ministry of Education. The evaluation of teachers should focus on key gaps, including their qualifications and training, commitment to *Almajiri* education, professional conduct and ethics, innovative teaching approaches, assessment and monitoring of student progress, teacher support and professional development, and community engagement. By addressing these areas, the government can promote professionalism among teachers, leading to improved educational outcomes and the overall development of *Almajiri* students.

Integrating rabbit farming into the Quranic school curriculum could provide practical and marketable skills to *Almajirai*. Since rabbits have small space requirement, a cubicle of 100 x 100cm, constructed using locally available materials (waste woods nails and roofing sheets etc.) can accommodate four rabbits (a male and three females) which can thrive well on forage and available kitchen wastes. Complementing this with practical lessons on animal husbandry, entrepreneurship, and agricultural techniques, will enhance

their employability prospects and self-reliance. Moreover, integrating literacy and skill education alongside rabbit farming will bridge the educational gap often experienced by *Almajirai*, adding value to the *Almajiri* system and ensuring food security. To ensure the long-term impact of this approach, it is essential to address the socioeconomic context surrounding the *Almajiri* system. Considering available resources, infrastructure, and cultural aspects will be crucial in designing effective programs. Moreover, the ethical implications of involving children and youths in vocational training must be carefully examined, with measures in place to protect their rights and well-being.

Integrating rabbit farming into Quranic schools offers a promising pathway to empower *Almajirai* in Northern Nigeria. By providing practical skills and knowledge, this approach can create livelihood opportunities and enhance the economic and social well-being of neglected children and youths. To achieve sustainable change, we encourage policymakers, educators, and communities to collaborate in implementing this holistic approach and transform the *Almajiri* system for the betterment of future generations.

### **Rabbit Farming for Food Security:**

The adoption of rabbit farming presents a promising opportunity to address nutritional security among the *Almajirai* Northern Nigeria. Rabbit meat is a rich source of protein, essential vitamins, and minerals, making it a valuable dietary supplement for communities facing nutritional deficiencies (FAO, 2022). Numerous studies have shown that incorporating rabbit meat into the diet can improve overall nutrition and combat malnutrition effectively (Bello *et al.*, 2020; Jabbar *et al.*, 2014; Aduku and Olukosi, 1990). To ensure the success of rabbit farming for nutritional security, it is essential to provide training and support to the *Almajirai* on rabbit husbandry and management practices. Community workshops and demonstrations can be organized to disseminate knowledge and best practices in raising rabbits. Additionally, partnerships with local agricultural institutions and NGOs can offer technical expertise and access to resources such as improved breeds and feed. However, it is essential to consider potential challenges, such as limited access to capital for initial investments and the cultural acceptability of rabbit meat within the affected communities. To overcome these obstacles, stakeholders must be engaged in sensitization campaigns to promote the nutritional benefits of rabbit meat and its integration into local cuisines.

### **Social Integration and Empowerment**

Rabbit farming has the potential to foster social integration and empowerment within the *Almajiri* community. Through engaging in a collective and income-generating activity such as rabbit farming, the *Almajirai* child can experience a sense of belonging and cooperation, leading to increased social cohesion. To encourage social integration, community-based rabbit farming cooperatives can be established, this will unit individuals to work together, share responsibilities, and pool resources. These cooperatives not only promote a supportive environment but also create opportunities for skill development, mutualism, leadership, and decision-making among the participants. Furthermore, the empowerment of *Almajirai* through rabbit farming could be enhanced by providing them with ownership and responsibility over the process. Empowerment workshops and training sessions can be organized to build their capacity in entrepreneurship, financial management, and marketing. However, cultural norms and traditions might pose challenges to social integration and empowerment efforts. Therefore, inclusive and participatory approaches that respect local customs should be adopted as a means of addressing the issues. Involving community leaders and influencers in the process could facilitate acceptance and support for such initiatives.

### **Conclusion**

In conclusion, rabbit farming shows great promise as a means of mitigating the *Almajiri* system's challenges in Northern Nigeria. By addressing issues of nutritional security, social integration, and empowerment, rabbit farming can positively impact the lives of *Almajirai* child. The nutritional benefits of rabbit meat offer a sustainable solution to combat malnutrition and improve overall health in the affected communities. Simultaneously, the collective nature of rabbit farming can promote social cohesion and empowers

individuals to take charge of their economic future. However, the successful implementation of rabbit farming programs relies on addressing potential barriers, including financial constraints and cultural acceptance. By adopting inclusive and culturally sensitive approaches, stakeholders can overcome these challenges and realize the full potential of rabbit farming as a transformative strategy.

### **Recommendations**

Based on this review, the following recommendations are proposed to effectively utilize rabbit farming as a means of mitigating the *Almajiri* system in Northern Nigeria:

- a. **Establish Training Programs:** Develop comprehensive training programs on rabbit husbandry, management, and entrepreneurship for the *Almajirai* child at their study centers. These programs should be designed to empower participants with the knowledge and skills necessary for successful rabbit farming.
- b. **Form Community-Based Cooperatives:** Encourage the formation of community-based rabbit farming cooperatives to foster social integration, collective decision-making, and resource-sharing among the participants.
- c. **Sensitization Campaigns:** government and stake holders should conduct sensitization campaigns to raise awareness about the role of rabbit farming as a means of wealth creation in addition to source of food and promote its cultural acceptability within the community.
- d. **Collaboration with NGOs and Agricultural Institutions:** Forge partnerships with relevant organizations and institutions to access technical expertise, funding, and resources for sustainable rabbit farming initiatives.
- e. **Monitor and Evaluate:** Implement a robust monitoring and evaluation system to assess the impact of rabbit farming projects on nutritional security, social integration, and empowerment. Use the data gathered to make informed adjustments and improvements.
- f. **Infrastructural development:** There is need to prioritize investment in infrastructural development, focusing on building and improving educational facilities like schools and learning centers. Emphasis should also be made on access to learning materials, providing teacher training and support, engage local communities and religious leaders, foster government and NGO collaborations, implement curricular reforms and establish a robust monitoring and evaluation system. These measures will enhance the educational system of *Almajirai* and empower them with better learning opportunities and improve their socio-economic prospects.

By adhering to these recommendations, stakeholders can effectively harness the potential of rabbit farming as a transformative tool to alleviate the challenges posed by the *Almajiri* system in Northern Nigeria.

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# Resolving Farmers-Herders Conflict Through Security-Necessitated Technologies in Nigeria

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## Abstract

This paper exposes some security necessitated technologies that have been explored in recent times particularly in the advance world to combat the various security threats that have overwhelmed modern civilisation. The study becomes necessary following the recent blitzkrieg-like attacks carried-out by Fulani herdsmen on many farming communities in Nigeria. Taking a historical approach to understanding conflicts cum conflict resolution and employing various theories including crime opportunity and routine activity theories to adequately comprehend this sorry situation which has claimed many lives, so as to proffer a more lasting solution to the quagmire, the discourse observes that herders and herds invasion of farmlands in Nigeria is enabled by the absence of the role of a capable guardian in the face of a very high motivation to commit this crime and the environment which encourages it. The work concludes that while the dearth of security-based technologies in Nigeria have enabled these attacks to be perpetrated without containment or detection, the shortfall without mincing words portray grave danger to the country's national security. As a policy recommendation therefore, the Nigerian state is admonished to immediately strive to bridge this gap by appropriately employing necessary technologies such as those which aid biometric data identification, instant information communication and aerial surveillances.

**Keywords:** Herdsmen, Farmers, Conflict resolution, Security, Technological deficit

## 1. Introduction

### 1.1 Background

It was in 1804 that a group of Fulanis, led by Usman dan Fodio staged an invasion and subsequently established a now enduring reign over most of the area now known as the northern part of Nigeria. Before this time, the indigenous Hausa tribe partitioned into various states harmoniously organised themselves socio-politically in this part of the world. Following this Fodio's institutionalisation of the emirate system of governance and the further quest to annex neighbouring entities to replicate same system, a cloud of animosity has ever since built-up over the entire socio-political landscape of contemporary Nigeria threatening intermittently, the economy and national security.

Being a vital component of national security, food security which is the *raison detre* for the quarrel between the Fulani herdsmen and their host farming communities stands out as a precondition for the survival of any state. The very first damage often caused by herdsmen invasion and which is very detrimental to food security is the pollution of the ecosystem. This is evident in the pollution of drinkable and total consummation of irrigation water. It manifest also in the cattle's destruction of important herbs, shrubs and trees within the often invaded communities which locals use as foods and drugs. Also, overgrazing is known to lead to hardening of soils and rendering them infertile and even difficult to till.

While these are happening following the invasion by herdsmen and their cattle, the farmers who find it difficult to tolerate this degradation of their environment retaliate or carry out actions that provocatively affect the herders. For instance, host community youths are often accused of stealing and killing livestock

belonging to herdsmen. In fact the violent conflicts that have always erupted following aroused rift between herders and farmers have more often than not claimed productive lives and infrastructural facilities. This apparently has grossly affected national security in Nigeria.

This paper takes a historical look into the farmers-herders conflict in Nigeria and reviews the various measures the Nigerian state has adopted to solve this imbroglio. The work went further to unveil various security necessitated technologies and establish how they can be explored to contain the invasion of farmlands by herds as well as the consequent violent conflicts that usually erupts. Aside this introduction, other sections of the work are the problem statement, objectives literature review, methodology, results, discussion, conclusion and recommendation.

## **1.2 Problem Statement**

One observed problem here is that conflict resolution which is conceptualized as the methods involved in facilitating the peaceful ending of conflict and retribution, has always been perceived as a process where committed group members attempt to resolve group conflicts by actively communicating information about their conflicting motives or ideologies to the rest of the group and by engaging in collective negotiation (Forsyth, 2009). Even though Mayer (2012) explains behavioural resolution as thinking about disputants' actions and their behaviours, provoking a wide range of methods and procedures such as negotiation, mediation, arbitration and diplomacy, not much is discussed on how negative acts or their attempts should be effectively deterred, detected and ended as a method of resolving conflicts. A conglomeration of some conflict and security theories such group and failing state have been selected to guide the course of this discourse. To this effect information for the work are both secondary and as well generated through observations. This introductory note is followed by conceptual clarifications/analytical framework, a chronicle of herdsmen/farmers conflict in Nigeria and an appraisal of state's response to the abnormally. The need for a technological based security strategy is thereafter advanced with exemplifications of security instruments and tactics. The conclusion and policy recommendation for the Nigerian state ends this discourse.

## **1.3 Objectives**

This paper is thus not only looking at the invasion of herdsmen across the length and breadth of the country as an issue bedeviling the Nigerian nation, it attempts to establish a nexus between the contemporary security situation threatening the corporate existence of Nigeria and the inability of state security agencies to adequately contain the excesses of these loss agents.

## **2. Literature Review**

### **2.1 Theoretical Framework**

The Crime opportunity and Routine activity theories serve as compass to guide this discuss. As a theory, crime opportunity suggests that offenders make rational choices and thus choose targets that offer a high reward with little effort and risk. The occurrence of a crime depends on two things: the presence of at least one motivated offender who is ready and willing to engage in a crime, and the conditions of the environment in which that offender is situated. All crimes require opportunity but not every opportunity is followed by crime. Similarly, a motivated offender is necessary for the commission of a crime but not sufficient. A large part of this theory focuses on how variations in lifestyle or routine activities affect the opportunities for crime (Hindelang, 1978).

Also, the Routine activity theory from Cohen and Felon (1979), emphasises that crime occurs when three elements converge. These are a motivated offender, a suitable target, and the absence of a capable guardian. The theory is dwells on the routine activities of both the offender and victim. An offender like the herdsman may routinely walk through a community or farmland looking for food his herds. But because the farmers cannot be at farms throughout the day, some sort of "Neighborhood Watch", security operatives and alarm systems can prevent crime. A capable guardian can therefore be ordinary people, police or technologically propelled devices whose presence and/or knowledge of their presence can prevent the commission of crime. Opportunity as Hindelang (1978) clearly observes, becomes the limiting factor which determines the



outcome in environments prone to crime because the offender generally has little or no control over the conditions of the environment and the conditions that permit particular crimes are often rare, unlikely, or preventable.

As usual, hardly does any theory exist without any blemish or criticism. The theories espoused above have their observed shortcomings. One of the widely observed shortfalls of the Routine Activity theory for instance, is the assumption that criminals are rational in their decision-making. They may not use the same rationale as the person implementing the security measures. They may not even be aware of the situational crime prevention techniques put into effect or may simply not care about the security measures. This notwithstanding, the security necessitated technologies being recommended in this discourse are aimed at helping the farmer foresee and prevent loss agents before they invade the farmer's fortune.

## **2.2 Empirical Evidence**

While it is common for the average Nigerian to refer to the activities of what is now known as Fulani herdsmen as threat to national security, it must again be stated clearly as would soon be established that the actual threat is rather the state's inability to adequately deter or detect crime using modern technologies at the disposal of contemporary states. Herdsmen invasions must as a first step towards a comprehension of this discuss be understood as both a criminal activity and an affront against the state. Hence, the dear need to fight this hydra headed beast headlong. But unfortunately, the Nigerian government has been unwilling to address the causes of the crisis (SBMintel, 2017). Due to the widely perceived inefficacy of the Nigerian government, armed vigilante groups have sprung up in many farmer communities to tackle this quagmire in their own ways. Of course, this situation would often lead to vicious cycles of bloody feuds among farmers and herders. Local politicians and religious leaders have also exacerbated conflicts by recruiting members and frequently exaggerating claims (Roger, 2010). Since 2012, there have been projects to create transhumance corridors through the Middle Belt to allow for free grazing of herds. But as reported in Punch (2012), this is mostly supported by Northern lawmakers and opposed by their Southern counterparts. Hence, this endeavour have remained unsuccessful (Punch, 2012).

As noted by Oluka, Ativie and Efeosa-Temple (2019), President Muhammadu Buhari in 2019 tried to create Rural Grazing Area (RUGA) settlements. This proposal was met with fierce criticism. At the sub regional level, some state governments were recorded to have made efforts. Jinadu (2021) for instance, noted how the Ondo state governor, set an ultimatum for Fulani herdsmen to vacate certain areas, and in Oyo and Ogun state, people with Fulani and/or Hausa origins were asked to leave by politically mobilised youths from the local communities. Equally, on 17 May 2021, the 17 Southern governors in Nigeria issued the Asaba Declaration, aimed at solving the crisis (Channels TV, 2021). This group among other things advocated ranching as a solution to resolving the crisis.

Although ranching, where cattle are kept in enclosed parcels of land, has frequently been proposed as a solution to the crisis, this has proven to be highly unfeasible in Nigeria due to poor infrastructure (with unstable supplies of electricity, water, and fuel) and difficulties with acquisition and legal ownership of land (Rachael, 2018). Also, as Roger (2018) rightly noted, Land grabbing and cattle rustling are also potential difficulties that ranchers would have to deal with. Ranchers would also be unable to compete with nomadic herders with zero land-related costs.

Observing trends in contemporary Nigeria – a state challenged security-wise but finding it difficult to even profile criminals and terrorist elements, coupled with the country's dependence on western countries to donate to her fairly-used machines to engage insurgents, one cannot but say that Nigeria is highly technologically deficient and this in fact undermines the country. A little insight into some empirically generated information on this subject will assist our comprehension of this issue. Out of 141 countries assessed on Year 2015 Global Innovative Index (GII) by INSEAD (a graduate business school with campuses in Europe, Asia, and the Middle East), Nigeria was ranked 128<sup>th</sup> with 0.09 score, coming far below some seemingly quiet African countries such as Senegal (0.41), Botswana (0.36), Rwanda (0.35), Mozambique (0.33) and Malawi (0.31). While Switzerland ranked 1<sup>st</sup> with 1.00 score and United kingdom



2<sup>nd</sup> with 0.99, Mauritius (0.66), South Africa (0.58), Tunisia (0.46) and Morocco (0.45) ranked 49<sup>th</sup>, 60<sup>th</sup>, 76<sup>th</sup>, and 78<sup>th</sup> respectively. Seven years after, Nigeria continue to lag behind same African countries including Ghana and Tanzania, particularly coming 114<sup>th</sup> out of the 132 countries that were assessed (see WIPO, 2022).

The Global Innovation Index for clarification sake is an annual ranking of countries by their capacity for, and success in, innovation. It is published by INSEAD and the World Intellectual Property Organization (WIPO), in partnership with other organisations and institutions, and is based on both subjective and objective data derived from several sources, including the International Telecommunication Union, the World Bank and the World Economic Forum. The situation depicted above creates the loophole from which hoodlums like the homicidal herdsmen take advantage.

As observed earlier, this tense relationship between herdsmen in Nigeria most of whom are fulanis and farming communities has existed for many years but there has been a dramatic escalation in recent times which has claimed many lives. To be specific, since the Fourth Nigerian Republic which came into being in 1999, farmers-herders clashes have killed more than 19,000 people and displaced hundreds of thousands more (International Committee on Nigeria, 2020). The major reason for this chain of violence and its intensity is traceable to the struggle and competition for the limited resources of arable land and water resources in the rural communities of most of the western Sahel. This struggle became inevitable due to an expansion of agriculturist population and cultivated land at the expense of pasturelands; deteriorating environmental conditions, desertification and soil degradation; breakdown in traditional conflict resolution mechanisms of land and water disputes; and proliferation of small arms and crime in rural areas (Baca, 2015).

Insecurity and violence have led many populations to create self-defence forces and ethnic militias, which have engaged in further violence. From northwest regarded as the stronghold of the Hausa/ Fulani in Nigeria to the southern part, largely dominated by Christians, the story is the same as both have bitter experiences of attack by armed gangs suspected to be Fulani herdsmen. According to *The Africa Paper* of January 5, 2016, while farmers in host communities always complain that nomadic cattle destroy their crops, the herdsmen, who are predominantly of the Fulani ethnicity, say they have nowhere to graze their cattle. Such disagreement from both groups often leads to conflict that claim lives properties and monies. The table below lists locations where herdsmen's attacks on farming communities have been rife since 2010.

**Table 1: Locations of Herdsmen - Farmers' Attacks in Nigeria Since 2010**

Year	Areas of Occurrences
2010	Chawai, Southern Kaduna, Kaduna State
2011	Anchuna, Ikulu in Zango Kataf; Gwong communities of Angwan Yaro and Yuli in Kussom District of Gwong Chiefdom, Jema'a LGA, Angwan Rana, Bitaro District, Jaba LGA; Kagarko LGA; Fadia Bakut, near Zonkwa, Kukum Dutse, Kagoro Chiefdom, Kaura LGA, Dutsen Bako District; Anchuna District, Ikulu Chiefdom; Fadan Daji, Kagoro Chiefdom,
2012	Barkin Ladi and Riyom LGAs in Plateau state. Isoko North LGA in Delta State.
2013	Mbasenge community in Guma LGA; Agatu; Nassarawa, Nassarawa State; Ekwo-Okpanchenyi, Agatu LGA; Nzorov, Guma LGA; Ikpele & Okpopolo communities
2014	Adeke village; Naka road, Makurdi; Ukpam village of Mbabaai in Guma LGA; Umenger; Logo LGA; Gbajimba, Guma LGA; Obagaji, Headquarters of Agatu LGA; Tee-Akanyi village; Galadima village; Villages in Ogbadibo LGA; Katsina State,
2015	Egba village in Agatu LGA; Galadima village, Zamfara State; Ukura, Gafa, Per & Tse-Gusa, Logo LGA; Motokun village, Patigi LGA, Kwara State: Oro-Ago community; Ifelodun LGA; Ninji and Ropp villages in Plateau State: Onitsha Ukwuani in Ndokwa West LGA, Delta State; Oghonogbo community, a boundary between Edo and Delta State; Odighi village in Ovia North East LGA; Ulaja and Ojeh communities in Dekina LGA, Abejukolo, headquarters of Omala LGA both in Kogi State; Akure at Olu Falae Farms
2016	Ko, Gereng and Ndikajam in Girei LGA; Tom-Anyiin, Tom-Ataan, Mbaya and Tombu in the Buruku LGA; Ijebu-Igbo, Ijebu North LGA Ogun State; Uzo-Uwani in Enugu State; Udi LGA; Okokolo village in Agatu; Tarkaa LGA; villages in Benue and Nasarawa states; Ado-Ekiti; Gashaka LGA, Taraba state; along Benin-Asaba Expressway; Lagun, Iyana Offa, Offa, Atagba, Lapata and other communities in Lagelu LGA, Ibadan, Oyo State; seven villages in Nimbo in Uzo- Uwani LGA, Enugu State. Ossissa , Ndokwa east LGA, Delta state; Communities in Southern Kaduna.
2018	Numan and Lamurde local councils of Adamawa State; Plateau State, Dowaya, Yandang community in Lau Local Government Area of Taraba State. Bassa in Kogi and Jema'a in Kaduna
2019	Adara settlement named Ungwar Bardi in Kajuru LGA of Kaduna State
2020	Villagers were murdered in two different attacks in Plateau State
2022	Mbadwem and Tiortyu communities in Benue state.

Source: Authors compiled contents from various news sources

While it is though reasonable to concur with public opinion that herdsmen in recent times have constituted a great lot of threat to national security, this discourse is hypothetical as we though hope to establish through historical and logically qualitative analysis, that it is the state's inability to invent and/or employ security-necessitated technology as well as adopt and institute modern ways of rearing herds such as ranching that is the main challenge facing Nigeria. Security-necessitated technology is conceptualised in this study to refer to innovations such as the biometric data capturing, Global Positioning System, Close Circuit Television cameras, and drones which are being explored and exploited to deter, detect and prosecute crimes like terrorism and kidnapping.

### 3. Methods

#### 3.1 Study Setting

The study dwells on the security sector and the various technological apparatuses at the disposal of man that could be utilized to promote and maintain law and order as they affect the relationship between farmers and herders in Nigeria. Because most farmers in the country live in rural communities, where technological presence and its use is at dismal, effort is made here to unveil and explain the use of requisite technological systems.

#### 3.2 Study Design

A survey of varying technological apparatuses and applications particularly as they have been used and are still being used in other climes is carried out here before reasoning on how they could be employed to secure order between the farmers and the herders. To be precise, because the study aims to espouse the various security necessitated technologies and unveil their usage in contemporary times to resolve the

security challenges face mostly by farmers, effort is made here to draw out how they are being used in countries like the United States before deciphering how important they can be in Nigeria.

### **3.3 Data Sources**

Information for this study was garnered from secondary data sources. The idea of relying on secondary data is anchored on the availability of extensive collections on farmers-herders imbroglio in Nigeria as well as technologies that have been used to ensure security globally. Reports and editorial comments from both the broadcast and print media represent secondary sources from where valuable information were drawn. Within the secondary category too are governmental broadcasts and acts.

### **3.4 Sampling**

Of all technological systems that have been developed by man for the benefit of humanity, security necessitated technologies such as the biometric data capturing devices and systems, the CCTV and GPS are chosen for their direct or close relevance to the aim of this work. This is purposive sampling as for this, is to focus on particular characteristics or abilities of a population or phenomenon that are of interest, which will best enable a study achieve its objectives.

### **3.5 Instruments**

Tools used to collect data for this discourse include the library, internet-enabled devices, bot, radio and television. The radio and television mentioned here, were particularly important as broadcasted news on the spate of farmers-herders violent conflicts in Nigeria instigated the desire to embark on this study.

### **3.6 Data Analysis**

Data garnered in the course of this exercise were collated and analysed qualitatively. Information extracted from this secondary sources such as expert contribution in books and journals as well as media bulletins were logically analysed and utilised to explain how the presence and usage of technological necessitated technologies could accrue benefit to the Nigerian state.

## **4. Results**

Observations have revealed that the technological equipment used by different criminal elements such as the invading herdsmen and Boko haram are very advanced as compared to the equipment that security agencies use in many developing states. Therefore, there is the need for the governments of these nations to upgrade not only equipment in the hands of law enforcement agencies but those the populace utilise for self-help and protection of their belongings. The activities of armed herdsmen such as the invasion of communities can be checked through modernised surveillance. Surveillance is the monitoring of the behaviour of people as well as checking unwanted or suspected objects. It is in this respect that Closed Circuit Television cameras (CCTVs) are used in many parts of the developed world to deter, trace and track the activities of criminal elements.

If not for the use of CCTV cameras, it would have been very difficult to unveil the brains behind the famous July 7, 2005 Islamic extremists coordinated bomb attacks in central London. Following the experienced investigative exploit made through these security cameras, the Scotland Yard advocated in 2015 that every home in the United Kingdom (UK) should be equipped with a CCTV camera (Greenwood, 2015). According to the estimates of the British Security Industry Authority (BSIA) as reported by Barrett (2013), there are up to 5.9 million closed-circuit television cameras scattered throughout the UK, including 750,000 in “sensitive locations” such as schools, hospitals and care homes. It is on record that the United Kingdom - a nation of 64 million has one CCTV camera for every 11 people. Also in the advanced world, Traffic cameras which were meant to help enforce traffic laws at intersections are sometimes utilised by law enforcement agencies for purposes not really related to traffic violations. Cameras for instance are used for identifying individuals inside a vehicle and license plate data to be collected and time stamped for cross reference with other data used by police. To this extent, the US Homeland Security department has been funding networks of surveillance cameras in cities and towns as part of its efforts to combat terrorism (Savage, 2007).

It is interesting to know too that cell phone is equally an important device for surveillance in the modern world. Known as cell-phone spying, this involves the tracking, bugging, monitoring, interception and recording of conversations and text messages on mobile phones. It also encompasses the monitoring of

people's movements, which can be tracked using mobile phone signals when phones are turned on. In the United States, law enforcement agencies can legally monitor the movements of people from their mobile phone signals upon obtaining a court order to do so (Richtel, Matt 2005). Cell-phone spying software is installed on the gadgets to enable these actions. These devices are used by law enforcement agencies to track people's movements, and intercept and record conversations, names, phone numbers and text messages from mobile phones. Their use entails the monitoring and collection of data from all mobile phones within targeted areas. Some security agencies in the U.S. such as the Oakland Police Department, San Francisco Police Department, Sacramento County Sheriff's Department, San Jose Police Department and the Fremont Police Department are known to have explored this opportunity (Bott & Jensen, 2014).

Bott & Jensen above, attests that in 2007, this technology assisted the Oakland Police Department in Oakland, California in making 21 arrests, and in 2008, 19 arrests were made. In early 2006, USA Today reported that several major telephone companies were providing the telephone call records of U.S. citizens to the National Security Agency (NSA), which is storing them in a large database known as the NSA call database. This report came on the heels of allegations that the U.S. government had been conducting electronic surveillance of domestic telephone calls without warrants (Cauley, 2006).

For any surveillance activity or operations to yield the result of identifying crime perpetrators, there has to be a data base of those migrating into and out of a country. This brings us to the idea of biometrics for security purposes. Biometrics which refers to metrics relating to human characteristics and used in computer science as a form of identification and access control is used to identify individuals in groups that are under surveillance. Biometric identifiers are the distinctive, measurable characteristics used to label and describe individuals (Jain, Hong, & Pankanti, 2000). Examples include, but are not limited to fingerprint, palm veins, face recognition, DNA, palm print, hand geometry, iris recognition, retina and odour/scent. Others are typing rhythm, gait, and voice.

For decades, biometric data has been collected by governments across the world. This started by recording basic physical attributes within paper records, including height, eye colour, weight hair colour and various other physical characteristics. Fingerprint biometrics is used by the police to help deal with crime scenes. As early as the start of World War I, some nations, including Britain, began using the biometric passport that kept track of rudimentary physical characteristics or identifiers. It must however be noted that a technological deficit observed in the use of biometrics in Nigeria is the inability of the government or the security agencies to develop a central data base that can be explored by the law enforcement agencies in their task of identifying and prosecuting suspected criminals. Taking clue from the U.S. for example, the FBI in partnership with other security agencies has not only over the years authenticated an individual's identity but have assumed responsibility for managing the national fingerprint collection in that country since 1924.

The Global Positioning System (GPS) has also been employed to resolve some security challenges in other climes. It is a global navigation satellite system which provides geo-location and time information to a GPS receiver in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The system operates independently of any telephonic or internet reception, though these technologies can enhance the usefulness of the GPS positioning information. The GPS system provides critical positioning capabilities to military, civil, and commercial users around the world. Although the United States government created the GPS and maintains it, it however makes it freely accessible to anyone with a GPS receiver even though she (US government) can selectively deny anyone access to the system (Srivastava, 2014). While the GPS was originally a military project, it has progressively metamorphosed into a dual-use technology, serving both military and civilian applications. As a tracking device used in determining the positions or locations of a vehicle or a person to which it is attached, Since the early 1990s the GPS has become very popular for identifying locations and many researchers have used GPS in collars for experiments to measure animal behaviour and location (Schlechte et al, 2004; Umstatter et al, 2008).

Some of the vast areas in which the GPS have been applied to resolve security issues are as follows: mobile phone tracking, fleet tracking, geo fencing, and disaster management and relief services. GPS is known to have played vital role in relief efforts for global disasters such as the tsunami that struck the Indian Ocean region in 2004, Hurricanes Katrina and Rita which wreaked havoc in the Gulf of Mexico in 2005, and the Pakistan-India earthquake in 2005. Search and rescue teams used GPS, geographic information system (GIS), and remote sensing technology to create maps of the disaster areas for rescue and aid operations, as well as to assess damage. This shows how emergency services depend upon GPS for location and timing capabilities. Like the Internet, GPS is an essential element of the global information infrastructure. The free, open, and dependable nature of GPS has led to the development of hundreds of applications affecting every aspect of modern life. With these uses, the GPS can be explored by the Nigerian security network to quickly respond to distress calls either by the farmers or herdsmen. This is said because in the USA for instance, GPS remains critical to national security, as its applications are integrated into virtually every facet of military operations.

Nearly all new military assets -- from vehicles to munitions -- come equipped with GPS. As of 2009, military GPS applications include: its use to find objectives, even in the dark or in unfamiliar territory, and to coordinate troop and supply movement. In the United States armed forces, commanders use the Commanders Digital Assistant and lower ranks use the Soldier Digital Assistant (Sinha, 2003); using GPS to track potential ground and air targets before flagging them as hostile; Military aircraft, particularly in air-to-ground roles, use GPS to find targets; Search and rescue as well as close management of Patrol movement.

Again, the Unmanned Aerial Vehicle (UAV) commonly known as a drone is another related technology that has aided security agencies in the advanced world to resolve some of their security issues such as surveillance. The drone is an aircraft with no human pilot aboard. The flight of UAVs may operate with various degrees of autonomy: such as under remote control by a human operator, or fully or intermittently autonomously, by on-board computers. Compared to manned aircraft, UAVs are often preferred for missions that are too dull, dirty or dangerous (Tice, 1991). As at 2013, at least 50 countries used UAVs. China, Iran, Israel and others designed and built their own varieties (Horgen, 2013). Other security necessitated equipment which are invoke in this modern times and which are greatly in use in many countries are various types of spy gears used to perform surveillance involving observation of the behaviour of a particular target, conducting counter-surveillance to monitor or for bugging devices.

These set of gadgets are now even used not only by security agencies, but private investigators, farmers, and bounty hunters have all keyed into its usage. They use it to gather information from a subject such as photographs or video of their activities. In other words, the equipment is becoming an important part of both personal and home security with the use of security cameras, hidden surveillance and wireless cams. Examples of spy equipment are audio amplifiers and recorders, electronic bug detectors, digital cameras, GPS tracking devices, listening devices, and night vision goggles.

While the night vision goggles or Night Vision Binoculars are today useful for night time surveillance and security, they were said to be initially used in World War II and only came into wide usage during the Vietnam War (Tyson, 2001). The image produced by an NVD is typically monochrome green, as green was considered to be the easiest colour to look at for prolonged periods in the dark. (Liszewski, 2021). The technology has evolved greatly since their introduction, leading to several generations of night vision equipment with performance increasing and price decreasing. Consequently, they are available for a wide range of applications as designed for gunners, drivers and aviators.

## **5. Discussion**

As the Crime opportunity and Routine activity theories rightly posited, crime occurs when the three elements of a motivated offender, a suitable target, and the absence of a capable guardian converge. Empirical research have been revealing how sophisticated modern day herdsmen operate in Nigeria. They do not only go about with sophisticated weapons but they are equipped with gadgets such as android phones

which are capable of directing them on locations where they would find the best of pastures for their cattle. Unfortunately on the part of the average rural farmer in Nigeria, he is so neglected by the state to the extent that the government does not even have the bio-data of the occupational farmers in the country.

Following this observation, it is the opinion of this paper that the Nigerian state would guarantee the security of both the farmers and herders if a serious and concerted effort is embarked upon to possess a database of all farmers and herders in the country. This would mean that the biometrics of both the farmers and the pastoralists are captured. This would ease and improve the job performances of the various security agencies including the community based vigilantes. Of course, for any surveillance activity or operations to yield the result of identifying criminal elements, there has to be a data base of those migrating into and out of that community, state, or country.

A major security deficit in Nigeria which must be mentioned particularly as it contrasts modern best security practice is the absence of CCTVs. CCTVs as noted earlier, have been used to observe, monitor and track the activities of criminal elements. Even though sky scrapers and other high rising buildings are absent in most rural communities where the herds and herders invade, the various communication masts of various communication companies can be used by the state and its security agencies to install the CCTV cameras.

-The Nigerian government can through her social welfare schemes make android cell phones available to the rural farmers and herders to enable them explore the various benefits cell phones can accrue to the desire to enhance or guarantee security. Of course, these cell-phones are capable of spying, tracking and bugging, monitoring, interception and recording of conversations. Of course this will help security agencies in their investigation and interrogation of cases.

It is no longer news that the rampaging herders who cause havoc in Nigeria are more equipped with up to date weapon system and communication gadgets than the security operatives employed by the governments at various levels. The confession of the Niger state government in north-central Nigeria reminds us of this dilemma. The Premium times (2022) reported how the secretary to the state government attested that they found out that the conventional security architecture has inadequacy in the number of personnel and even in equipment. He said banditry in Nigeria has become well-structured with a high level of communication that enables bandits to call for reinforcement when under attack. The police and other law enforcement agencies are ill equipped to the extent that even when the villagers call for help in the face of attacks or invasion, it takes ample time of many hours before the police or other agencies respond, mostly after the attackers must have left. So, the Global Positioning System (GPS) can be of great utility in this regard. It can be used effectively as done in advanced countries of the world to monitor, control or track the animals and their shepherds. This will greatly reduce insecurity in Nigeria. Finally on this discussion segment, it is imperative to still refer to our theoretical guide where it was admitted that crime thrives based on the existence of three elements which are a motivated potential offender, a suitable environment and an absentee guardian. This situation which breeds insecurity can be reversed in Nigeria by all stakeholders who desire to salvage the country from the looming food insecurity and the possibility in the near future of an outbreak of war between the Fulanis who reside in various countries in West Africa and their unwilling host communities. Stakeholders who comprise the federal government, state and local governments, security agencies, community leaders, farmers' associations and media organisations can engender this reversal by individual and collective efforts to make use of the Unmanned Aerial Vehicle (UAV) commonly known as a drone to monitor the activities of various persons and groups at various times and levels.

## **6. Conclusion and Recommendation**

Following this study, it is glaring that the Nigerian state if she really has the political will to resolve the herders-farmers conflict which has claimed many lives and continues to do so can adopt a security-necessitated technological strategy for this purpose. It is in the opinion of this paper that if every operational strategy from surveillance, through arrest to prosecution is computerised or technologically driven, it will definitely be difficult for criminals to perpetrate atrocities and escape being unravelled or discovered. Exemplified cases such as the successful unmasking through CCTV cameras, of the arrow heads of the

famous July 7, 2005 Islamic extremists coordinated bomb attacks in central London attest to this position. To this effect, the following recommendations are proffered as solutions for resolving the incessant herdsmen – farmer’s violent attacks.

1. Mass surveillance which is the intricate surveillance of an entire or a substantial fraction of a population in order to monitor that group of citizens, has to begin by governmental security agencies and this again must be conducted by putting in place a data base of all Nigerian citizens as well as foreigners who do business in the country. Mass surveillance has often been cited as a necessity to fight terrorism and or enhance overall security of a community or state. CCTVs should be installed at all public places like parks, streets and markets. This of course can be very helpful in preventing crimes. CCTVs are capable of checking and deterring bomb blasts and other terrorist activities. The Nigerian governments (federal, state and local) at various levels can take advantage of the presence of communication masts in nooks and crannies of the country to place CCTV cameras on the masts in order to have the opportunity of tracking or reviewing the activities of criminal elements as the need arises.
2. The Nigerian state should develop the will to take advantage of most if not all the security apparatuses that have in recent times aided crime prevention, detection and prosecution in the modern world as no price is too small to pay for the safety and security of the people. After all, the citizens’ welfare and security are the reasons governments exist. While with captured biometrics and a data base of every individual in place, it will not only be easy for the herdsmen and their animals to be identified at any crime scene, the GPS technology could equally be explored to monitor the locations and position of these nomads. In addition to the foregoing, equipment such as the listening Devices, voice recorders, spy gears and their likes should be made easily available for use to people particularly those living in rural communities or some of their community leaders so as to enable them foresee some form of imminent attacks before they happen. This of course will deter the potential criminal who may be aware of the capabilities of his supposed victims.
3. Finally, it is noteworthy to say that many ways to use technology in crime prevention and detection abounds, the only thing that is however required is that the state should assess their peculiar situation and adopt the measure that best suits its peculiarity. In this light and in tune with Parsons (ibid.) postulation on education as element of national advancement, continuous research to quickly discover new threats so as to seal up the loopholes through technological based tactics should be encouraged.

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## Unpacking Oil Spillage and Its Effect on Food Security in the Niger Delta, Nigeria (A Study of Oil Spill Areas and Causes)

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### Abstract

Since more than three decades ago, environmental deterioration in the oil-rich Niger Delta region has been uncontrolled with severe health, social, and economic consequences for its citizens as a result of oil spills. Extant research has looked at the effects and consequences of oil spills, while the areas and causes of the oil spill, which are essential in reducing this threat, have not been determined. This paper examines the area and causes of oil spillage in the Niger Delta. The paper employed secondary data from Oil Spill Monitor, Shell Company, and Amnesty International among others from 2018 to mid-2023. The data collected were subjected to simple statistical analysis (mean and standard deviation), which informed the interpretation of the result. The results indicate that the main areas of oil spillage are swamp, seasonal swamp, land, and offshore. Also, the study found that the main causes of oil that spill into these areas are; sabotage, corrosion, equipment failure, operational and maintenance error, etc. Further, Vegetation, soil, farmland, surface water, and fishponds, were impacted as a result of oil spillage. It is concluded in the paper that the causes of oil spillage have negatively and significantly impacted the environment in the study area. The paper recommended that addressing the causes of oil spills will reduce the quantity of oil spills that negatively impact the environment in oil spillage areas.

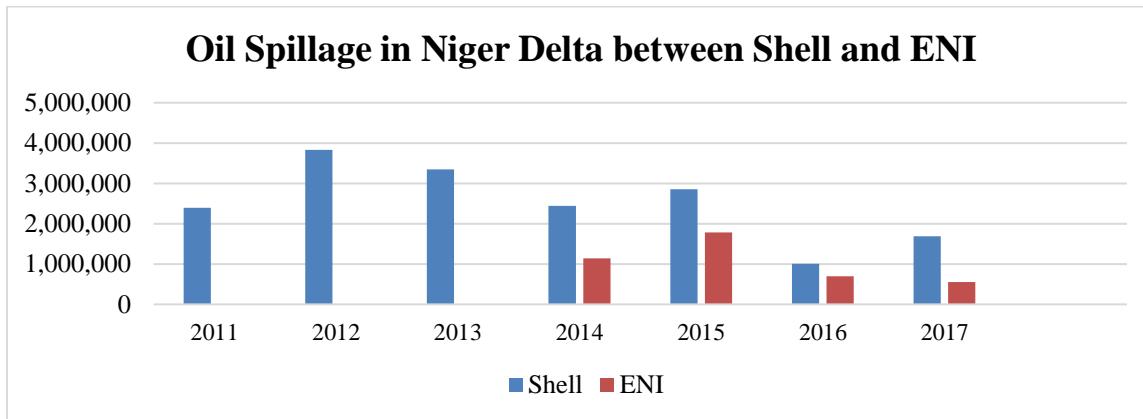
**Keywords:** Oil Spillage, Food Security, Niger Delta.

### 1.0 Introduction

Transporting or storing oil from the oil field to storage facilities or from refineries to oil depots can result in oil spills that rock Niger Delta communities. These spills may occur on land, in a swamp, or water. Scholars have continued to recognize the causes of oil spills. Some have looked at the causes of oil spills concerning a variety of predisposing conditions, including natural and man-made disasters. For instance, Egbe and Thompson, (2010) posited that oil spills can occur as a result of natural disasters such as earthquakes and hurricanes, they can also result from accidents, lack of maintenance of engineering equipment, and deliberate acts (including oil bunkering and sabotage). The causes of oil spills are also categorized into natural, human, and mysterious spills by Mba et al. (2019). Therefore, natural spill causes are those spills that come naturally such as natural disasters, inadequate trap systems, and shift of tectonic plates beneath the ocean floor. Human causes include vandalization of oil pipelines, sabotage, bunkering, oil siphoning, and carelessness on the side of both workers (operational) and tanker drivers (during delivery). While for mysterious spills it's difficult to determine what caused the spill specifically.

According to Amnesty International, (2018) every year, hundreds of oil spills damage the environment and devastate the lives of people living in the Niger Delta. These spillages are categorized into operational spills (corrosion, poor maintenance, and equipment failure) and third-party interference spills (with wells, pipelines, and other infrastructure by armed militant groups, criminal gangs, and others). Shell oil terminals are always polluted owing to spills from pipeline leakage and other infrastructural damages. These have

been caused by decades of poor maintenance and underinvestment. However, 1,010 spills reported by Shell since 2011, and 820 spills have been documented by Eni in the Niger Delta since 2014.



**Fig 1:** shows the volume of oil spill per barrel by two Oil Companies in the Niger Delta (Amnesty International 2023)

The above figure displays the volume of oil spills from Shell Petroleum Development Company and ENI Oil Company, about 110,535 barrels (17.5 million liters) and 26,286 barrels (4.1 million liters) that gave the total of 21.7 million liters of oil spill which is the equivalent of 9 Olympic swimming pools. (Amnesty International, 2023). This research aims to unpack the drivers of oil spills in the Niger Delta region and explore the implications of this for local food security. The research concentrated on the evaluation of the areas and causes of oil spillage in the Niger Delta, with emphasis on which causes have a significant effect on the volume of oil spillage, which areas are most affected, and agricultural products that are highly impacted.

## 2.0 Methodology

### 2.1 Material and Method

Data was obtained from reports published by governmental and non-governmental groups to determine the causes and location of oil spilled in the Niger Delta region throughout the study period. Thus, secondary data from the Nigerian oil spill monitor, Shell Petroleum Development Company, United Nations Environment Programme, Amnesty International, papers from seminars, and other published materials served as the main source of the data. However, the causes and locations of oil spilled in the Niger Delta region from 2012 through 2023, the annual number of oil spill incidents, the volume of oil spills per barrel, and the volume of oil recovery per barrel were recorded. All the obtained data were analyzed descriptively by using SPSS in the form of a rectangular *data matrix*. Each column in a data matrix contains a variable (year, mean, sum, minimum, maximum, and standard deviation), each row is an observation or case, and each cell contains a single value for a particular variable and observation, e.g. the mean score for every year. If the value is not available, the cell content will show somehow that the value is missing; all statistically oriented software will automatically skip that kind of value in computations.

### 2.2 Study Area Description

Niger Delta is one of the regions that has over 800 oil-producing communities, over 900 oil-producing wells, and other infrastructure associated with petroleum production, and it covers an area of over 70,000 km<sup>2</sup>, or 7.5% of Nigeria's total geographical area (Agochi, 2014). The region is greatly endowed with abundant natural resources and weather which supports all year-round agricultural production (Akorede *et al.*, 2017). According to Amnesty International, (2018) Niger Delta is Africa's largest oil-producing region, and one of the most polluted places on earth because for decades' oil spills have been damaging the environment and devastating lives in this part of Nigeria. The Niger Delta comprises nine states cutting across three geopolitical zones in Nigeria (Akwa Ibom, Bayelsa, Edo, Cross Rivers, Rivers, Delta in the South-South part of the nation; Abia, Imo in the South-East part; and Ondo state in the South-west part of

Nigeria; and is home to around 31 million people spread throughout 186 Local Government Areas (Ordinioha and Brisibe, 2013). The area is home to 95% of Nigeria's oil deposits, which generate 90% of the country's government's income and 95% of its export earnings (Adishi and Hunga, 2017).

The region is one of the world's most oil-impacted ecosystems, with independent estimates indicating that at least 115,000 barrels (15,000 tons) of oil are spilled into the Delta annually. These spills pollute drinking water and soil and negatively affect farming and fishing in the region whereby communities living close to oil exploration companies are adversely affected in terms of their health and food security.



Fig 2: shows the map of the Niger Delta region

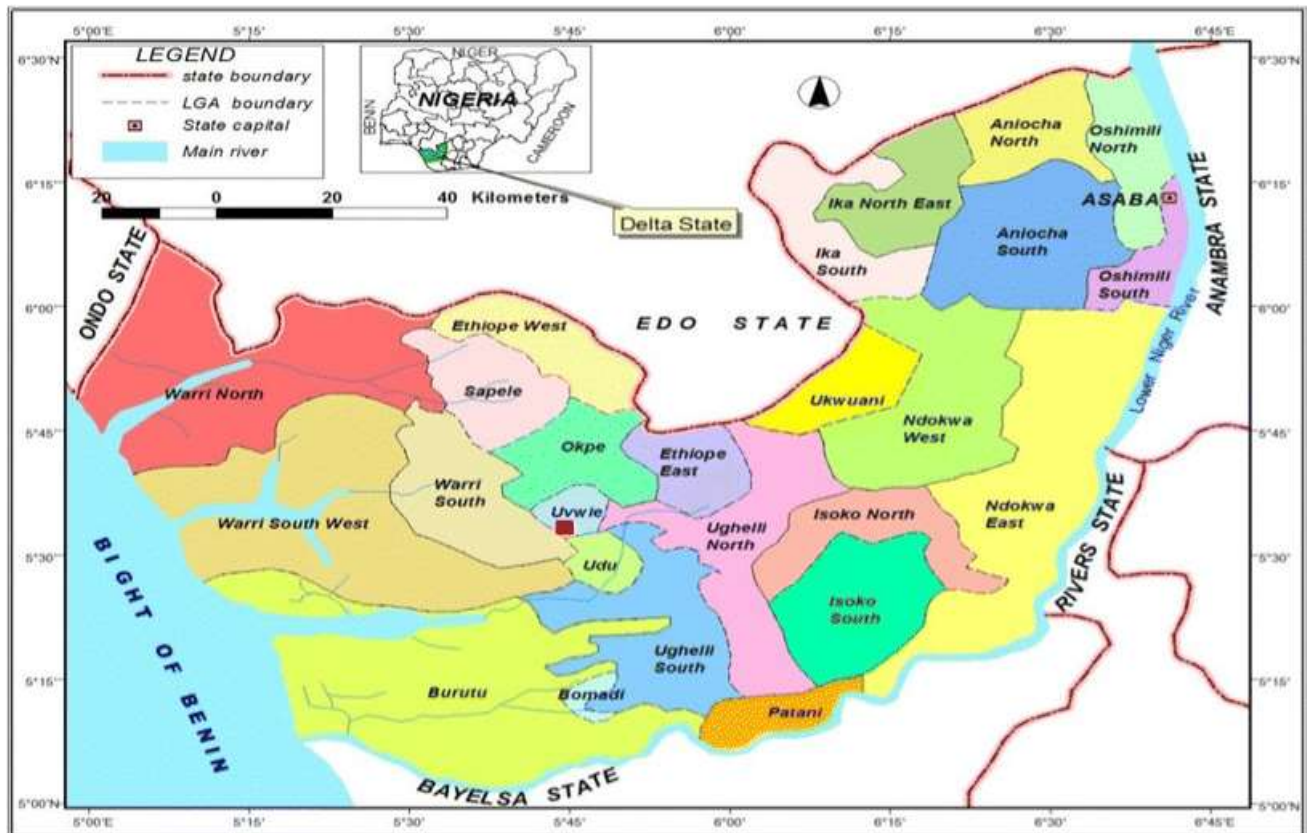


Fig 3: shows the map of Delta State in Nigeria

The paper focused on the Niger Delta region of Nigeria and purposely selected Delta State, one of the region's nine (9) states that is home to several oil-producing communities and the second leading source of on-shore crude oil production. Delta State is situated roughly between latitude 5 0 00'N and 6 0 30' N of the Equator and longitude 5 0 00' E and 6 0 45' E of the Greenwich Meridian. It is one of Nigeria's extremely southern states and covers an area of 17,001 km<sup>2</sup>. The inhabitants of communities in this area are mainly crop farmers and fishers.

### 3.0 Results of the Data

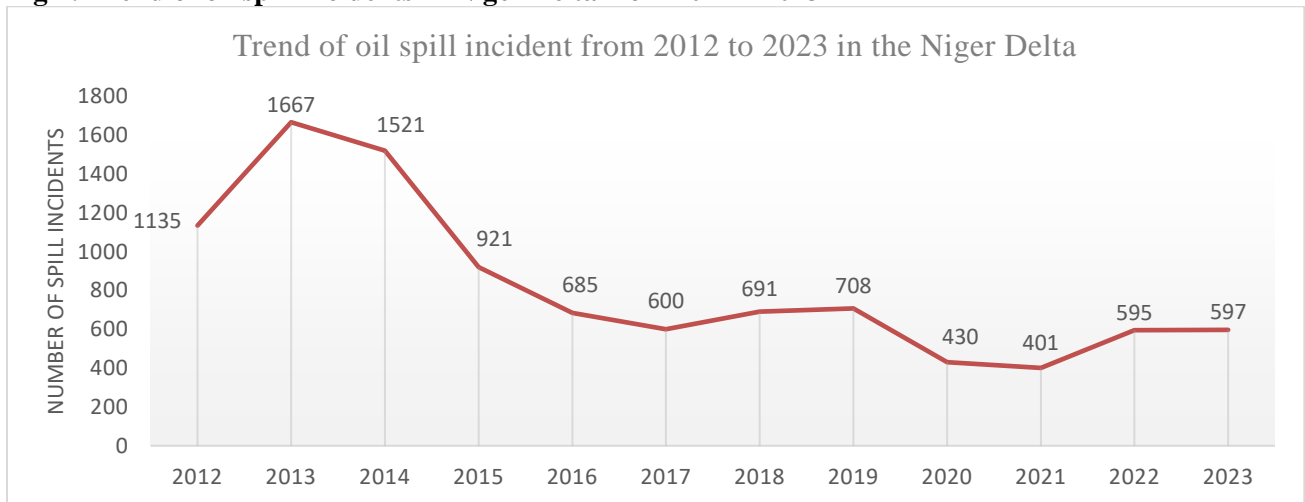
The following tables and figures determine and illustrate the areas, causes, trends, quantity of oil spilled, quantity recovered, as well as the adverse impact of this catastrophe on food security.

#### 3.1 Trend of oil spill incident from 2012 to 2023 in the Niger Delta

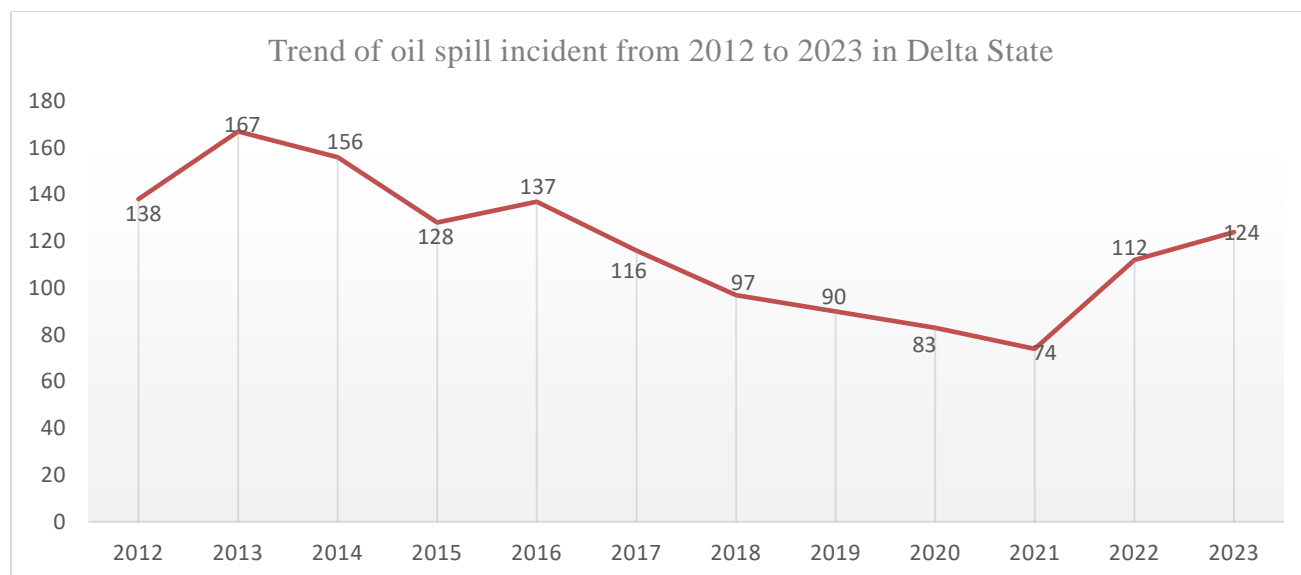
The trend of incidents that occurred in the Niger Delta region from 2012 to 2023 shows that there are about ten thousand recorded oil spill incidents.

Figures 4 and 5 illustrate the trend in oil spill incidents from 2012 to 2023 and it follows a regular pattern, as there was a substantial yearly decrease preceded by an increase in this period in Delta.

**Fig 4: Trend of oil spill incidents in Niger Delta from 2012 – 2023**



Source: Nigerian oil spill monitor (NOSDRA, 2023)



**Fig 5: Trend of oil spill incidents in Delta state from 2012 – 2023**

Source: Nigerian oil spill monitor (NOSDRA, 2023)

### 3.2 Estimated quantity of spill per barrel and quantity recovered

The data obtained from this research shows that over 33 thousand barrels of oil were spilled into the environment from 2018 to 2023. The results also showed the estimated quantity of oil spills and quantity of oil recovered per barrel from 2018 to 2023 in Delta. 2018 has (9065.29) barrels of oil spilled into the environment. 2019 had (13371.14) barrels; in 2020, the number of barrels that spilled into Delta’s environment was (2540.98); while in 2021 has (1773.31) barrels of oil spills; 2022 in other hand has (3899.03) barrels; whereas in the first half of 2023 has (2548.30) barrels spilled in the study area.

#### Estimated Quantity of oil spill per-barrels

Year	Mean	Sum	Minimum	Maximum	Std Dev.
2018.00	91.5686	9065.29	.01	2333.00	282.60784
2019.00	146.9356	13371.14	.00	4065.00	494.94792
2020.00	30.2498	2540.98	.00	780.00	92.17851
2021.00	23.6441	1773.31	.01	1000.00	116.22214
2022.00	34.5046	3899.03	.01	575.00	97.92606
2023.00	45.5054	2548.30	.00	1845.00	245.86342
Total	64.0889	33198.04	.00	4065.00	267.57223

**Table 1: shows the estimated quantity of oil spills per barrel in the Delta**

However, the data below shows the amount of oil recovered per barrel in Delta from 2018 to 2023. In 2018, 6570.71 barrels of oil were recovered out of 9065.29 spilled. In 2019, 9884.11 barrels were recovered out of 13371.14 barrels spilled. However, in 2020, 992.68 barrels of oil were recovered out of a total of 2540.98 barrels leaked into the environment, and in 2021, 194.61 barrels of oil were recovered out of a total of 1773.31 barrels spilled. 2022, on the other hand, recovered 1077.00 barrels out of 3899.03 barrels of oil

spilled; eventually, 2023 recovered 1687.30 barrels out of 2548.30 barrels of oil spilled in Delta. Therefore, about thirteen thousand quantity of barrels spill into the environment in the research area.

**Quantity of oil recovered per barrels**

Year	Mean	Sum	Minimum	Maximum	Std Dev.
2018.00	273.78	6570.71	0.02	2000.00	479.54
2019.00	449.28	9884.11	0.20	4025.00	916.28
2020.00	43.16	992.68	0.00	585.00	123.23
2021.00	17.69	194.61	0.44	132.00	38.55
2022.00	63.35	1077.00	0.00	384.00	105.77
2023.00	153.39	1687.30	0.10	1540.00	460.68
Total	188.95	20406.41	0.00	4025.00	514.53

**Table 2: shows the quantity of oil recovered per barrel in the Delta**

**3.3 Oil Spill Areas in Delta**

From the data obtained, the areas of oil spill found in Delta include land (La), swamp (Sw), multiple (swamp, seasonal swamp, land), and others (inland water, offshore, and near shore). However, the results indicated the average of oil spills into the land from 2018 to 2023 is 6508.6 barrels, multiple has the average of 4448.6 barrels’ others 19.34 barrels, and swamp 22221.54 barrels.

**Table 3: shows the estimated quantity of oil recovered per barrel in the Delta  
Oil Spill Areas**

Areas	Year	Mean	Sum	Minimum	Maximum	Std Dev.
Land	2018.00	51.9	1403.6	.01	943.00	183.49367
	2019.00	128.3	3463.1	.01	1403.60	363.93489
	2020.00	21.1	548.1	.01	160.00	40.35490
	2021.00	8.01	256.4	.01	60.80	13.85206
	2022.00	40.4	727.6	.03	424.00	109.76551
	2023.00	9.9	109.7	.00	95.00	28.27480
	Total	46.2	6508.6	.00	1403.60	185.92229
Multiple	2018.00	69.4	347	2.00	300.00	129.93768
	2019.00	87.1	1393.6	.01	350.00	109.44646
	2020.00	217.5	1305	25.00	780.00	286.42189
	2021.00	235	1175	.03	1000.00	431.33086
	2022.00	41	123	10.00	98.00	49.42671
	2023.00	52.5	105	50.00	55.00	3.53553
	Total	120.2	4448.6	.01	1000.00	210.00066
Other	2018.00	0.8	2.38	.13	2.00	1.04673
	2020.00	1.2	3.50	.50	2.00	.76376



	2021.00	1.9	3.86	1.80	2.06	.18385
	2022.00	1.7	8.40	.10	5.00	1.99173
	2023.00	0.6	1.20	.20	1.00	.56569
	Total	1.3	19.34	.10	5.00	1.27887
Swamp	2018.00	114.3	7312.22	.03	2333.00	328.09260
	2019.00	177.4	8514.50	.00	4065.00	624.21115
	2020.00	13.9	684.31	.00	100.00	23.38426
	2021.00	9.4	338.06	.01	80.00	16.88671
	2022.00	34.9	3040.06	.01	575.00	99.89175
	2023.00	56.9	2332.40	.13	1845.00	286.93845
	Total	68.4	22221.54	.00	4065.00	306.11292

### 3.4 Causes of oil spillage in Delta

The data generated for this research show the causes of oil spillage in Delta. The results illustrated the causes of oil spills in Delta which include; corrosion, sabotage/theft, equipment failure, operational error, and others. However, the result pointed out the percentage of factors responsible for oil spillage in the study area from 2018 to 2023. Corrosion is (20.8%), equipment failure (15.8%), operational error (5.8%), sabotage/theft (55%), Yet to determine (0.6%), and lastly other factors has (2.1%).

#### Causes of oil spillage in Delta

Causes		Year						Total
		2018	2019	2020	2021	2022	2023	
Corrosion	Number	13	13	18	20	31	13	108
	% of Year	12.9%	14.3%	21.4%	26.7%	27.4%	23.2%	20.8%
Equipment Failure	Numbers	25	13	12	11	15	6	82
	% of Year	24.8%	14.3%	14.3%	14.7%	13.3%	10.7%	15.8%
Operation Maintenance Error OME	Numbers	4	7	5	4	10	0	30
	% of Year	4.0%	7.7%	6.0%	5.3%	8.8%	0.0%	5.8%
Other	Numbers	3	3	3	1	0	1	11
	% of Year	3.0%	3.3%	3.6%	1.3%	0.0%	1.8%	2.1%
Sabotage/Theft	Numbers	56	53	46	39	56	36	286
	% of Year	55.4%	58.2%	54.8%	52.0%	49.6%	64.3%	55.0%
Yet to determine (YTD)	Numbers	0	2	0	0	1	0	3
	% von Year	0.0%	2.2%	0.0%	0.0%	0.9%	0.0%	0.6%
Total	Numbers	101	91	84	75	113	56	520
	% of Year	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

**Table 4:** shows the causes of oil spills in the Delta

### 3.5 Discussion of the Results

Based on the data analysis of this paper, the paper discovered the following:

- i. About 33198 oil spills in the research area, and about 20406 of these oil spills were recovered. This indicates that about 12792 of oil was spilled into the environment and ecosystem in Delta state.

The results are in consonant with the submission of Odjuvwuederhie *et al.*, (2006) who cited from the Department of Petroleum Resources that over 6000 spills had been documented in Nigeria's 40 years of oil exploitation, with an average of 150 spills each year. In the period 1976 – 1996, 647 incidents occurred resulting in the spillage of 2,369,407.04 barrels of crude oil. With only 549,060.38 barrels recovered, 1,820,410.50 barrels of oil were lost to the ecosystem (DPR 1997).

- ii. The result of this paper also pointed out the major areas of oil spills in the Delta state are Land, swamps, and multiple (land and Swamp). The results of this paper also indicate the volume of oil spilled into land and swamps in the Delta remains one of the most important repercussions of the oil spill on agricultural products. Most of the oil that spills into the land has a negative impact on farmland and palm trees which contaminates the farm products such as cassava, yam, cocoyam maize, plantain, etc., and despoils most of the farmland. The results are in line with the submission of Plessl *et al.*, (2017) who pointed out that within the period 1976–2015, a total no of 16,476 spills occurred on different occasions, and a total quantity of approximately 3 million barrels spilled into the environment. Unfortunately, more than 70% was not recovered, 69% of these spills occurred off-shore, a quarter was in swamps and 6% spilled on land. Odjuvwuederhie *et al* (2006) posit that oil spills have degraded most agricultural lands in the state and have turned hitherto productive areas into wastelands. However, oil spill into swamp has affected fish ponds, vegetation, and surface water. Elum *et al.*, (2016) posit that oil production has increased the rate of environmental degradation and has perpetuated food insecurity as a result of the death of fish and crops as well as the loss of farmlands and viable rivers for fishing activities leading to the loss of livelihood.
- iii. The results of this paper also revealed that the main factors responsible for oil spillage include sabotage/theft, corrosion, equipment failure, and operational error. The results align with what Michel and Fingas (2016) Opines, they identified the rate of spillage has decreased in the past 10 years, even with increased oil production, transportation, and consumption. Despite this, spill experts estimate that 30%–50% of oil spills are either directly or indirectly caused by human error, with 20%–40% of all spills caused by equipment failure or malfunction. However, according to Hunga (2017), reasons responsible for spillage of oil include oil theft, illegal bunkering, and pipeline vandalism, all of which occur at various degrees and volumes in the Niger Delta. These findings also support the finding of Ndinwa *et al.*, who claimed that oil spills in the Niger Delta region were caused by 50% of all oil spills due to corrosion of oil pipelines and tankers. According to Amnesty International (2018), the proportion of oil spills in the Niger Delta that are caused by sabotage or theft is keenly contested by communities and cannot be determined with any degree of accuracy because of flaws surrounding the collection of spill data.

### **3.6 Effect of oil spill on Agricultural products.**

Oil spills are typically caused by recurring sabotage, corrosion equipment failure, etc., which kill aquatic life and contaminate the environment to the point where farming is impossible in the affected areas. According to Osuagwu and Olaifa (2018), an oil spill's long-term effects are typically linked to decreased agriculture productivity and fish mortality. Nnabuenyi (2012), mentioned the detrimental effects of oil spills on agriculture, the majority of farmlands have been damaged, rivers have been contaminated, killing fish, and most farmers and fishermen are now jobless.

### **4.0 Conclusion and Recommendations**

The new research shows that individuals in the area of study may be in danger of food insecurity as a result of the considerable amount of oil that has been spilled nearby. To reduce the exposure to the amount of spilled oil that caused food insecurity in Delta, effective strategies for minimizing the frequency of oil spills should be employed.

### **5.0 Recommendations**

Based on these results, the paper recommends that remediation policies should be put in place to boost farmers' productivity, the government on the other hand should work together with oil companies to



mitigate and reduce the oil spill area to enhance food security. The risk of an oil spill on Delta's land and swamp should be evaluated holistically.

#### **Acknowledgment:**

This is an ongoing that supported and funded by the Petroleum Technology Development Fund (PTDF) under the Federal Government of Nigeria (PTDF/ED/OSS/PHD/MKH/2023)

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## Awareness of Undergraduate Students Towards the Anthropocentric and Natural Causes of Climate Change

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### Abstract

This study took a critical look at the level of awareness on the causes of climate change among undergraduate students in university of Benin, Benin City. In the course of this research, two basic research questions were raised and one was hypothesised. The respondents for this study were chosen systematically using systematic sampling. This is a type of probability sampling method in which sample members from a larger population are selected according to a random starting point and a fixed periodic interval. The research instrument was questionnaire. A sample size of 360 respondents was selected using random sampling and was analyzed using frequency count and simple percentage method. The validity and reliability of this study was carried out by experts and a consistent result was obtained ( $r=0.78$ ). The results of the findings show that students have a high awareness on the causes of climate change. Based on the findings, conclusions and further recommendations were made, one of which being that environment-promoting courses should be made compulsory all over the federation for this will not only improve on awareness but will also improve students' practices on climate change tremendously.

**Keywords:** Climate change; adaptation measures; environmental education

### Introduction

Climate change refers to a change which is attributed directly or indirectly to human activities that alter the composition of the global atmosphere and which are in addition to natural climate variability observed over comparable time period (United Nations Framework Convention on Climate Change UNFCCC, 1992). It is one of the most serious environmental and human threat that is undermining the achievement of the Millennium Development Goals (MDGs) and the international communities' efforts to reduce extreme poverty. It has therefore emerged as a major environmental challenge in this 21<sup>st</sup> century. Recent research has also noted the impacts of climate change on agriculture and natural resource management in countries of Africa, Asia and Latin America (Speranza, 2010). Because of low adaptive capacities and the projected impacts of climate change, a consensus has emerged that developing countries are more susceptible to the impacts of climate change this is because of the predominance of rain-fed agriculture in their economies, the scarcity of capital for adaptation measures, their warmer baseline climates and their heightened exposure to extreme events (Nnamchi & Ozor, 2009).

Human activities have tended to exacerbate climate change and its impacts on education, industry, agriculture and livelihoods in West Africa. Nigeria having the fastest growing economy in this region tends, to contribute most to the causes of climate change. For example, the Niger-delta region in Nigeria is reported to have over 123 gas flaring sites; making Nigeria one of the highest emitter of Greenhouse gases (GHGs) in Africa (Akinro, 2008). A study by the World Bank (2008) reveals that Nigeria alone is responsible for roughly one-sixth of worldwide flaring. According to the report also, Nigeria flares about

75% of its gas. These flared gases have apparently contributed more Greenhouse gases (GHGs) thus climate change in Nigeria and specifically in the Niger-delta regions. It should as well be noted that agriculture in most part of Nigeria is dependent on rainfall as opined by (Nnamchi & Ozor, 2009). The changes in rainfall patterns have greatly affected vegetation and agriculture in Nigeria. Uncontrolled logging, damaging agricultural activities, acid rain, oil exploration and exploitation, urbanization, industrialization, and mining activities contribute immensely to climate change. The impacts of these causes of climate change are already being felt in the country with food shortage, insecurity, increased risk of disease occurrence and spread, and extreme weather conditions being the most evident.

Some recent studies in Niger-delta have drawn a link between effects of gas flaring on health and attitudes towards gas flaring (Ibeanu, 2007; Dung, 2008; Eldino, 2010). Global climate change will affect people and the environment in many ways. Specifically these effects includes health-related issues( which may arise from exposure to high radiation from the sun, hence sunburn, discomfort, cancer, tanning, increased body metabolism, etc.), changes in seasonal pattern which will directly or indirectly affect farmers and migratory animals thus leading to starvation, frustration, poverty, etc., destruction of our natural environment which will not only affect economies and aesthetics of nations but also be a huge loss to the future generations whom if fortunate enough will only be left with pictures of these destroyed resources. The more man learns how climate change is caused by human activities, the better he can see reasons its necessary to take actions “not just actions but appropriate actions” to reduce the greenhouse gases (GHGs) emission which is actually the major cause of climate change.

### **Statement of Problem**

The earth’s climate is getting warmer and the signs are everywhere – rain patterns are changing, sea-levels are rising, and ice caps are melting. As global temperature continues to rise, we will experience more adverse challenges in our environment. These challenges are already affecting people, animals and the ecosystem at large, and students are not left out in these effects. Less rainfall can mean less water for some areas, while excess rainfall could cause terrible flooding. The negative impacts of global climate change will be less severe if we reduce the amount of greenhouse gases we produce and worse still, if we continue producing these gases in current or faster rate. This research work seeks to investigate the level of awareness on the cause of climate change among university students at University of Benin.

### **Research Questions**

These following research questions are raised to guide the study.

1. Are undergraduate students aware of the causes of climate change?
2. Is there difference in the awareness of the causes of climate change between male and female undergraduate students?

### **Hypotheses**

The following null hypotheses were tested at 0.05 level of significance.

1. Undergraduate students are not significantly aware of the causes of climate change
2. There is no significant difference between males and females in their awareness of the causes of climate change.

### **Methodology**

The descriptive survey research design was adopted for the study. The design was chosen because it involves studying a group of people or items by collecting and analyzing data from only a few people or items considered to be representatives of the entire population. The population of the study is 7,516 which consists of all the undergraduate students of university of Benin selected from the university’s halls of residence: hall I, hall II, hall III, hall IV and hall V. (University of Benin porter, 2018). In terms of the sample and sampling technique, the systematic sampling technique was employed to select the sample from the total population. This is a type of probability sampling technique in which sample members from a larger population are selected according to random starting point and a fixed periodic interval. Therefore, hall I, III, V were chosen for the study. Then, a simple random sampling was used to select 10% of the population by balloting. Hence 360 respondents made up the sample size for the study. A self-structured

questionnaire was used to elicit response from the respondents. The questionnaire was divided into two sections (A& B). Section A elicited demographic information, while section B elicited the level of awareness on the causes of climate change. Inview of this study, the validity of the questionnaire was ascertained through construct and content validity. The instrument underwent thorough scrutiny by three lecturers from the department of Health Safety and Environmental Education, and their corrections were incorporated. The test-retest reliability was adopted to establish the reliability of the instrument. The instrument was administered to a segment of the population twice after an interval of two weeks, and was collected and computed using pearsons product moment correlation coefficient and a coefficient of 0.78 was obtained. The collected data were analyzed using descriptive statistics and inferential statistics.

## Result and discussion of findings

**Research question one:** Are undergraduate students of university of Benin aware of the causes of climate change?

**Table 1: Undergraduate students awareness of the causes of climate change**

SN	Students' Awareness on Causes of Climate Change	Yes	%	No	%
1	Deforestation is one of the causes of climate change.	304	84%	56	16%
2	Burning of fossil fuel causes climate	324	90%	36	10%
3	Greenhouse gases (GHGs) are the major cause of climate change	315	87.5%	45	12.5%
4	Over population plays a part in earth's changing climate.	310	86%	50	14%
5	Humans are the major contributors of the causes of climate change.	333	92.5%	27	7.5%
6	Climate change is the change in the total atmospheric weather condition of a place over a long of time.	356	99%	4	1%
7	Climate change is only associated with weather condition of a place.	320	89%	40	11%
8	Climate change is a contemporary environmental problem	317	88%	43	12%
9	Climate change is more of global problem than regional problem.	323	90%	37	10%
10	Problem of climate change can be reduced through awareness.	311	86%	49	14%

Source: Field survey (2022)

From the above table, 304(84%) were aware that deforestation is one of the cause of climate change while 56(16%) respondents were unaware. Also 324(90%) of the total respondents were aware that burning of fossil fuel causes climate change while 36(10%) of the respondents were not aware. The table above also shows that 315 respondents were aware that greenhouse gases (GHGs) causes climate change while 45(12.5%) of the respondents were unaware. Consequently, 310(86%) of the sample were aware that over population plays a part in our changing climate while 50(14%) were not aware. The table indicates that 333(92.5%) respondents were aware that human beings are the major contributor to the causes of climate change while 27(7.5%) were not aware. However, 356(99%) respondents are conversant with climate change as a term while just 4(1%) respondents are not aware of the climate change. 320 (89%) respondents answered YES showing that they are aware of the fact that they are aware that climate change is associated with atmospheric weather condition of a place while 40(11%) respondents was not aware. The table also shows that 317(88%) of the respondent are aware that climate change is a contemporary environmental problem while 43(12%) respondents are not aware of this. Consequently, it was also recorded that 323(90%)

are aware that climate change is more of a global problem while 37(10%) of the respondents are not aware and 311(86%) of the respondents agreed that effects of climate change can be reduced through awareness while 49(14%) of the respondents disagreed with this. This table revealed that majority of the respondents are aware of the causes of climate change.

**Hypothesis one:** Undergraduate students are not significantly aware of the causes of climate change

**Table 2: Independent sample t-test statistics showing undergraduate students are not significantly aware of the causes of climate change.**

	N	Mean	S.D	t-value	Df	Sig. (2-tailed )
Aware	304	7.24	1.35	10.96	358	0.00
Unaware	56	4.21	0.77			

\*aware- score of 6 to 10; unaware- score of 0 to 5.

The table above reveals those that 304 respondents were aware with a mean score of 7.24 while 56 respondents were unaware, with a mean score of 4.21. The t-value in the table is 10.96, degree of freedom is 358 and alpha level is 0.00 which is less than the set level of significance of 0.05. Hence the null hypothesis which suggests that undergraduate students are not significantly aware of the causes of climate change is rejected. Therefore it can be inferred that they are significantly aware of the causes of climate change in the study.

**Research question two:** Is there difference in the awareness on causes of climate change between male and female undergraduate students?

**Table 3: Mean distribution showing male and female awareness**

Gender	N	Mean	S.D
Male	207	7.01	1.44
Female	153	6.81	1.51

The table above reveals the mean distribution showing the difference between male and female in their awareness of the causes of climate change. It can be deduced that male have a mean of 7.01 while female had mean of 6.81.

**Hypothesis two:** There is no significant difference between males and females in their awareness of the causes of climate change.

**Table 4: Independent sample t-test statistics showing the difference between males and females in their awareness of the causes of climate change.**

t-value	Df	Sig. (2-tailed)
1.32	358	0.18

The table reveals the t-test statistics showing the difference between males and females in their awareness of the causes of climate change. It can be deduced that the t-value is 1.32, degree of freedom is 358 and alpha level is 0.18 which is greater than the set level of significance of 0.18. Thus the null hypothesis which suggests that there is no significant difference between males and females in their awareness of the causes of climate change is accepted. This shows that there is no significant difference between males and females in the study.

### Discussion of Findings

This research which is focused on investigating the students' awareness on the causes of climate change, taking university of Benin as a case study has exposed the following from the data collected. It was discovered that students are very much aware of the causes of climate change, and that it is also a major environmental problem that has been and is still militating against human and environmental development and sustainability. This is in congruence with the report of Millennium Development Goals (MDGs) that climate change is the biggest environmental issues of our time. This is also in line with the statement that

climate change is an environmental, social and economics challenge on a global scale (Mendelssohn, Dinnar & Williams, 2006). This research is also supported by the findings that adverse impacts climate change includes; frequent drought, increased environmental damages, increased biodiversity loss, decline in soil conditions, increased health risks and the spread of infectious diseases, and changing livelihood systems (Abutudu, Joab – Peterside, & Ishumonah, 2007).

It was also discovered that there is a significant level of awareness on the causes of climate change among the respondents. This research is in contrast with the UNDP report (2010) that the level of awareness on climate change is rather low in Nigeria, and that it's likely to continue if no intervention measures are taken. Nnamchi and Ozor, (2009) identified that because of low adaptive capacities and the projected impacts of climate change will hit most on developing countries than the developed countries... there is need for the government to enhance adaptive capacity among students as agreed by the fact that adaptive capacity reduces vulnerability and promotes sustainable development (Smith, 2000). It was also observed that there is no significant difference between males and females in their awareness of the causes of climate change is accepted. This shows that there is no significant difference between males and females in the study.

### **Conclusion**

This study has examined the level of awareness on the causes of climate change among undergraduate students of university of Benin. The findings have shown that undergraduate students are aware of term "climate change". The research has also exposed that this high level of awareness that was recorded is basically based on individuals' private/sole efforts in understanding their environment or through incidental information they got while surfing the net or engaging other mass media rather than on the information they got through specific awareness programs on climate change organized by any governmental and non-governmental agencies targeted on capacity building on climate change.

### **Recommendations**

Based on the research, the following are deemed necessary;

- ✓ Government should implement environmental laws that will help in protecting Nigerian environment against environment-damaging activities from both individuals and industries.
- ✓ Oil companies in Nigeria should be placed under serious scrutiny in order to deter them from flaring gases which is an act not only considered to be economically unwise but also environmentally unhealthy.
- ✓ To further improve on students' awareness level, free internet service should be made available in all higher institutions of the federation this will enable student to read articles on climate change, download documentaries on climate change and follow-up the world community in environmental matters.
- ✓ These environment related courses should be made compulsory and pre-requisite for gaining admissions into tertiary institutions and passing out of tertiary institution.
- ✓ Government and non-governmental agencies should be organizing seminars, workshops and conventions on environmental matters at least once every year for capacity building on climate change.

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## Socio-Demographic Determinants of Workplace Violence against Nurses and Preventive Strategies in Nsukka Local Government Area, Enugu State

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### Abstract

The study investigated socio-demographic determinants of workplace violence against nurses and preventive strategies in Nsukka LGA, Enugu State. The cross-sectional survey research design was adopted for the study. The population for the study consisted of 310 nurses in Nsukka LGA. The sample was 120 nurses drawn using a multi-staged sampling procedure. The instrument used for data collection was a researcher 23-item structured on Determinants of Workplace Violence and Preventive Strategies Questionnaire (DWVPSQ). Frequencies, percentages, and Pearson Product Moment Correlation were used to analyse and answer the research questions while logistic regression was used to test the null hypothesis at .05 level of significance. The results showed that low proportion (28.6%) of nurses suffered workplace violence. There is a weak positive relationship between workplace violence against nurses and gender ( $r=.056$ ), income level ( $r=.024$ ), marital status ( $r=.081$ ). There is a weak negative relationship between workplace violence against nurses and years of experience ( $r=-.011$ ). High proportion (77.8%) of nurses adopted the preventive strategies for workplace violence against them. Socio-demographic factors of gender, years of experience, income level and marital status ( $p > .05$ ) were not significant determinants of workplace violence against nurses. It was recommended among others, that health educators, teachers, and other relevant stakeholders should enlighten nurses both old and young on the importance of reporting any form of workplace violence they may experience in discharging their professional duties.

**Keywords:** Violence, Workplace violence, Nurses, Preventive strategies, Determinants

### Introduction

Violence directed towards healthcare professionals is a global public health issue that varies greatly throughout nations' healthcare systems. Violence in the healthcare industry has reached pandemic proportions, with nurses being the most often impacted group (Berry, 2013; Nelson, 2014). The health industry accounts for over one-third of all workplace violence worldwide (Boafo, Hancock & Gringart, 2016). Abodunrin et al. (2014) found that 88 per cent of healthcare workers in poor nations reported experiencing violence of various kinds at work, with bullying, abuse, and beating with objects being the most common forms. The prevalence of workplace violence is a severe issue for both developed and developing nations, with more workers in developing nations, particularly in Africa, at danger because of their underdeveloped healthcare systems (Seun-Fadipe et al., 2019). With a population of more than 738 million, Africa has been estimated to have the poorest health indices in the world (World Health Organization, 2014). The primary obstacle to achieving the sustainable development goals is the health problems caused by workplace violence in African health sectors (Salami et al, 2016).

In Nigeria, workplace violence is also pervasive. Research done at Katsina General Hospital in Nigeria to determine the prevalence of workplace violence (WPV) against nurses found that 100 per cent of the nurses have dealt with some sort of violence at work (Abdulahil, Thomas & Sanusi, 2018). Furthermore, in a multi-centre survey conducted by Ogundipe et al. (2013) in Nigeria, about 88.6 per cent of those surveyed said they had seen violent incidents at emergency rooms, and 65 per cent said they had personally suffered



injuries, nurses being the most common victims. Abodunrin (2014) conducted a cross-sectional survey with 242 healthcare workers in Oshogbo, Southwest Nigeria. The results showed that nurses had the highest prevalence at 53.5 per cent. Nonetheless, the majority of locally conducted research showed that the offenders were either patients or the relatives of the victims.

The World Health Organization (WHO, 2022) defines violence as the deliberate use of physical force or power, threatened or actual, against oneself, another person, or against a group or community that has consequences or has a high probability of resulting in injury, death, mental distress, mal-development, or deprivation. This definition emphasizes that a person or group must intend to use force or power against another person or group in order for an act to be classified as violent. Also, workplace violence is defined as any act or threat of physical violence, harassment, intimidation, or other threatening disruptive behaviour that occurs at work by the Occupational Safety and Health Administration (OSHA, 2015). This study will be adopting the definition of the World Health Organization. Violence can come in various forms physical assault; (bullying, slapping, kicking, stabbing), verbal abuse, sexual assault and psychological. Violence can occur and where, in the home, school churches, parks, and even in the workplace (Rafati, Zabihi, & Hosseini, 2011).

Even at work, violent crimes are frequently committed. Workplace violence refers to “the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, which either results in or has a high likelihood of resulting in injury, death, community, which either results in or has a high likelihood of resulting in injury, death, physiological harm, maldevelopment, or deprivation”. (International Labour Office; International Council of Nurses; World Health Organization; Public Services International, 2002). Workplace violence is defined as any act or behavior that puts an employee's health and well-being at jeopardy while they are at work, according to the International Council of Nurses (2013). According to Chappell and Di Martino (2006), workplace violence is any action, incident, or behavior that deviates from appropriate conduct and results in an individual being attacked, threatened, harmed, or injured while performing their job. In this study, workplace violence is defined as any action wilfully carried out to threaten, demean, injure, or assault a worker in his or her place of employment. The National Institute for Occupational Safety and Health (NIOSH, 2012) defines workplace violence as “violent acts (including physical assaults and threats of assaults) directed toward persons at work or on duty.” Workplace violence may also include acts that result in damage to an organization's resources or capabilities.

The following are some examples of workplace violence: criminal intent: the offender typically enters the impacted workplace with the intention of committing a robbery or other criminal conduct, and they have no official business link with the establishment. Customer/client: the offender is the victim or the person who receives a service from the impacted workplace. The attacker can be a criminal suspect, an inmate, a prisoner, a patient, a customer, or a former client. Co-worker: the offender has some connection to the impacted workplace through their job. This typically entails an attack by a management, supervisor, or former or present employee. Personal relationship; the perpetrator is someone who does not work there but has or is known to have had a personal relationship with an employee. Workplace Violence also has subtypes which were classified as physical violence or non-physical violence, such as verbal abuse, verbal threats, sexual harassment and psychological stress (Cheung & Paul 2017).

The goal of preventive measures is to avoid negative things from happening or things that lead to problems from happening. The goal of prevention is to minimize, eradicate, or otherwise lessen the effects of a disease or handicap (Abdellah & Salama, 2021). Interventions aimed at preventing the development of particular illnesses are known as preventive strategies. According to Sarfield, Hyde, & Gervas (2008), preventive measures are any tactics that stop a disease or illness from getting worse at any point along its causation. Eliminating risk factors for workplace violence is one way to implement preventive tactics. Regardless of the situation, all types of workplace violence seem to be harmful to the victim's health and exploitative. In addition, workplace violence carries gross health implications against nurses and needs to be prevented in the interest of the nurses and the wider society

A nurse's job is to tend to the medical needs of sick and injured patients, usually in a hospital. A person who has successfully finished a basic or generalized nursing education program and has been granted permission by the relevant regulatory body to practice nursing in their nation is also known as a nurse (ICN, 2013). According to the ICN (2013), basic nursing education is an officially recognized program of study that offers a solid and comprehensive basis in the behavioural, life, and nursing sciences for post-basic education in specialized or advanced nursing practice, as well as for general nursing practice and leadership roles. In this study a nurse is a person who has completed a program of basic, generalized nursing education and is authorized by the appropriate regulatory authority to practice nursing in his/her country and is practicing nursing.

Several socio-demographic factors have been found to be determinants of workplace violence against nurses. However, the factors of interest in his study are gender, years of experience, income level and marital status. Edward et al. (2016) reported that female nurses were victims of verbal abuse more often than male nurses, and male nurses were reported to be more commonly the victims of physical abuse. Physical violence and verbal abuse were found to be more experienced by nurses with fewer years of experience or those who just began practicing than those with higher years of experience (Martinez, 2016). Martinez also reported that cases of violence like physical violence, verbal abuse, and sexual harassment have been reported to be more in places with people of low-income level than in places with people with high income level (Martinez, 2016). In general patients and their relatives have been reported to be more hostile to nurses perceived to be single than those perceived to be married. Single nurses experienced verbal abuse physical assault (slaps) and sexual harassment (slapping of butt) more than those married (NIOSH, 2012).

Preventive strategies for workplace violence are strategies that reduces risk occurrence of work place violence. These strategies include, social and emotional competence, awareness of patient's behaviour, familiarity with workplace violence prevention program, attend safety health program, report violent incident promptly and accurately, dress for safety, note exits and emergency phone numbers when changing workplace, beware of your environment, check socio cultural biases and use violence risk assessment tools (Gates, Gillespie, & Succop, 2011 }.

This study was carried out in Nsukka LGA. Nsukka is a local government area in Enugu state, with administrative headquarters in the town Nsukka. Nsukka LGA falls within the northern senatorial zone of Enugu state otherwise known as Enugu north senatorial zone or Nsukka zone alongside Igbo-etiti, Igbo-eze north, Igbo-eze south, Udenu an Uzo-uwani LGAs Nsukka also forms a federal constituency alongside igbo-eze south LGA, Nsukka covers an area of 484km<sup>2</sup>, with a population of 309,448 as at the 2006 national population census, Nsukka LGA is the largest LGA population in Enugu state. Nsukka LGA is bound to the north by Igbo-eze south LGA, to the north east by Udenu LGA, to the south by Isi-uzo LGA, to the south by Igbo-etiti LGA, to the southwest by Uzo-uwani LGA, and to the west by Kogi state.

Evidence has indicated that the aftermath of workplace violence in the medical field significantly affects how well health systems function, particularly in poor nations. Despite growing concerns from healthcare professionals about the rising prevalence of workplace violence, not much has been done to identify its root cause or establish protective and preventive measures to lessen its threat, particularly in developing nations like Nigeria. In view of these facts, the researcher investigated determinants of workplace violence and their preventive strategies in Nsukka LGA, Enugu State. Ideally, health care centres should be a place where peace and tranquillity should reign. The atmosphere should be conducive for the effective administration of curative medicine. There should be no assault, both nurses and patients should be disciplined each playing their roles for effective administration of medicine which in turn will make both the nurses, patients and their relatives happy. Unfortunately, this is not the case, as patients and their family members/relatives sometimes misbehave and demonstrate behaviours capable of making both nurses and patient express some undesirable behaviours which are inimical to the health of both nurses and patients. Some of such behaviours include verbal abuse, physical assault, sexual harassment especially against female nurses. Workplace violence is harmful and leads to decreased performance of nurses. Also, nurses are regularly

faced with risk factors such as individual/patient factors (factors directly related to the patient); family and relative's factors (those factors arising from the family and relatives of the patient) as well as socio/environmental factors (those factors emanating from the environment or social interaction) all these tend to expose nurses to workplace violence

Workplace violence has been linked to some health problems. Some of these health problems leave these nurses incapacitated for life. In most cases, they experience humiliation, embarrassment, isolation, depression, discrimination and also physical injury due to physical assault. This study investigated the proportion of nurses who suffer workplace violence, the relationship between workplace violence and socio-demographic factors of gender, years of experience, income level, and marital status. The study also identified the preventive strategies for workplace violence against nurses. It was hypothesized that socio-demographic factors of gender, years of experience, income level, and marital status are not significant determinants of workplace violence against nurses.

## **Methods**

**Study Design:** The cross-sectional survey research design was adopted to achieve the objectives of the study.

**Area of the Study:** The study was conducted in Nsukka Local Government Area (LGA), Enugu State. Nsukka is one of the 17 LGAs in Enugu State. The LGA is named after the town of Nsukka, which serves as its headquarters. According to the National Population Commission of Nigeria (2018), the land area of Nsukka LGA is approximately 1,777.3 square kilometres and has a population of approximately 309,633 people. There are several hospitals in Nsukka LGA with nurses employed to provide patient care.

**Study Population and Sample:** The population for the study consisted of all the nurses in Nsukka LGA which consists of, there 310 nurses in the 28 hospitals in Nsukka LGA. The sample used by the researcher for this study was 120 nurses in Nsukka LGA determined using multistage sampling procedure was used to arrive at the sample. Stage one involved simple random sampling to draw out 10 hospitals in Nsukka LGA. Stage two involved simple random sampling technique to draw 12 nurses from each of the 10 hospitals in stage one. Stage three involved the use of convenience sampling to draw out 120 nurses from that were used for the study. Convenience in the sense that, only nurses who had time and expressed their consent participated in the study.

**Method of Data Collection:** The instrument used for data collection was a researcher structured 23-item structured Determinants of Workplace Violence and Preventive Strategies Questionnaire (DWVPSQ). The DWVPSQ consisted of three sections, A, B and C. Section A comprised of four items which sought information on the socio-demographic data of the respondents. Section B consisted of 11 items with a yes or no response options eliciting information on the workplace violence against nurses. Section C consisted of 8 items with a yes or no response options to identify the preventive strategies for workplace violence against nurses. The face validity of the instrument was established by five experts from Department of Human Kinetics and Health Education, University of Nigeria, Nsukka. A reliability index of .801 was obtained using split half (Spearman's rank order correlation) and adjudged reliable for the study based on the guidelines of Cohen, Manion and Morrison (2018) that if the reliability coefficient yields 0.70 and above, the instrument should be considered reliable for the study.

The researchers explained the objectives of the research to the participants and the participants were assured about the privacy of their data. After their consent was gotten, 120 copies of the questionnaire were administered to the respondents in each of the sampled hospital by the researchers, out of which 99 copies were returned which gave a return rate of 82.5 per cent. The returned copies of the questionnaire were properly filled out and used for data analysis.

**Data Analysis:** Data were coded and analysed using IBM Statistical Package for the Social Sciences (SPSS) version 25. Data were analysed using frequency, percentages and Pearson product moment correlation to answer the research questions. Logistic regression was used to test the null hypothesis at .05 level of significance.

## Results

**Table 1: Proportion of Nurses Who Suffer from Workplace Violence (n=99)**

s/n	Items on workplace violence	Yes f(%)	No f(%)
1.	Have you been assaulted before by a patient or their relative?	27(27.3)	72(72.7)
2.	Have you been assaulted/bullied by a senior colleague?	38(38.4)	61(61.6)
3.	Have you been assaulted due to a lack of experience to manage the situation?	25(25.3)	74(74.7)
4.	Is being single a factor to be sexually harassed in work place?	28(28.3)	71(71.7)
5.	Have you been assaulted because you are considered too young to be a nurse?	16(16.2)	83(83.8)
6.	Have you been assaulted because you are considered inexperienced to be a nurse?	22(22.2)	77(77.8)
7.	Is income level a factor to be considered for bullying/assault in the workplace?	38(38.4)	61(61.6)
8.	Were you treated with respect in the workplace because you are older than the patients/relative	27(27.3)	72(72.7)
9.	Were you treated with respect in the workplace because of your marital status?	33(33.3)	66(66.7)
10.	Is gender a factor to be considered for sexual harassment?	27(27.3)	72(72.7)
11.	Is gender a factor to be considered for physical assault?	30(30.3)	69(69.7)
<b>Cluster %</b>		<b>28.6</b>	<b>71.4</b>

Key: < 50% = low proportion, ≥ 50% = high proportion

Results in Table 1 showed that low proportion (28.6%) of nurses suffer from workplace violence.

**Table 2: Pearson Product Moment Correlation between Workplace Violence against Nurses and Socio-demographic factors (n=99)**

s/n	Socio-demographic Factors	R
1.	Gender	.056
2.	Years of experience	-.011
3.	Income level	.024
4.	Marital status	.081

Key for interpretation: ±.00 – ±.29 = None to weak relationship; ±.30 – ±.59 = Moderate relationship; ±.60 – ±.99 = Strong relationship; ± 1.00 = Perfect relationship. Source: Nwagu and Agbaje (2017)

Results in Table 2 showed that there is a weak positive relationship between workplace violence against nurses and gender ( $r=-.056$ ), income level ( $r=.024$ ), and marital status (.081). Also, the results showed a weak negative relationship between workplace violence against nurses and years of experience ( $r=-.011$ ).

**Table 3: Preventive Strategies for Workplace Violence against Nurses (n=99)**

s/n	Items	Yes f(%)	No f(%)
1.	Availability of emergency bell can be a factor to prevent workplace violence	88(88.9)	11(11.1)
2.	Sensitization of people against workplace violence is a preventive strategy	79(79.8)	20(20.2)
3.	Assigning patients of a gender to nurses of the same gender is a preventive strategy to workplace violence	48(48.5)	51(51.5)
4.	Creating policies where penalties would be met to defaulters can help prevent workplace violence	80(80.8)	19(19.2)
5.	Creating a demarcation in hospitals between relatives of patients and nurses is a preventive strategy to workplace violence	72(72.7)	27(27.3)
6.	Training nurses on psychological and social management skills can help reduce workplace violence.	82(82.8)	17(17.2)
7.	Paying of incentives to nurses assaulted/harassed by patients can help prevent workplace violence	79(79.8)	20(20.2)
8.	Raising of salaries and hazard allowances can encourage hospitals to enforce laws against workplace violence.	88(88.9)	11(11.1)
<b>Cluster %</b>		<b>77.8</b>	<b>22.2</b>

Key: < 50% = low proportion, ≥ 50% = high proportion

Results in Table 3 showed that a high proportion (77.8%) of nurses adopted the preventive strategies for workplace violence against them.

**Table 4**  
**Logistic Regression Identifying Socio-demographic Determinants of Workplace Violence Against Nurses (n=99)**

Demographic Factors	B	S.E	Wald	Df	p-value	OR	95% C.I. for Exp(B)	
							Lower	Upper
<b>Gender</b>								
Male <sup>a</sup>								
Female	-18.510	14487.402	.000	1	.999	.000	.000	
<b>Years of Experience</b>			.683	2	.711			
Below 5 years <sup>b</sup>								
5-10 years	18.046	9972.629	.000	1	.999	68721193.747	.000	
Above 10 years	19.089	9972.629	.000	1	.998	195110212.062	.000	
<b>Income Level</b>			1.539	2	.463			
Below 50k								
50k-100k	17.265	13610.871	.000	1	.999	31495479.148	.000	
Above 100k	18.980	13610.871	.000	1	.999	174877932.024	.000	
<b>Marital Status</b>								
Single <sup>c</sup>								
Married	.361	1.044	.119	1	.730	1.434	.185	11.105
Constant	-38.436	16873.336	.000	1	.998	.000		

Cox & Snell R<sup>2</sup> = .099

CI= confidence Interval

$\chi^2(6) = 10.304, p = .112 > .05$

Predicted Classification Table Overall = 92.9

Ref Groups: Gender = Male<sup>a</sup>; Years of Experience = Below 5 Years<sup>b</sup>; Income Level = Below 50k<sup>c</sup>; Marital Status= Single<sup>d</sup>

Results in Table 4 show that a test of the full model identifying socio-demographic determinants of workplace violence against nurses against a constant only model was not statistically significant, indicating that the socio-demographic factors of gender, years of experience, income level and marital status as a set had no significant effect,  $\chi^2(6) = 10.304, p = .112 > .05$ . Also, Cox and Snell R<sup>2</sup> of .099 indicated that 9.9 per cent variation in the dependent variable was explained by the socio-demographic factors. Prediction success overall was 92.9 per cent. Findings showed that gender, years of experience, income level and marital status ( $p > .05$ ) were not significant determinants of workplace violence against nurses.

### Discussions

Findings in Table 1 showed that overall, low proportion of nurses suffered from workplace violence. This is expected and not surprising because nurses are professionals who have been trained on how best to deal with aggressive patients and patient relative. The findings agree with the findings of Ming (2014) that 7.8 per cent of nurses reported physically violent experiences and 71.9 per cent reported non-physically violent experiences. The findings disagree with the findings of Abdellah and Salama (2021) that workplace violence was reported by 59.7 per cent of healthcare workers in Ismailia, Egypt. The difference in findings may be because both studies were carried out in different location using different instruments. The findings have implications for nurses. Nurses should ensure that every form of violence experienced is reported immediately to the appropriate authority.

Findings in Table 2 showed that there is a weak positive relationship between workplace violence against nurses and gender. The corresponding hypothesis in Table 4 showed that gender was not a significant determinant of workplace violence against nurses. This is surprising and not expected because from observation, females are always at the receiving end of violence. The findings disagree with the findings of Alyaemnia and Alhudaithib (2012) that gender was significantly associated with workplace violence against nurses in the emergency departments of three hospitals in Riyadh, Saudi Arabia. The findings also disagreed with the findings of Kitaneh and Hamdan (2012) that males significantly experienced higher exposure to physical violence in comparison with female physicians and nurses in Palestinian public hospitals. The disparity in findings may be because of the difference in instrument used for data collection.

Furthermore, findings in Table 2 showed that there is a weak negative relationship ( $r=-.011$ ,  $p=.430$ ) between workplace violence against nurses and years of experience. The corresponding hypothesis in Table 4 showed that years of experience was not a significant determinant of workplace violence against nurses. This is expected and not surprising as experience or no experience is not enough reason to be aggressive to another individual. The findings disagreed with the findings of Alyaemnia and Alhudaithib (2012) that years of experience is a significant determinant of workplace violence. The findings also disagree with the findings of Ming (2014) that inexperienced nurses were more likely to report physical or nonphysical violence compared with experienced nurses. The disparity in findings may be due to difference in culture, values and belief.

Similarly, findings in Table 2 showed that there is a weak positive relationship ( $r=.024$ ,  $p=.331$ ) between workplace violence against nurses and income level. The corresponding hypothesis in Table 4 showed that income level was not a significant determinant of workplace violence against nurses. The findings are not expected and so surprising. This is because nurses with low income may be more likely to react violently to aggressive behaviours from patient and patient relatives than those with higher income. The findings have implications for the government as they need to review the take home pay of nurses and also include hazard allowances to cover for some forms of violence.

In the same way, findings in Table 2 showed that there is a weak positive relationship between workplace violence against nurses and marital status. The corresponding hypothesis in Table 4 showed that marital status was not a significant determinant of workplace violence against nurses. The findings are expected and not surprising because, regardless of marital status, nurses have been trained to manage outbursts and aggressive behaviours from other people. The findings agree with the findings of Betty et al. (2021) that marital status was not a significant predictor of workplace violence against emergency nurses at a tertiary hospital in Kenya.

Findings in Table 6 showed that overall, high proportion of nurses adopted the preventive strategies for workplace violence against nurses. This is expected as the strategies agree with the trainings nurses may have received with regards to interpersonal relationships and how to deal with aggressive and violence individuals. The findings agreed with the findings of Abdellah and Salama (2021) who reported that 75 per cent of HCW thought that work place violence could be prevented in Ismailia, Egypt. The findings, however disagreed with the findings of Mitchell, Ahmed and Szabo (2014) that most of the nurses did not have correct knowledge about preventive strategies of workplace violence. The findings have implication for health educators. Health educators are expected to organise seminars and workshops aimed at educating nurses on the preventive strategies for workplace violence.

## **Conclusions**

The findings of the study showed that low proportion of nurses suffered from workplace violence. There is a weak positive relationship between workplace violence against nurses and gender, income level and marital status. However, there is a weak negative relationship between workplace violence against nurses and years of experience. High proportion of nurses adopted the preventive strategies for workplace violence against nurses. Socio-demographic factors of gender, years of experience, income level and marital status were not significant determinants of workplace violence against nurses.

## **Recommendations**

Based on the findings, discussion and conclusion of the study, the following recommendations were made:

1. Health educators, teachers, and other relevant stakeholders should enlighten nurses both old and young on the importance of reporting every form of violence they may experience in the workplace.
2. Agencies, both governmental and non-governmental should sponsor programmes in the civil service to teach workers about the best ways to handle violent situations in the workplace.

3. Health educators, teachers and health care providers should also enlighten individuals and patients on the need to adopt friendly and calm behaviours towards nurses.
4. Hospital administrators should be encouraged to train their staff irrespective of age and gender on the right attitude to adopt when dealing with violent patients. This way, the knowledge can be sustainable and easily propagated.

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## Impact of Meal Ticketing on Students' Academic Performance and Well-Being in Havilla University, Nde-Ikom, Cross River State

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### Abstract

This research utilizes primary data obtained from weekly sales meal tickets from HUNI cafeteria, students hospital bills, and GPA/CGPA (1<sup>st</sup> and 2<sup>nd</sup> semesters) covering a period of twelve months (9/11/2021 to 20/08/2022). Chi-square estimation, showed a significant relationship between the incidence of ill-health and feeding regime, [ $\chi^{cal}(434.98) > \chi_{0.05,9}^{tab.}(16.919)$ ] with a p – value = 0.0000. This implied that meal ticketing, students' academic performance and well-being are inter-dependent. The linear correlation is strongly/positively correlated (i.e., 1). Also, male students between the age bracket of 17 to 18 years were more prone to ill-health between first and second semesters when compared to the female students. This means that in the first semester (without a feeding regime) ill-health cases were higher than those recorded for the second semester (when feeding a regime was introduced). Hence, the analysis recommended that HUNI should encourage and continue with its meal ticketing policy to enhance students' academic performance and well-being. Also, government should be encouraged in the light of the above to institute a meal ticketing policy in tertiary institutions.

**Keywords:** Chi-square, Correlation, Academic performance, Meal ticketing

### Introduction

The increasing knowledge of the importance of nutrition in the promotion of growth, good health, disease prevention as well as in the enhancement of general physiological and psychosocial well-being of man has led to a greater concern about the kind of food and the feeding patterns of man especially among students (Rola & Ahlam, 2021). Food can be characterized as any solid or liquid substance which when taken into the body supplies the body with chemical substances called nutrients, which are generally classified into six namely carbohydrates, proteins, lipids (fats), vitamins, minerals and water (Food, Nutrition and Health, 2020). Essentially, food is eaten for the purpose of gaining energy, growth repair, and as well as for the overall maintenance and regulation of various activities in the body.

The importance and benefits of food in the body have been documented. Reuter et al., (2022), reported that the cells in the human body got energy from food calories in the form of macronutrients from carbohydrates, protein, and fats. According to them the recommended total daily calories should include 45-65% of carbohydrate, 12-20% protein, and 20-25% from fat. Food reinforces the body with energy, vitamins, which are concern with processes that promote neuronal survival, and promote the synthesis of neurotransmitters which have to do with the efficient flow of information across synapses (Mudambi & Rajagopal, 2020). Deficiencies or excesses of certain micronutrients can lead to nerve damage in the brain, and thus bring about alterations in memory, impairment of brain function and reduction in the ability to solve problems (Food, Nutrition and Health, 2020). Vitamins and minerals are very essential in humans, even though they

are needed in small amount they help in the production of energy, gives support to the walls of the blood vessels, promote good vision, and bone formation and have antioxidant functions. The function of food as the overall nourishment of the body and promotion of healthy living can be achieved through proper dieting such as taking a balanced diet and eating regularly at normal mealtime otherwise malnutrition occurs (Sohail et al., 2022).

School feeding programmes have been lauded to be a viable social protection mechanism and an investment in social capital of the society (Solomon & Yusuf, 2022). School feeding contribute to student's readiness to learn and ability to participate in their educational processes. Poorly fed students are more prone to ill-health and stunted growth rate, weakness of the body system and inability to participate in their academic work (Radhika, 2022). That is, food and nutrition are regarded to render an important contribution in promoting health and well-being (Radhika, 2020). This is similar to the observation by Abd El Hakeem et al., (2015), who assesses that school feeding reduces hunger among the learners which improves their ability to concentrate in the classroom. More so, dietary examples such as omission or intake of breakfast can influence intellectual capacity and conduct in young people, meal patterns and nutrient composition can over the long-run apply to have helpful or adverse effects as these may connect with cognition (Reuter et al., 2020). Breakfast as a component of a healthy diet and way of life decidedly impacts children and students well-being and general prosperity, particularly supplements rich in fruits and dairy items (Egede, 2021). Students who eat a balance diet do better in their exams than those who do not. Similarly, nourished students show better performance as compared to malnourished students (Egede, 2021).

Jessica et al. (2019), found that high level of physical activity and taking daily main meals are directly related to improved performance in school and emphasize the essentialness of encouraging these habits among students. Rola & Ahlam (2021), revealed that students' score was better if their dietary intake was healthy and regular. Peter et al. (2020), conducted an online survey with 577 undergraduate universities in the US to find a relationship between their consumption habit and academic performance. They found that eating a healthy breakfast had a constructive consequence on self-reported GPA and that eating fast food had a negative outcome. Their overall conclusion was that a healthy diet has a constructive effect on the academic performance on students. A study conducted in Jamaica shows that school meals indeed improve the education of beneficiaries they found that school performance indicators such as enrollment, attendance, dropout rate, school attainment levels, and cognitive functions have all improved in response to school feeding habits.

In a global survey of school meal programs in Africa showing regional results from 2019 by Wineman et al (2022), detailed information on school feeding activities in each country was captured in the Global Survey of School Meal Programs which launched in 2019. Each government received an invitation to join, and they then designated a national respondent to compile data on every aspect of the nation's extensive school meal program. The study was completed in 2019 by 41 African nations, including 38 in sub-Saharan Africa. The responses included details on 68 extensive projects that collectively impacted 60.1 million children. The total budget for meals for schools in these nations was USD 1.3 billion. Regions, income levels, and degrees of national commitment all show diversity in school meal programs. Southern Africa, nations where school feeding is a line item in the national budget, and nations where the domestic part of the school feeding budget is higher tending to have the highest coverage rates. Programs that procured food through domestic purchases rather than relying on foreign in-kind donations tended to have the most diversity in their school menus. About two-thirds of the programs served fortified foods, and a quarter offered micronutrient supplements to combat micronutrient deficiency. Only 10% of school meal programs designated prevention of overweight/obesity as a goal, despite the fact that these conditions are becoming more prevalent among African schoolchildren. This concluded that a significant shift in favour of national ownership and local food procurement may be seen in how much domestic financing is used to support school meal programs in Africa. Programs have struggled with underfunded and unpredictable budgets, as well as issues with supply chains and logistics. These issues need to be resolved if these programs are to accomplish their goals. Overall, the survey's findings highlight the significant role that school meal

programs play in African food systems and their potential to sustainably enhance child nutrition, food security, and health.

In a review to determine impacts of school feeding on educational and health outcomes of school-age children and adolescents in low- and middle-income countries by Wang et al (2021), found that the percentage of school days attended increased significantly as a result of school feeding (2.6%; 95% CI=1.2%, 3.9%;  $P=0.001$ ). In another study testing whether food fortified with multiple micronutrients provided in Food for Education (FFE) programs reduced anemia prevalence of primary-school-age adolescent girls, adult women, and preschool children in Uganda, results showed that adolescent girls aged 10-13 y in FFE schools experienced a significant ( $P < 0.05$ ) 25.7 percentage point reduction (95% CI: -0.43, -0.08) in prevalence of any anemia [hemoglobin (Hb)  $<11.5$  g/dL, age 10-11 y; Hb  $<12$  g/dL, age 12-13 y] and a significant 19.5 percentage point reduction (95% CI: -0.35, -0.04) in moderate-to-severe anemia (Hb $<11$  g/dL) relative to the control group (Adelman et al., 2019).

In a study to evaluate the impact of a large-scale school meals program in Ghana on school-age children's anthropometry indicators by Gelli et al (2019), A longitudinal cluster randomized control trial was implemented across the 10 regions of Ghana, covering 2869 school-age children (aged 5–15 y). Communities were randomly assigned to 1) control group without intervention or 2) treatment group providing the reformed national school feeding program, providing 1 hot meal/d in public primary schools. Height-for-age (HAZ) and BMI-for-age (BAZ) z scores were the primary outcomes. The findings indicated that school meals had no impact on HAZ and BAZ in kids between the ages of 5 and 15. The school feeding intervention did, however, improve HAZ in 5- to 8-year-old children (effect size: 0.12 SDs), in girls (effect size: 0.12 SDs), particularly in girls aged 5-8 y living in the northern regions, and in children aged 5-8 y in households living below the poverty line (effect size: 0.22 SDs) in per-protocol subgroup analysis. Additionally, there was evidence that the intervention affected how food was distributed and shared among households. It was concluded that in the early years of primary school, school meals can serve as a foundation for scaling up nutrition interventions, with significant advantages accruing for more disadvantaged children (Gelli et al, 2019).

### **Statement of the Problem**

Lack of proper feeding habits can cause ailments that range from mild gastric discomfort, through infections and diarrhea, to severe diseases such as diabetes, hypertension, cardiovascular disease, some forms of cancer, anemia, malnutrition, and starvation. Poor feeding habits lead to decreased mental capacity, and deficiencies in specific vitamins and minerals that can inhibit cognitive abilities and mental concentration. Many reasons have been presented to count for these deficiencies, and if nothing is done, our nation's dream of becoming a healthier nation will be a mirage.

School feeding programmes across most sub-Saharan African countries are focused on primary and secondary schools. Although there is literature on the advantages of school feeding on academic performance at these educational levels, there is a glaring research gap on how these programs could affect university students' academic performance, particularly in Nigeria.

It is important to assess how lifestyle factors especially feeding habits, affect students' academic performance at the college and the university level. As students of Havilla university Nde-Ikom moved from first semester 2021 academic year (without meal tickets regime), to the second semester 2022 academic year (with meal tickets), their feeding habits transformed as they adapted to new resources. Hence, this prompted the need to assess the effect of meal ticketing on the academic performance and health of students in HUNI.

This study intends to close the gap in school feeding programmes literature by examining the relationship between Nigerian university students' health and academic performance and their school feeding programme. Havilla University has an extensive school feeding program and all students reside on-campus and feed from the single-vendor cafeteria system.

## Objectives of the Study

The broad objective of these research is to assess the impact of meal ticketing on students' academic performance and well-being in Havilla University, Nde-Ikom, Cross River State, Nigeria.

While the specific objectives are:

- i. To determine the relationship between meal ticketing, students' academic performance and well-being in Havilla University.
- ii. To assess students average scores before and after school feeding program (SFP), 2021/2022.
- iii. To determine the health condition of students before and after school feeding program.

## Hypotheses

The following two null hypotheses were tested at 0.05 significant levels:

H<sub>01</sub>: There is no statistically significant relationship between meal ticketing and students' academic performance

H<sub>02</sub>: There is no statistically significant relationship between meal ticketing and students' wellbeing

## Methodology

For this study, the population involved sixteen (16) 200 level students of Havilla University, Nde Ikom, Cross River State, Nigeria. The research utilizes primary data obtained from weekly sales of meal tickets covering a period of twelve months ranging from 9<sup>th</sup> November, 2021 to 20<sup>th</sup> August, 2022, due to students' frequent visits to the hospital within period under review. Hospital bills from students' files and student GPA (first and second semester), for the analysis. Quantitative answers were analyzed using chi square statistic to check whether self-reveal meal tickets sold was connected with student examination performance and well-being, frequency and percentage methods was also utilized. The justification for this study is to analyze the impact of good meal on students' academic performance in Havilla University.

## Model

To determine the impact of meal ticketing (feeding habit) on students' academic performance and well-being in Havilla University Nde-Ikom, Cross River State. The following empirical model was specified based on the objective of the study called chi square statistic for analysis of  $r \times c$  table. Thus;

$$X^2 = \sum_{i=1}^r \sum_{j=1}^c \frac{(o_{ij}-e_{ij})^2}{e_{ij}} \quad (1)$$

Where  $r = \text{row}$ ,  $c = \text{column}$ ,  $O_{ij} = \text{observed frequencies}$ ,  $e_{ij} = \text{expected frequencies denoted by}$

$$e_{ij} = \frac{(\text{ith row total}) \times (\text{jth column total})}{\text{grand total}} \quad (2)$$

And  $v = (r - 1)(c - 1)$  degree of freedom (3)

To perform a chi square test, we then substitute into equation one and we reject the null hypothesis if the value of the calculated statistic  $X^2$  exceed the tabulated value  $X^2_{\alpha}$  for  $(r - 1)(c - 1)$  degree of freedom.

## Results and Discussion

**Table 1:** Demographic profile of the participants

		Frequency	Percentage %
Gender	Male	13	63.16
	Female	7	36.84
Total			100
Age (in years)	15-16	1	5.26
	17-18	10	52.63
	19-20	3	15.79
	21 and above	5	26.32
Total			100

Source: HUNI Admission Record (2021/2022).

To determine whether there really is a relationship between meal ticketing, students' academic performance and well-being in HUNI, the researcher took a sample of 1769 cases from weekly tickets sold from cafeteria extensive files and obtained the results shown in Table 2.

**Table 2: A summary of tickets sold per week.**

		Number of weeks				
Sales per week	Weeks	Week 1	Week 2	Week 3	Week 4	Total
	Week 1	105	138	192	185	<b>620</b>
	Week 2	59	152	52	140	<b>403</b>
	Week 3	48	143	42	158	<b>391</b>
	Week 4	170	168	13	4	<b>355</b>
	Total	<b>382</b>	<b>601</b>	<b>299</b>	<b>487</b>	<b>1769</b>

Source: Research data (2021/2022)

$$e_{11} = \frac{620 \times 382}{1769} = 133.88, \quad e_{12} = \frac{620 \times 601}{1769} = 210.64, \quad e_{13} = \frac{620 \times 299}{1769} = 104.79$$

$$e_{14} = \frac{620 \times 487}{1769} = 170.68,$$

$$e_{21} = \frac{403 \times 382}{1769} = 87.02, \quad e_{22} = \frac{403 \times 601}{1769} = 136.92, \quad e_{23} = \frac{403 \times 299}{1769} = 68.12$$

$$e_{24} = \frac{403 \times 487}{1769} = 110.94$$

$$e_{31} = \frac{391 \times 382}{1769} = 84.43, \quad e_{32} = \frac{391 \times 601}{1769} = 132.84, \quad e_{33} = \frac{391 \times 299}{1769} = 66.09$$

$$e_{34} = \frac{391 \times 487}{1769} = 107.64$$

$$e_{41} = \frac{355 \times 382}{1769} = 76.66, \quad e_{42} = \frac{355 \times 601}{1769} = 120.61, \quad e_{43} = \frac{355 \times 299}{1769} = 60.00$$

$$e_{44} = \frac{355 \times 487}{1769} = 97.73$$

$$X^2 = \frac{(105 - 133.88)^2}{133.88} + \frac{(138 - 210.64)^2}{210.64} + \frac{(192 - 104.79)^2}{104.79} + \frac{(185 - 170.68)^2}{170.68} + \frac{(59 - 87.02)^2}{87.02} \\ + \frac{(152 - 136.92)^2}{136.92} + \frac{(52 - 68.12)^2}{68.12} + \frac{(140 - 110.92)^2}{110.92} + \frac{(48 - 84.43)^2}{84.43} \\ + \frac{(143 - 132.84)^2}{132.84} + \frac{(42 - 66.09)^2}{66.09} + \frac{(158 - 107.64)^2}{107.64} + \frac{(170 - 77.66)^2}{77.66} \\ + \frac{(168 - 120.61)^2}{120.61} + \frac{(13 - 60.00)^2}{60.00} + \frac{(4 - 97.73)^2}{97.73}$$

$$X^2 = 6.23 + 25.05 + 72.58 + 1.20 + 9.02 + 1.66 + 3.81 + 7.62 + 15.72 + 0.78 + 8.78 + 23.56 \\ + 113.64 + 18.62 + 36.82 + 89.89$$

$$X^2 = 434.98$$

### Criterion

Degree of freedom at  $\alpha = 0.05$ ,

$$v = (r - 1)(c - 1) = (4 - 1)(4 - 1) = 3 \times 3 = 9$$

$$\alpha_{0.05,9} = 16.919$$

### Decision

Since  $X^2 = 434.98$  exceeds  $X_{0.05,9}^2 = 16.919$ , we reject the null hypothesis, and conclude that meal ticketing, student academic performance and well-being (health outcome) are dependent.

### Correlation

Correlation defines the relationship that exist between two variables. In this respect, we look at the relationship between meal ticket/academic performance and meal ticket/students well-being.

Let Meal ticket be denoted by  $X_{MTK}$ , Academic performance be denoted by  $Y_{ACP}$ , and let students well-being be denoted by  $Y_{SWB}$ .

**Table 2:** Summary analysis of Meal ticketing, Academic performance and Students well-being.

$Y_{SWB}$ (000)	$Y_{ACP}$	$X_{MTK}$	$(Y_{SWB})^2$	$(Y_{ACP})^2$	$X_{MTK}Y_{SWB}$	$X_{MTK}Y_{ACP}$	$(X_{MTK})^2$
5	4.90	105	25	24.01	525	514.5	11025
5	4.82	138	25	23.23	690	665.16	19044
5	2.43	192	25	5.90	960	466.56	36864
5	4.73	185	25	22.37	925	875.05	34225
5	4.51	59	25	20.34	295	266.09	3481
5	3.77	152	25	14.21	760	573.04	23104
5	4.77	52	25	22.75	260	248.04	2704
7.7	5.59	140	59.29	31.25	1078	782.6	19600
5	4.72	48	25	22.28	240	226.56	2304
5	4.63	143	25	21.44	715	662.09	20449
3.5	4.75	42	12.25	22.56	147	199.5	1764
22.75	4.63	158	517.56	21.43	3594.5	731.54	24964
5	4.75	170	25	22.56	850	807.5	28900
26.43	3.70	168	698.54	13.69	4444.24	621.6	28224
5	2.66	13	25	7.08	65	34.58	169
23.95	2.10	4	573.60	4.41	95.8	8.4	16
TOTAL			2136.24	299.51	15645.54	7682.41	256837

**Source:** Researchers computation from research data (2021/2022)

Using product moment formula to estimate linear correlation coefficient. The model is given by;

$$r = \frac{\sum XY}{\sqrt{(\sum X^2)(\sum Y^2)}} \quad (4)$$

To estimate the correlation between Meal ticketing and Students Academic Performance; we have the model as

$$r = \frac{\sum X_{MTK}Y_{ACP}}{\sqrt{(\sum X_{MTK}^2)(\sum Y_{ACP}^2)}} \quad (5)$$

$$r = \frac{7682.41}{\sqrt{(256837)(299.51)}}$$

$$r = \frac{7682.41}{8770.70}$$

$$r = 0.8759 \approx 1.$$

∴ The correlation between meal ticketing and academic performance is positive.

To estimate the correlation between Meal ticketing and Students well-being;

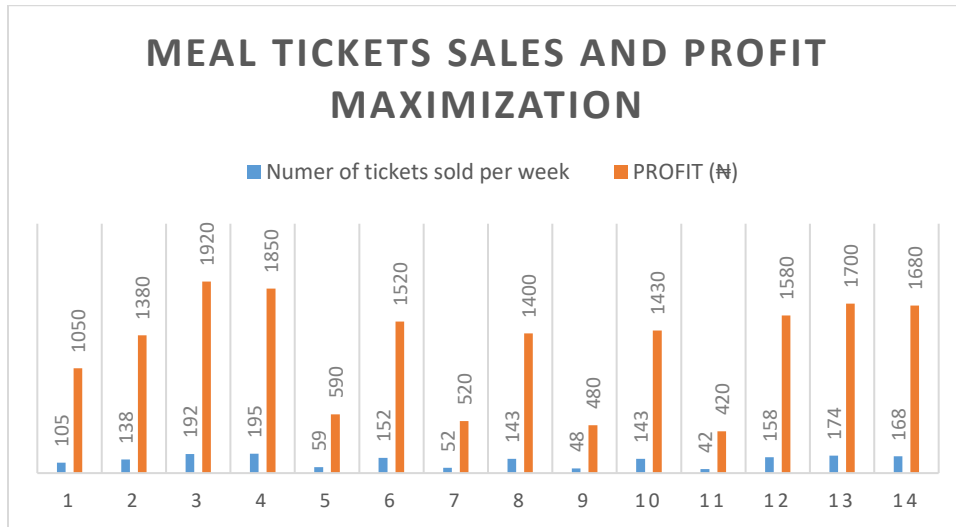
$$r = \frac{\sum X_{MTK}Y_{SWB}}{\sqrt{(\sum X_{MTK}^2)(\sum Y_{SWB}^2)}} \quad (6)$$

$$r = \frac{15645.54}{\sqrt{(256837)(2136.24)}}$$

$$r = \frac{15645.54}{\sqrt{548665472.88}}$$

$$r = 0.6679 \approx 1$$

∴ The Correlation between meal ticketing and students well-being is positive.



**Figure 1: Sales/ profit maximization**

Figure 1 shows the number of tickets sold and its profit margin. At 105 sales its profit was ₦1050, at a sale of 168 tickets the profit was ₦1680 etc. this means that the higher the number of sales, the higher the profit.

**Table 3: Patient care demographic profile of students' health outcome for first semester.**

		Frequency	Percentage	Cost ₦
Gender	Male	12	70.59	124,330
	Female	5	29.41	36,690
Age(in years)	15 – 16	1	5.88	5,000
	17 – 18	7	41.18	83,390
	19 – 20	3	17.65	36,430
	21 and above	6	35.29	31,200
In-patient's	Male	2	66.67	73,130
	Female	1	33.33	19,990
Out-patient's	Male	9	69.23	46,200
	Female	4	30.77	16,700

**Source: Researchers computation from research data (2021/2022)**

At the upper part of table 3 above, the male gender had a frequency of 12 and cost of ₦124,330, and female gender with frequency of 5 and a cost of ₦36,690. This implies that the male students visited the hospital in first semester more than the female students.

At the middle part of the table, the aged bracket between 17 to 18 years where more prone to ill-health condition denoting a frequency of 7 and with an incurred cost of ₦83,390. At the lower part of the table,

the analysis shows that the in-patients (those admitted for treatment) exceeded the out patients who only visited the hospital for examination and for mile treatment.

**Table 4:** Patient care demographic profile for second semester 2022.

		Frequency	Percentage	Cost ₦
Gender	Male	1	33.33	5,000
	Female	2	66.67	29,360
Age (in years)	17 – 18	2	66.67	12,860
	19 and above	1	33.33	21,500
Out-patients	Male	1	50	5,000
	Female	1	50	7,860
In-patients	Male	-	-	-
	Female	1	100	21,500

**Source:** Researchers computation from research data (2021/2022)

In table 4 above, the analysis shows that female gender with frequency 2 and a treatment cost of ₦29,360 visited the hospital most than the male. At the middle part of the table, aged bracket of 19 years and above is more significant i.e., mostly affected. And at the lower part, in-patients are significant incurring a cost of ₦21,500 to ₦12,860.

The ratio between student well-being in table 3 and 4, male: female is 12:2. This means that ill-health cases where recorded in first semester when there was no meal ticketing regime than second semester when meal ticket was introduced.

**Table 5:** A summary of academic performance in HUNI 2021/2022.

S/N	Faculty	Depart.	Age	Gender	1 <sup>st</sup> sem. GPA	2 <sup>nd</sup> sem. GPA	CGPA
1	Computing & sciences	Computer science	18	M	4.92	4.89	4.90
2	Computing & sciences	Computer science	19	M	4.68	4.96	4.82
3	Computing & sciences	Computer science	25	M	2.00	2.88	2.43
4	Computing & sciences	Computer science	19	M	4.68	4.83	4.76
5	Computing & sciences	Computer science	17	M	4.24	4.79	4.51
6	Computing & sciences	Biological sciences	23	F	3.60	3.96	3.77
7	Computing & sciences	Biological sciences	20	F	4.88	4.65	4.77
8	Computing & sciences	Computer science	23	M	4.24	4.96	4.59
9	Health sciences	Public health	24	F	4.62	4.80	4.72
10	Health sciences	Nursing	17	M	4.71	4.53	4.63
11	Health sciences	Nursing	21	F	4.89	4.61	4.75
12	Management & social sciences	Economics	19	F	3.56	3.82	3.70
13	Management & social sciences	Accounting	19	M	2.00	3.41	2.66
14	Management & social sciences	Human resource management	20	M	1.20	3.00	2.10
15	Management & social sciences	Human resource management	23	M	3.52	4.52	4.02
16	Management & social sciences	Human resource management	19	M	3.08	4.60	3.84

**Source:** HUNI Cafeteria Record (2021/2022).



The result in table 5, showed clearly the significant impact of meal ticketing on students' academic performance. The analysis found that a male student in the faculty of computing and sciences, department of computer science with aged 19 years outperformed others with a CGPA of 4.90. considering students 4, 5, and 6 in table 5 above the rates of improvement are 0.15, 0.55 and 0.36 and the percentage increase or effect on CGPA were 15%, 55%, and 36% respectively. This implies that the differences in GPAs between first and second semesters shows a corresponding increase in academic performance of students in HUNI with respect to meal ticketing policy.

### Conclusion

It is pertinent that the food consumed is essential to form the mind-sets of individuals and render an important contribution in promoting health and well-being. However, as students migrates in their academic pursued their lifestyle changes as a result of hard work. Healthy diet becomes relevant to help them achieve higher academic performance. Hence, the value of chi square calculated ( $\chi^2 = 434.98$  exceeds the critical value ( $X_{0.05,9}^2 = 16.919$ ), this shows that meal ticketing determines students' academic performance and well-being. The correlation between meal ticketing, academic performance and being is strongly/positively correlated i.e., 1. The result shows at first semester year 1, that male students where prone to ill-health than the females, with aged bracket of 17 to 18 years mostly affected. In-patients/cost were administered more than the out-patients. In table 4, year 1 second semester, the analysis shows that female students where more affected to ill-health condition with an age limit of 19 years and above mostly affected. More so, a student of the faculty of computing and sciences, department of computer sciences was the best student with a CGPA of 4.90. The differences in GPAs in first and second semesters shows the impact of meal ticketing on academic and students well-being in HUNI. It is then recommended that the government should encourage meal ticketing programs in tertiary institutions in other to enhance academic performance and well-being of students in the university level.

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# Application of Transactional Leadership Style for Managers in Adopting the Organization's Cultural Intelligence: A Study of Coscharis Group of Companies, Nnewi, Nigeria

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## Abstract

As Leadership is culturally influenced, leaders should demonstrate styles that enable effective functioning in culturally diverse circumstances. This research aimed to investigate the implementation of the transactional leadership style by managers in adopting the organization's cultural intelligence: A study of Coscharis Group of Companies, Nnewi, Nigeria. The study's goals included assessing the impact of contingent reward leadership on cultural intelligence, exploring connections between active management by exception and cultural intelligence, and examining the influence of passive management by exception on cultural intelligence. The population was 2,700, with a sample size of 348 determined by Taro Yamane formula. SPSS version 20.0 software was used for data analysis, revealing significant relationships. Contingent reward leadership notably affects cultural intelligence (sig =0.000 < 0.05, R2= 0.437 and t-statistic= 15.528); active management by exception has a significant relationship with cultural intelligence (sig =0.000 < 0.05, R2= 0.85 and t-statistic= 5.371); passive management by exception significantly affects cultural intelligence (sig =0.000 < 0.05, R2= 0.149 and t-statistic= 7.375). In conclusion, a global leadership development strategy should align with the company's global culture and involve management commitment to enhance employees' cultural intelligence. It is recommended to adopt the transactional leadership style, a driver of cultural intelligence, across industries to boost global organizational performance.

**Keywords:** active management by exception, contingent reward, coscharis group of companies, cultural intelligence, passive management by exception, transactional leadership style.

## 1.1 Introduction

Different leadership styles play a crucial role in the ability of managers to navigate diverse groups of individuals and various knowledge domains within organizations. Leadership is a significant factor contributing to gaining a competitive edge, achieving successful business performance, and ensuring long-term sustainability (Aguinis, 2019). In today's increasingly globalized world, leaders encounter new challenges, not only when leading in multicultural settings but also when managing more diverse workforces. This influx of various cultures requires leaders to possess cross-cultural competencies, necessitating a range of skills to effectively lead on a global scale (Ahmed, 2018). Diverse cultural backgrounds lead to various interpretations of organizational experiences, resulting in leaders having to manage different behavioral patterns. When managing culturally diverse workforces, Cultural Intelligence (CI) can assist leaders in bridging cultural gaps by adapting suitable leadership styles that align with different cultural contexts. In the study, we aimed to utilize a transactional leadership style, focusing on the effects of contingent reward leadership, active management by exception, and passive management by exception, to address the challenges posed by the extensive range of cultural backgrounds within the organization under investigation.

Furthermore, the transactional leadership style is often observed in companies seeking swift operations (Aguinis, 2019). To achieve rapid success, leaders establish standardized regulations and protocols across organizational levels. Transactional leadership is frequently found in mid-to-large-sized organizations, where leaders rely on an exchange-based relationship with employees. Motivation is driven by rewards and penalties: good performance and adherence to rules result in rewards, while poor performance leads to penalties (Albuhisi & Abdallah, 2018). However, this crisis-oriented leadership style, though effective during emergencies, can stifle creativity and problem-solving skills, potentially fostering rigidity and inflexibility. Emphasizing supervision, organization, and methodical approaches, transactional leadership differs from the more discussed transformational leadership style in the context of Cultural Intelligence. Given the competitive landscape, many enterprises shift toward transformational leadership to meet crucial goals and strategies essential for survival. As such, Cultural Intelligence (CI) has emerged as a pivotal competency during transformations (Albuhisi et al., 2018).

In essence, as the Nigerian economy rapidly transforms, businesses aim to equip employees with skills to engage with diverse populations across the country (Abdallah & Alnamri, 2015). Cultural intelligence, or cultural quotient (CQ), is pivotal in achieving this successfully. Cultural intelligence entails the ability to effectively interact and relate across cultures. Given that large corporations often operate both locally and globally, employees must adapt to the cultures of their peers. Similar to emotional intelligence, cultural intelligence necessitates understanding others' interests, feelings, and cultural contexts. Different cultures may have distinct socially acceptable responses, work styles, and lifestyles. With its dimensions— Cultural Intelligence encompasses metacognitive, motivational, and behavioral aspects, providing leaders with a comprehensive set of competencies and viewpoints that can be applied in various cultural contexts (Adha et al., 2020). While previous research has examined the association between transformational leadership and Cultural Intelligence, the link between transactional leadership and CI has been disregarded. Thus, while transactional leadership's significance, particularly in emotional intelligence research, is prominent, it's crucial to consider how cultural intelligence, complementing emotional intelligence, may relate to contingent reward behaviors (Appiah-Nimo, 2018).

It is as a result of aforementioned development that the researcher intends to examine the application of transactional leadership style of managers in adopting the organization's cultural intelligence considering the effect of contingent reward leadership, active management by exception and passive management by exception as independent proxies.

## **1.2 Statement of the Problem**

Promoting effective transactional leadership style in cross-cultural scenarios should be a paramount concern for businesses. While some individuals may possess innate leadership qualities within their own cultural context, leaders who can navigate intercultural contexts effectively are cultivated (Alimudin & Sukoco, 2017). However, identifying the specific skills essential for such leadership, as encapsulated in leader Cultural Intelligence (CQ), remains somewhat ambiguous.

Adha et al. (2020) highlighted that a significant portion of organizations' training budgets, particularly focused on leadership development, is allocated to the cultivation of skills in contingent reward leadership, active management by exception, and passive management by exception within the transactional leadership style. Al-Kurdi, Alshurideh & Al-Afaishat (2020) contended that upskilling leaders for success in culturally diverse leadership positions remains suboptimal, underscoring a critical concern. This is concerning, as effective leaders equipped with cultural intelligence are not only in high demand but also in short supply (Fidyah & Setiawati, 2020).

Despite their scarcity, a multicultural workforce offers manifold advantages, including superior customer service, enhanced decision-making, cultural intelligence, innovation, creative thinking, and improved productivity (Cera & Kusaku, 2020). In this context, Dajani & Zaki (2015) argued that aligning workforce performance with cultural intelligence stands as a pivotal factor in distinguishing corporate champions from corporate failures. Consequently, Earley & Ang (2013) asserted that talent management constitutes a crucial

focal point for leaders across organizations. However, the literature predominantly grapples with managing cultural disparities rather than optimizing them, as evident from the limited emphasis on leader CQ (Han, Seo, Yoon & Yoon, 2016).

Fidyah et al. (2020) posited that despite various measures in place, employees continue to face challenges in interactions with individuals from different cultures due to misunderstandings and flawed relationships. As a result, most organizations require managers who can promptly adapt to various cultures, creating a conducive work environment and ensuring the application's effectiveness in multicultural settings. Successfully addressing this managerial challenge hinges on cultural intelligence (Drewniak, Drewniak & Posadzinska, 2020).

This study was inspired by the fact that the empirical research studies carried out disclosed that poor research attention has been accorded to the application of transactional leadership style of managers in Adopting the organization's Cultural intelligence: A Study of Coscharis Group of Companies, Nnewi, Nigeria. Empirical studies revealed that studies had been carried out on effect of transactional leadership styles on performance of organizational culture of financial institutions, the hospitality sector and the health sector etc, in and outside of the country. Notwithstanding, none of these studies addressed the issue of the application of transactional leadership style of managers in Adopting the organization's Cultural intelligence. They did not analytically provide empirical evidence on how transactional leadership style relate to cultural intelligence of Coscharis Group of Companies, Nnewi, Nigeria, regarding contingent reward, active Management by exception, passive Management by exception showing that the application of transactional leadership style of managers in adopting the organization's Cultural intelligence: A Study of Coscharis Group of Companies, Nnewi, Nigeria has not received adequate attention, thus this study wants to achieve the following objectives:

- i. To ascertain the effect of Contingent reward leadership on cultural intelligence.
- ii. To find out the relationship between active Management by exception and cultural intelligence.
- iii. To investigate the effect of passive Management by exception on cultural intelligence.

### **1.3 Research Hypothesis**

The null hypothesis includes the following:

- i. Contingent reward leadership does not have significant effect on cultural intelligence.
- ii. Active Management by exception does not have significant relationship with cultural intelligence.
- iii. Passive Management by exception does not have significant effect on cultural intelligence.

## **2.1 Literature Review**

### **2.1.1 Transactional Leadership**

Transactional leadership is a leadership approach that places a strong emphasis on supervision, organization, and performance. It constitutes an integral component of the Full Range Leadership Model. This style of management originated during the Industrial Revolution and was viewed as a means to attain a competitive advantage. Some common strategies employed within this management style encompass the pursuit of efficiency objectives, the realization of economies of scale, and the differentiation of quality (Han et al., 2016). Transactional managers primarily concentrate on tasks and objectives linked to performance. This approach proves effective for managers seeking to enhance the efficiency of established procedures and is particularly adept at managing new and turbulent organizations. It involves the establishment and standardization of practices, processes, and behaviors.

As described by Iqbal and Akhtar (2017), transactional leadership is a leadership style where leaders encourage followers to comply through a combination of rewards and punishments. Transactional leaders utilize a system of rewards and punishments to maintain follower motivation in the short term. In contrast to transformational leaders, those employing the transactional approach show less inclination towards developing their workers' skills. Transactional leadership is characterized by one person initiating contact with others for the purpose of exchanging valuable resources (Cera et al., 2020).

A transactional leadership approach is less suitable for situations demanding strong collaboration among individuals. It proves effective in crisis and emergency scenarios, as well as for projects that require precise execution (Kaplan & Norton, 2019).

Transactional leadership involves conditional reward and management by exception, either active or passive. In the former, leaders maintain a positive rapport with followers, who receive bonuses for achieving specific goals. Rewards are agreed upon between leaders and followers. The latter involves leaders consistently or minimally monitoring performance and addressing issues reactively. This leadership style prioritizes established routines, organization, and performance based on past effectiveness. It is also known as managerial leadership, emphasizing adherence to hierarchical authority and existing procedures. Transactional leaders maintain the status quo, acting primarily in response to errors, with minimal interaction and passive relationship management with followers.

### **2.1.2 Contingent Reward Leadership**

Contingent reward leadership is a direct leadership style, rewarding followers based on task completion and outcomes. It encompasses bonuses, promotions, recognition, and appreciation, all structured to explicitly define rewards for specific achievements (Kihara, Bwisa & Kihoro, 2016). Transactional leadership similarly relies on a structured system of rewards and punishments to gauge performance across various levels. It prioritizes results, efficiency, and performance over interpersonal relationships, essentially reflecting the principles of contingent reward leadership.

Contingent reward leadership can thrive in transactional environments or situations where fostering genuine motivation, inspiration, and employee engagement is challenging (Mousavi, Hosseini & Hassanpour, 2015). Many individuals work primarily for monetary gain, rather than out of passion or purpose. In such settings, implementing a contingent reward system can significantly enhance productivity and performance.

An effective contingent reward leadership approach hinges on providing utmost clarity. When employees know precisely what they can attain by meeting specific conditions, it motivates them to strive for those goals (Nguyen, Nguen, Hiep, Nguyen & Hoang, Hung-Trong, 2021). Conversely, uncertainty or lack of clarity is a less effective incentive because people may remain unsure about the rewards and expectations, thereby reducing their motivation.

### **2.1.3 Active Management by Exception**

Active Management by Exception, as per Nwokocha and Iheriohanma (2015), is a business management strategy that suggests that managers and supervisors should focus on examining, investigating, and developing solutions exclusively for issues displaying deviations from established standards, norms, business practices, or financial goals, such as profit variations, quality concerns, and infrastructure issues, instead of dealing with routine business activities (Rockstuhl & Van-Dyne, 2018). Active Management by exception involves the practice of identifying and reporting a situation to management only when a manager-level intervention is genuinely required. Its primary objective is to optimize management's time by involving them exclusively in the event of significant deviations from routine or standard business outcomes. In this approach, management proactively addresses situations, provides assistance in problem-solving, actively participates in all activities, and closely monitors their staff's actions to rectify errors (Schlaegel, Richter & Taras, 2021).

Management by Exception (MBE) is a leadership approach where management is summoned to intervene solely when notable deviations from the established plan are identified. This method is designed to enable managers to focus on critical issues while minimizing their attention to less crucial matters that employees are capable of handling. Management gets concise and full detailed reports that cover the critical aspects of a problem (Rockstuhl et al, 2018). This enables them to make decisions and take the most appropriate action. MBE assumes that employees can handle routine duties as long as the outcomes align with the set plan. Managers are only required to intervene to address variances. For MBE to be effectively implemented, an organization needs a budget, a reporting system, and an exception matrix. When the results deviate from

the plan, employees send a notification to the managers based on the exception matrix (Srimulyani & Hermanto, 2022).

#### **2.1.4 Passive management by Exception**

As Surucu and Yeşilada (2017) pointed out, a passive approach is beneficial for businesses with a relaxed work environment where staff clearly understand their roles and responsibilities. It can help boost staff morale and encourage independence. In contrast, an active approach is suitable for less experienced or new employees, especially in more structured organizations where they require step-by-step guidance to complete their tasks. In line with Uddin, Luva, and Hossain (2016), passive management by exception is a method in which management intervenes only when the desired goals are not achieved, changes in planning are necessary, or corrective actions are needed. This approach typically comes into play in response to unusual events. Both methods hold importance, and the choice between them should be based on specific business requirements.

Passive management by exception implies that the leader reacts to a problem or mistake after it has occurred. This can have a more significant impact on both the leader and employees than might be initially apparent (Suknunan & Bhana, 2022). Similar to many transactional leadership strategies, passive management by exception is most effective in repetitive environments where a limited set of activities is consistently performed, and the outcomes can be easily evaluated (Kaplan et al., 2019).

For successful implementation of a passive management by exception leadership style, it is imperative to provide employees with clear guidelines, specifying the situations that warrant managerial intervention. This ensures that employees have a well-defined understanding of what to expect and the boundaries within their work environment (Wahyuningsih, Sudiro, Troena & Irawanto, 2019). Additionally, if there is any room for flexibility in how tasks are performed as long as the expected results are achieved, these parameters should be clearly defined. The advantage of such flexibility is that it allows team members to explore more efficient ways of completing their work, fostering creativity, and contributing to process improvement, ultimately enhancing overall team productivity (Kaplan et al., 2019).

The primary issue with transactional leadership, particularly in the passive management by exception facet, is the tendency to address errors and problems with attention and penalties, while offering minimal feedback and emphasis on successful endeavors (Wakabi, 2016). It's essential to delve deeper into transactional leadership and its place within the broader Full Range Leadership Model.

#### **2.1.5 Cultural Intelligence**

In a conceptual sense, as outlined by Abdallah et al. (2015), cultural intelligence (CQ) pertains to the aptitude for effectively engaging with individuals from diverse cultural backgrounds. This involves the capacity to discern, integrate, rationalize, and respond appropriately to cultural cues in situations characterized by cultural diversity. It involves possessing knowledge about other cultures, motivation to engage with cultural differences, and the ability to interact and behave adeptly in cross-cultural interactions (Aguinis et al., 2019).

Cultural intelligence facilitates a prompt and accurate comprehension of the varied cultural aspects of behavior that are suitable for each context. The significance of CI extends to both individuals and organizations, given the contemporary and diverse nature of the world. Organizations recognize the value of bridging cultures to attain both personal and organizational success (Ahmed, 2018). Through its dimensions (metacognitive, motivational, and behavioral cultural intelligence), cultural intelligence equips leaders with a set of competencies and viewpoints that can be applied to a multitude of cultural scenarios (Alimudin et al., 2017). CI research seeks to provide insights into the enduring question of why some individuals thrive in culturally diverse settings while others do not (Albuhisi et al., 2018).

As per Al-Kurdi et al. (2020), cultural intelligence is characterized as an individual's competence to effectively adapt to a new cultural environment. Cultural intelligence, often referred to as CI, seeks to elucidate why certain individuals demonstrate the capability to navigate adeptly in culturally diverse

environments, while others face challenges. CI involves the utilization of observational and analytical skills to interpret unfamiliar cues and situations, ultimately formulating appropriate behavioral responses (Adha et al., 2020).

In essence, cultural intelligence focuses on how individuals thrive and adapt when placed in environments that differ from their initial socialization. It plays a pivotal role in understanding the reasons behind people's ability to function effectively in culturally diverse settings. Leadership, as per Iqbal et al. (2017), emphasizes the role of CI as a stimulus for action.

### **2.1.6 Relationship Between Transactional Leadership and Cultural Intelligence**

While many studies investigating the relationship between leadership and cultural intelligence are conducted in international settings, they provide valuable insights for enhancing the connection between cultural intelligence and transformational leadership. Research in cultural intelligence also seeks to comprehend leaders' capabilities in working with diverse populations, even within a domestic context (Appiah-Nimo et al., 2018).

In multicultural organizations, the ability to communicate effectively with both internal customers (employees) and external customers, comprehend cultural differences, and adapt to them is considered a fundamental doctrine (Anuforo, Mustapha, Intan & Ayoup, 2019). On one hand, this skill helps overcome challenges such as difficulties in cooperation and reaching compromises. Additionally, communication with individuals from diverse cultures adds a sense of novelty, enriches relationships, and opens up new opportunities in the lives of individuals (Azevedo & Shane, 2019).

In multicultural environments, effective communication and an understanding of cultural differences are more likely to be observed in transformational leaders, who excel in addressing today's complex conditions. Research conducted by Cera et al. (2020) highlights the significance of cultural intelligence in transformational leadership, demonstrating positive and substantial relationships between the two. Possessing cultural intelligence can be a contributing factor in adopting a transformational leadership style among managers.

### **2.1.7 Comparison between Transactional and Transformational Leadership**

According to Earley & Ang (2014), a transactional leader's practice of using rewards like wages and promotions in exchange for follower compliance is viewed as a less dynamic representation of effective leadership when compared to the dimensions associated with transformational leadership. Additionally, Dajani et al. (2015) found that transactional leaders tend to be less confident in their ability to control external factors, whereas transformational leaders exhibit a strong internal locus of control and believe in their capacity to influence organizational direction. In numerous studies, transformational leadership has garnered praise for its strong, positive correlation with subordinate satisfaction, performance, motivation, commitment, and leader effectiveness ratings compared to transactional leadership (Fidyah et al., 2020).

Furthermore, transformational leadership is recognized for its resilience across various conditions and its applicability in cross-cultural settings (Han et al., 2016). Regarding leadership effectiveness, transactional leadership is considered somewhat less effective than transformational leadership due to the straightforward and impersonal nature of the leader-follower relationship and its limited impact on followers. However, Drewniak et al. (2020) argue that while transactional leaders may motivate subordinates to meet expectations, transformational leaders have the ability to inspire subordinates to exceed expectations. The positive effects of transformational leadership are amplified by relational support, as it boosts employee confidence and serves as a role model for encouraging employees to pursue creativity in their work (Haque et al., 2020). Additionally, based on a study by Harwiki et al. (2016), contingent reward leadership behaviors exhibited by both lower and higher-ranking supervisors predict outcomes. Perceived contingent reward leadership strongly predicts follower job satisfaction and attitudes toward the supervisor, although not as strongly as transformational leadership. Kaplan et al. (2019) also noted significant differences in leadership styles between men and women, with female managers often leading in a transformational style,



while male managers tend to display a more transactional approach. Transactional leadership is described as an exchange that occurs between leaders and followers, where rewards are contingent on work performance (Iqbal et al., 2017). In terms of ethical considerations, both transactional and transformational approaches have distinct moral foundations.

### **2.1.8 Transactional leadership in Coscharis Group of Companies, Nnewi**

Transactional leadership is commonly observed in organizations that prioritize swift and efficient operations. Leaders in such companies implement standardized regulations and often employ similar or identical protocols at every level of the organization, aiming to achieve success as rapidly as possible (Uddin et al., 2016). The transactional leadership style is prevalent in mid-to-large-sized organizations and is frequently found in manufacturing or other highly regulated industries. It emphasizes adherence to established practices and procedures, particularly within global organizations where leaders must manage individuals from diverse cultures and language backgrounds (Surucu et al., 2017).

The sales industry, exemplified by organizations like Coscharis, also features transactional leaders. This is because employees in this sector often have to meet aggressive sales quotas. If an employee achieves their quota, they receive bonuses or raises as rewards (Suknuna et al., 2022). Transactional leadership operates on the assumption that all employees value external rewards, typically in the form of monetary compensation. This style of leadership operates under the belief that individuals are not inherently self-motivated.

However, many emerging leaders, particularly from younger generations, find motivation in intrinsic rewards. They are less likely to exhibit loyalty to a company and are more inclined to seek higher-level needs fulfillment, including belonging, esteem, and self-actualization (Srimulyani et al., 2022). In this context, rewards take the form of growth opportunities, meaningful work, and increased prospects for personal development.

## **2.2 Theoretical Review**

### **2.2.1 Transactional Leadership Theory**

As proposed by Mousavi et al. (2015), transactional leaders are characterized by their intent to influence the self-interests of their followers. These leaders prioritize task assignments, work standards, and ensuring follower compliance. They also drive subordinate performance by providing rewards for compliance and implementing penalties for those who fail to meet expectations.

In line with Nwokocha et al. (2015), transactional leaders engage in a cost-benefit economic exchange, aiming to fulfill the material and physical needs of their subordinates in exchange for negotiated contract obligations from the subordinates. This concept is closely associated with the transactional leadership style, emphasizing the exchange relationship between leaders and followers.

### **2.2.2 Cognitive Dissonance Theory**

The theory of cognitive dissonance, initially proposed by Festinger in 1957, illustrates the discomfort that arises from a lack of consistency between cognitions or between cognition and behavior (Dajani et al., 2015). This dissonance is rooted in an individual's psychological perception, rather than logic, and arises from the perception that cognitions or cognition and behavior are incongruent (Rockstuhl et al., 2018). The state of unease is motivational, driving efforts to resolve it (Schlaegel et al., 2021). These efforts may manifest as rationalizing one's viewpoint or behavior, or as modifying viewpoints or behaviors to make them more congruent (Shiqi, 2021).

Nguyen et al. (2021) argue that when an employee encounters a leadership style that conflicts with their preferred style, they may address this dissonance by adjusting their perceptions or preferences. In this scenario, it is suggested that the employee can only modify perceptions or preferences, as the behavior is determined by the leader. Conversely, it is plausible that culturally intelligent leaders might resolve any cognitive dissonance they experience when their default leadership style (behavior) doesn't align with what

their Cultural Intelligence (CQ) suggests as preferable for their subordinates by adjusting their leadership style (Khan et al., 2020).

Taking this into consideration, it was anticipated that the displayed leadership styles (empowering and directive) and leader CQ would exhibit strong positive relationships. Consequently, leader CQ, rather than the cultural identity of subordinates, would be the primary predictor of empowering and directive leadership styles (Kihara et al., 2016).

### **2.3 Empirical Review**

Nwokocha et al (2015), investigated the relationship between contingent reward leadership and cultural intelligence in the private sector of the economy in Ethiopian capital. The study used a descriptive research design. Stratified random sampling was used for the sample selection and a sample of 125 staff were randomly selected from various departments of the firm under study. Survey method was used for collecting the data from the respondents. Questionnaires with five points Likert were used to obtain response. Small amount of quantitative research were used.. The study concluded that there was a strong correlation between contingent reward leadership and cultural intelligence.

Mousavi et al (2015), examined the impact of active management by exception on cultural intelligence amongst private university staff in Pakistan. The study had a target population of 380 employees. A sample size of 400N was derived with the use of "krejci and Morgan formula". The study used primary data to obtain information which involved a per-paper survey and online Google forms consisting of questionnaires. The research followed a cross-sectional quantitative approach with probability sampling. Stratified random sampling technique was used to divide the population. The result of this study showed a positive relationship between active management by exception on cultural intelligence.

Rockstuhl et al s(2018) examined the impact of passive management by exception on cultural intelligence in Coca-Cola, Nepal. The research for this study was performed using descriptive research methods. Data was gathered from a primary source by using organized and structured questionnaires. A group of 120 participants are involved in which 91 of them responded and 24 of them didn't reply back, making the response rate to the questionnaire 74% adequate. The result of the study showed passive management by exception had a positive relationship on cultural intelligence.

Harwiki (2016) conducted a study to investigate the impact of leadership styles on job satisfaction among employees at Indomie Instant Noodles in Kaduna. The population under consideration for this study consisted of a total of 1,231 individuals. The sample size for the study was determined using the Krejcie and Morgan (1970) table formula, resulting in a sample of 310 respondents. The sampling technique employed was probability sampling, specifically using the simple random sampling technique. The research instrument used in the study was a structured questionnaire featuring closed-ended questions with a five-point Likert scale, ranging from "strongly disagree" to "strongly agree." To analyze the data and test the hypothesized model of the study, multiple regression analysis was applied. The conclusion of the study has it that leadership positively influence job satisfaction in Indomie Instant Noodles, Kaduna.resulting in 310 respondents. Probability sampling, specifically simple random sampling, was employed as the sampling technique. The research instrument used in the study was a structured questionnaire comprising closed-ended questions, and it employed a five-point Likert scale. To analyze the hypothesized model, multiple regression analysis was utilized. The study's findings revealed a positive correlation between leadership and job satisfaction among employees at Indomie Instant Noodles in Kaduna.

### **3.1 Research Design**

A research design outlines the structure and methodology of a study aimed at uncovering solutions to research inquiries. As indicated by Uddin et al (2016), a descriptive design offers an accurate depiction of individuals, events, or attributes, such as behaviors, opinions, skills, beliefs, and knowledge within a specific individual, context, or group. The preference for a descriptive research design stems from its ability to comprehensively portray transactional leadership styles and cultural intelligence, thereby ensuring minimal bias in data collection.

### 3.1 Population

The target population of interest in this study was 2700 from various departments of the organization under study.

### 3.2 Determination of Sample Size

The sample size is determined using the Yaro Yamane 1964 formula:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n is sample size

N is population size

e is margin of error

For the purpose of the study 5% tolerable error is allowed. Therefore, using this formula we have:

$$n = \frac{2700}{1 + 2700(0.05)^2}$$

$$]n = \frac{2700}{1 + 2700(0.0025)}$$

$$n = \frac{2700}{7.75}$$

$$n = 348$$

Thus, applying the formula the sample size for the study was 348 employees of the firm under study.

### 3.3 Sampling Technique

Stratified random sampling was the selected sampling technique for this study. Stratified sampling involves selecting samples from specific subgroups of interest, enabling effective comparisons. This technique was opted for in this study due to the heterogeneous nature of the target population, which consisted of employees from diverse levels and various departments.

### 3.6 Data Analysis Methods

To fulfill the study's objectives, online questionnaires were utilized to gather data. The collected data was subjected to analysis using SPSS (Statistical Package for Social Sciences) version 20, a dedicated software tool for data analysis in social sciences research. The research employed SPSS tests for hypothesis testing and simple linear regression analysis to present questionnaire results.

### 3.4 Model Specification

The model used in testing hypothesis of this study is presented below:

$$Y = f(X)$$

Y represents the Dependent Variable, and X represents the Independent Variables, with the following relationships:

Y stands for Cultural intelligence,

X stands for Transactional leadership style.

Where:

Y is represented as (Y)

X is represented as (x1, x2, X3).

Where:

Y signifies Cultural intelligence,

x1 represents Contingent reward,

x2 represents Active Management by Exception,

x3 represents Passive Management by Exception.

The relationship can be expressed as Y=f(X):

Y=f(x1) as Equation 1,  
 Y=f(x2) as Equation 2,  
 Y=f(x3) as Equation 3.

These equations (Equation 1-3) represent the variables under consideration in this study. The equations can be further developed as linear models:

Equation 1:  $Y = a_0 + \beta_1x_1 + \mu$   
 Equation 2:  $Y = a_0 + \beta_2x_2 + \mu$   
 Equation 3:  $Y = a_0 + \beta_3x_3 + \mu$

In these equations,  $a_0$  represents the intercept,  $\beta_1$ ,  $\beta_2$ , and  $\beta_3$  are the coefficients associated with  $x_1$ ,  $x_2$ , and  $x_3$  respectively, and  $\mu$  represents the error term. These equations are the basis for evaluating the relationships between cultural intelligence and the different components of transactional leadership style in this study.

#### 4.1 Data Analysis

**Table 4.1.1 Descriptive analysis of the effect of Contingent reward leadership on cultural intelligence.**

STATEMENT	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree	Mean	Standard Deviation
The contingent reward leader is engaging and supportive	0 (0.0%)	9 (2.9%)	59 (18.8%)	178 (56.9%)	67 (21.4%)	3.97	720
I got a chance to collaborate with my team members during the contingent reward leadership exercise and they were effective	0 (0.0%)	19 (6.0%)	55 (17.6%)	143 (45.7%)	96 (30.7%)	4.01	853
I felt competent and confident at the end of the exercise?	3 (1.0%)	10 (3.2%)	67 (21.4%)	127 (40.6%)	106 (33.9%)	4.03	876
Our organization offers enough contingent leadership opportunities to keep my knowledge and skills up to date.	0 (0.0%)	16 (5.1%)	79 (25.2%)	119 (38.0%)	99 (31.6%)	3.96	880
Because of the exercise I can perform my tasks effectively.	4 (1.3%)	22 (7.0%)	70 (22.4%)	126 (40.3%)	91 (29.1%)	3.89	949
The exercise has widened my understanding of my job	0 (0.0%)	31 (9.9%)	51 (16.3%)	156 (49.8%)	75 (24.0%)	3.88	887

**Source:** Researcher's Fieldwork,2023

Table 4.1.1: The participants were asked if the contingent reward leader is engaging and supportive. The results, as shown in Table 4.6, indicated that 56.9% of the respondents (178) agreed, 21.4% (67) strongly agreed another 18.8% (59) were unsure and 2.9% (9) disagreed. The respondents on average agreed that their trainer was engaging and supportive compared to does who did not. (Mean= 3.97, S.D= 720)

The results shows when the respondents were asked whether during the exercise if they were to collaborate with my team members during the contingent reward leadership and if they found it effective. 45.7% of the respondents (143) agreed, 30.7% ( 96) agreed strongly, 17.6% (55) were unsure, 6.0% (19) disagreed. Most of the respondents found collaborating with team members effective during the training program. (Mean= 4.01, S.D= 853)

In addition, respondents were asked whether their undergoing leadership exercise in the company had enhanced their organizational competence. As shown, 40.6% (127) agreed, 33.9%

(106) agreed strongly, 21.4% (67) were unsure, 3.2% (10) disagreed and 1.0% (3) disagreed strongly. Hence, it can be deduced that most of the respondents considered leadership exercise to enhance organizational competence compared to a lesser but significant number of respondents who disagreed. (Mean= 4.03, S.D= 876)

On the aspect whether, the organization offers enough contingent leadership opportunities to keep workers knowledge and skills up to date. The result showed that, 38.0% (119) agreed, 31.6% (99) agreed strongly, 25.2% (79) were unsure, 5.1% (16) disagreed. Hence, slightly more respondents considered the organization offer them contingent leadership opportunities. (Mean= 3.96, S.D= 880)

Further the results revealed that respondents felt less stressed with their job because of continuous leadership exercise. As shown, 40.3% (126) agreed, 29.1% (91) agreed strongly, 22.4% (70) were unsure, 7.0% (22), disagreed, 1.3% (4) disagreed strongly. Thus, while a slight majority felt less stressed with their jobs because of continuous leadership exercise, a significant proportion were not. (Mean = 3.89 , STD = 949 )

Respondents were asked if leadership exercise had widened their understanding of their job. 49.8% (156) agreed, 24.0% (75) agreed strongly, 16.3% (51) were unsure and 9.9% (31) disagreed. Therefore, most of the respondents considered training to have widened their understanding of their jobs. (Mean = 3.88, STD = 887 )

#### 4.1.2 Descriptive analysis of the relationship between active Management by exception and cultural intelligence

STATEMENT	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree	Mean	Standard Deviation
Employees find my work engaging following the active Management by exception	0 (0.0%)	32 (10.2%)	75 (24.0%)	112 (35.8%)	94 (30.0%)	3.86	965
Active Management by exception contributes to organisations success, making employees feel recognized, respected and valued	6 (1.9%)	23 (7.3%)	62 (19.8%)	120 (38.3%)	102 (32.6%)	3.92	994
Active Management by exception provides employees with a sense of meaning and purpose	0 (0.0%)	17 (5.4%)	68 (21.7%)	119 (38.0%)	109 (34.8%)	4.02	886
With active Management by exception, employees have opportunities for advancement or promotions.	0 (0.0%)	8 (2.6%)	54 (17.3%)	136 (43.5%)	115 (36.7%)	4.14	790
Active Management by exception encourages employees' participation in decision- making.	4 (1.3%)	18 (5.8%)	81 (25.9%)	112 (35.8%)	98 (31.3%)	3.90	956
Active Management by exception prepares the organizations for the future	0 (0.0%)	4 (1.3%)	67 (21.4%)	129 (41.2%)	113 (36.1%)	4.12	785

**Source:** Researcher's Fieldwork, 2023

Table 4.1.2 shows results concerning whether Employees find their work engaging following the active Management by exception 35.8% (112) agreed, 30.0% (94) agreed strongly, 24.0% (75) were unsure, 10.2% (32) . a reliable percent of worker finds their work engaging. The organization therefore mostly permits employees to participate in decision making. (Mean= 3.86, S.D= 965)

In addition, the result revealed when participants were asked whether Active Management by exception contributes to organisations success, making employees feel recognized, respected and valued. As indicated, 38.3% (120) agreed, 32.6% (102) strongly agreed, 19.8% (62) were unsure and another 7.3% (23)

disagreed. 1.9% (6) disagreed strongly. Thus, the company mostly recognizes and value employees who efficiently complete their tasks. (Mean= 3.92, S.D= 994)

The results shows whether respondents considered that active management by exception provides employees with a sense of meaning and purpose 43.5% (136) agreed, 36.7% (115) disagreed strongly, 17.3% (54) were unsure and 2 6% (8) disagreed that opportunities for advancement were available for them in the firm. Thus, most of the respondents consider the organization as having created opportunities for the employees to advance their careers. (Mean= 4.02, S.D= 886)

38.0% (n = 119) respondents agreed that with active Management by exception, employees have opportunities for advancement or promotions. 34.8% (n = 109) disagreed strongly, 21.7% ( 68%) were unsure, 5.4% (17) disagreed. The respondents on average agreed that With active Management by exception, employees have opportunities for advancement or promotions (Mean= 4.14, S.D= 790)

Further, the result shows whether active management by exception encourages employees’ participation in decision- making 35.8% (112) agreed, 31.3% (98) agreed strongly, 25.9% (81) were unsure, 5.8% (18) disagreed, and 1.3% (4) disagreed strongly. The company therefore mostly permits employees to participate in decision making. (Mean= 3.90, S.D= 956)

On the result whether active Management by exception prepares the organizations for the future. As shown, 41.2% (129) agreed, 36.1% (113) agreed strongly, 21.4% ( 67) were quite unsure, and 1.3% ( 4) disagreed. The majority of the employees felt Active Management by exception prepares the organizations for the future (Mean= 4.12, S.D= 785)

**4.1.3 Descriptive analysis of the effect of passive Management by exception on cultural intelligence**

STATEMENT	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree	Mean	Standard Deviation
With passive Management by exception, managers keep employees focused on clear priorities.	2 (0.6%)	8 (2.6%)	56 (17.9%)	167 (53.4%)	80 (25.6%)	4.01	774
Passive Management by exception helps managers make consistently effective decisions.	3 (1.0%)	13 (4.2%)	60 (19.2%)	137 (43.8%)	100 (31.9%)	4.02	857
Passive Management by exception makes a manager a highly effective leader.	0 (0.0%)	4 (1.3%)	77 (24.6%)	130 (41.5%)	102 (32.6%)	4.05	789
Passive Management by exception motivates managers to do best work.	1 (0.3%)	13 (4.2%)	67 (21.4%)	129 (41.2%)	103 (32.9%)	4.02	860
Managers give employees regular feedback on their performance.	0 (0.0%)	10 (3.2%)	82 (26.2%)	122 (39.0%)	99 (31.6%)	3.99	842
Passive Management by exception directs manager to be opened to new ideas, knowledge and skills.	0 (0.0%)	9 (2.9%)	33 (10.5%)	149 (47.6%)	122 (39.0%)	4.23	749

**Source:** Researcher’s Fieldwork,2023

Table 4.1.3 displays the findings of the descriptive statistics for Leadership Support. The analysis unveiled that out of the total respondents, 167 (53.4%) of the participants indicated their agreement that... passive Management by exception, managers keep employees focused on clear priorities, 80 (25.6%) of the respondents strongly agreed, 56(17.9%) were Undecided, 8 (2.6%) disagreed and 2(0.6%) disagreed strongly. On the average many respondents agreed that their With passive Management by exception, managers keep employees focused on clear priorities (Mean= 4.01, S.D= 774)

The results shows when the respondents were asked whether passive management by exception helps managers make consistently effective decisions. 137 of the respondents (43.8%) agreed, 100 (31.9%) agreed strongly, 60 (19.2%) were unsure, 13 (4.2%) disagreed and 3 (1.0%) strongly disagreed. It was definitely agreed that Passive Management by exception helps managers make consistently effective decisions. (Mean= 4.02, S.D= 875)

In addition, respondents were asked whether passive management by exception makes a manager a highly effective leader. As shown, 41.5% (130) agreed, 32.6% (102) agreed strongly, 24.6% (77) were unsure, 1.3% (4) disagreed. Hence, it can be deduced that most of the respondents considered their leader effective. (Mean= 4.05, S.D= 789)

Furthermore, the results shows when respondents were asked if passive management by exception motivates managers to do best work. As shown, 41.2% (129) agreed, 32.9% (103) strongly agreed, 21.4% (67) were unsure, 4.2% (13) disagreed, and 0.3% (1) disagreed strongly. Therefore, a greater number of employees acknowledged the fact that Passive Management by exception motivates managers to do best work (Mean= 4.02, S.D= 860)

When respondents were asked if Managers give employees regular feedback on their performance. As shown, 39.0% (122) agreed, 31.6% (99) agreed strongly, another 26.2% (82) were unsure, 3.2% (10) disagreed. From this result it is evident that Managers give employees regular feedback on their performance (Mean= 3.99, S.D= 842)

The respondents take on whether passive management by exception directs manager to be opened to new ideas, knowledge and skills 47.6% (149) agreed, 39.0% (122) agreed strongly, 10.5% (33) were unsure, 2.9% (9) disagreed. Therefore, the majority of the respondents were of the opinion that passive management by exception directs manager to be opened to new ideas, knowledge and skills (Mean= 4.23, S.D= 749).

#### 4.2 Hypotheses Testing.

**H0: Contingent reward leadership does not have significant effect on cultural intelligence.**

Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.661 <sup>a</sup>	.437	.435	1.848	.437	241.123	1	311	.000	2.046

a. Predictors: (Constant), CRL

b. Dependent Variable: CI

#### ANOVA<sup>a</sup>

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	823.530	1	823.530	241.123	.000 <sup>b</sup>
	Residual	1062.189	311	3.415		
	Total	1885.719	312			

a. Dependent Variable: CI

b. Predictors: (Constant), CRL

#### Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.135	1.014		8.020	.000
	CRL	.660	.043	.661	15.528	.000

a. Dependent Variable: CI

R =0.661  
 $R^2$  =0.437  
 F= 241.123  
 T = 15.528

**Interpretation:**

The calculated regression sum of squares, which amounts to 823.530, is notably lower in comparison to the residual sum of squares, which is 1062.189. This suggests that a substantial portion of the variation in the dependent variable remains unexplained by the model. Additionally, the observed significance value of the F statistic (0.000) is less than the established threshold of 0.05, indicating that the variance accounted for by the model is not a result of random chance.

The correlation coefficient, denoted as R, is computed as 0.661, signifying a positive correlation between contingent reward leadership and cultural intelligence. The coefficient of determination, represented by R square, reveals that 43.7% of the variability in cultural intelligence can be elucidated by the model. The utilization of the linear regression model results in a low error of estimate. Moreover, the observed contingent reward leadership coefficient underscores a statistically significant positive relationship between contingent reward leadership and cultural intelligence, as indicated by the t-value of 15.528. Consequently, this supports the rejection of the null hypothesis and affirms the alternative hypothesis.

**Hypothesis Two**

**H0: Active Management by exception does not have significant relationship with cultural intelligence.**

Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.291 <sup>a</sup>	.085	.082	2.356	.085	28.844	1	311	.000	1.663

a. Predictors: (Constant), AME

ANOVA<sup>a</sup>

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	160.048	1	160.048	28.844	.000 <sup>b</sup>
	Residual	1725.671	311	5.549		
	Total	1885.719	312			

a. Dependent Variable: CI

b. Predictors: (Constant), AME

Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	16.609	1.346		12.339	.000
	AME	.300	.056	.291	5.371	.000

a. Dependent Variable: CI

R =0.291  
 $R^2$  =0.085  
 F= 28.844  
 T = 5.371

**Interpretation:**

The computed regression sum of squares (160.048) appears to be lower than the residual sum of squares (1725.671), implying that a considerable portion of the variance in the dependent variable remains unaccounted for by the model. The derived significance value of the F statistics (0.000) is below the



threshold of 0.05, signifying that the variance explained by the model is unlikely to be attributed to random chance.

The correlation coefficient, represented by R, is measured at 0.291, indicating a positive correlation between active management by exception and cultural intelligence. The coefficient of determination, denoted as R square, reveals that approximately 8.2% of the variability in cultural intelligence can be elucidated by the model. The utilization of the linear regression model results in a low error of estimate.

The observed active management by exception coefficient indicates a statistically significant positive correlation between active management by exception and cultural intelligence, as evidenced by the t-value of 5.371. Thus, this validates the rejection of the null hypothesis and the endorsement of the alternative hypothesis.

### Hypothesis Three

**H0: Passive management by exception does not have significant effect on cultural intelligence.**

Model Summary<sup>b</sup>

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.386 <sup>a</sup>	.149	.146	2.272	.149	54.395	1	311	.000	1.717

a. Predictors: (Constant), PME

b. Dependent Variable: CI

ANOVA<sup>a</sup>

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	280.719	1	280.719	54.395	.000 <sup>b</sup>
	Residual	1605.000	311	5.161		
	Total	1885.719	312			

a. Dependent Variable: CI

b. Predictors: (Constant), PME

Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	12.928	1.480		8.735	.000
	PME	.447	.061	.386	7.375	.000

a. Dependent Variable: CI

R = 0.386

R<sup>2</sup> = 0.149

F = 54.395

T = 7.375

### Interpretation:

The obtained regression sum of squares (280.719) is observed to be smaller than the residual sum of squares (1605.000), suggesting that a considerable proportion of the variability in the dependent variable remains unaccounted for by the model. The significance value of the F statistics (0.000) is below the significance threshold of 0.05, signifying that the variance accounted for by the model is unlikely to be attributed to random chance.

The correlation coefficient, denoted as R, is calculated to be 0.386, suggesting a favorable correlation between passive management by exception and cultural intelligence. The coefficient of determination, denoted by R square, suggests that around 38.6% of the variability in cultural intelligence can be accounted for by the model. The utilization of the linear regression model results in a low error of estimate.

The calculated coefficient for passive management by exception reveals a statistically significant positive association between this leadership approach and cultural intelligence, as indicated by the t-value of 7.375. Hence, this finding supports the rejection of the null hypothesis and the acceptance of the alternative hypothesis.

### 4.3 Discussion of Findings

The findings of this study are discussed under the various objectives of the study.

Hypothesis one was tested using simple linear regression, to ascertain the effect of Contingent reward leadership on cultural intelligence. ( $r=0.661$ ,  $F= 241.123$ ,  $t = 15.528$ ). This is in line with Nwokocha et al (2015), The study was conducted by researchers who explored the correlation between contingent reward leadership and cultural intelligence within the private sector of the Ethiopian capital. The research employed a descriptive research design. Stratified random sampling was used for the sample selection and a sample of 125 staff were randomly selected from various departments of the firm under study. Survey method was used for collecting the data from the respondents. Questionnaires with five points Likert were used to obtain response. Small amount of quantitative research was used. The study concluded that there was a strong correlation between contingent reward leadership and cultural intelligence.

Hypothesis two underwent examination through simple linear regression to ascertain the connection between active Management by exception and cultural intelligence ( $r = 0.291$ ,  $F = 28.844$ ,  $t = 5.371$ ). This finding aligns with the study conducted by Mousavi et al (2015), which investigated the influence of active management by exception on cultural intelligence among private university staff in Pakistan. The study had a target population of 380 employees. A sample size of 400 was derived with the use of "krejci and Morgan formula". The study used primary data to obtain information which involved a per-paper survey and online Google forms consisting of questionnaires. The research followed a cross-sectional quantitative approach with probability sampling. The population was divided using the stratified random sampling technique. The study's findings revealed a positive correlation between active management by exception and cultural intelligence.

Hypothesis three was tested using simple linear regression, to investigate the effect of passive Management by exception on cultural intelligence. ( $r =0.386$ ,  $F= 54.395$ ,  $t= 7.375$ ). This is in line with Rockstuhl et al (2018),who examined the impact of passive management by exception on cultural intelligence in Coca-Cola, Nepal. The research for this study was performed using descriptive research methods. Data was gathered from a primary source by using organized and structured questionnaires. A group of 120 participants are involved in which 91 of them responded and 24 of them didn't reply back, making the response rate to the questionnaire 74% adequate. The result of the study showed passive management by exception had a positive relationship on cultural intelligence.

### 4.4 Summary Table of Findings

The summarized outcomes of the hypothesis testing are presented in the following table:

Model	Hypothesis	P-Value	Outcome
1	$Y = \alpha_0 + \beta_1x_1 + \mu$	$P < 0.5$	HO1 rejected
2	$Y = \alpha_0 + \beta_2x_2 + \mu$	$P < 0.5$	HO2 rejected
3	$Y = \alpha_0 + \beta_3x_3 + \mu$	$P < 0.5$	HO3 rejected

The hypotheses proposed for models 1, 2, and 3 were rejected since their p-values were below 0.05, indicating a significant analysis.

### 5.1 Conclusion

This study underscored the importance of transactional leadership styles in navigating the complexities of cultural diversity within organizations. The findings highlighted the significant positive effects of contingent reward leadership, active management by exception, and passive management by exception on cultural intelligence. This implies that there was a strong correlation between contingent reward leadership

and cultural intelligence, revealed a positive correlation between active management by exception and cultural intelligence and also showed passive management by exception had a positive relationship on cultural intelligence. This supports the notion that transactional leadership can be an effective approach in enhancing employees' abilities to interact effectively across diverse cultural contexts. The study also emphasized that fostering cultural intelligence is crucial for organizational success in a globalized business environment. The recommended strategies, including cross-cultural training and exposure to various leadership styles, can contribute to the development of employees' cultural intelligence, thereby enabling them to adapt and thrive in multicultural settings. By aligning leadership practices with the principles of cultural intelligence, organizations can enhance their overall performance, productivity, and innovation.

## 5.2 Recommendations

- i. Organizations are expected to embrace the transactional leadership styles as it is the best tool to boost cultural intelligence in the 21<sup>st</sup> century. It is a credible fact that applications of transactional leadership style (reward and punishment system) has motivated employees to put in their best to enhance performance because of the fear of punishment,
- ii. Transactional leadership style, the driver of the cultural intelligence, should be adopted both in the service and non-service industries to enhance performance across the globe as it stands as a tool to measure employee's readiness to add to organizational productivity.

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# Exploring University-Industry Collaboration for Technological Innovation in Nigeria

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## Abstract

University-industry collaboration (UIC) is a key driver of technological innovation and economic development. However, there are many challenges and barriers that hinder effective and sustainable UIC in developing countries, such as lack of trust due to skill gap, policies, finance/incentives and infrastructure. This paper aims to explore the existence of UIC that promotes technological innovations in Nigeria. A mixed-methods approach that combines quantitative and qualitative data from both university and industry was applied via online Google form questionnaires. Obtained results were analyzed using SPSS software. Results show that out of 185 respondents, 79.5% indicate that UIC exists in their establishments. Only 4.1% of the observed data was based on technological innovation while 38.4% was based on undergraduate students' industrial training (IT) attachments. There is no strong evidence of significant linkage between universities and industries that promotes research that would lead to technological innovation and solve existing industrial problems. Among other recommendations, a good working policy should be instituted and enforced to ensure proper and effective UIC to promote the Nation's technologically innovative research and development.

**Keywords:** University-Industry Collaboration (UIC), technological innovation, developing countries, R&D, Nigeria

## 1.0 Introduction

Technical Innovation is developing new ideas, products, services, and processes which make use of technology (Audrey Paul Ndesaulwa, and Jaraji Kikula, 2016). Technological advancement plays a vital role in stimulating economic growth, enhancing competitiveness, and advancing society. In today's fast-paced and ever-changing global environment, promoting innovation has become critical for countries, sectors, and organizations. Developed countries that are highly technological in the world invest so much in technological innovation through the collaboration of industry with academia (Bramwell, A. and Wolfe, 2008). A crucial factor driving innovation is the cooperation between universities and industries, where academia and businesses come together to share knowledge, resources, and expertise.

University-industry collaboration is of great interest to researchers, policymakers, and industry leaders but little or no effort has been made on its impact on technological innovation, especially in developing countries like Nigeria. The three main catalysts for cultivating innovation within any organization include; the industry, which is acknowledged as a "creator of economic well-being," the university, also recognized as a "spring of innovative concepts," and the government, perceived as a "supervisor of public matters." The Government comes amidst the university and the industry (Sutrisna et al., 2021). The framework known as the "triple helix model" according to Leydesdorff in 2018, unites these three crucial stakeholders to clarify the structural progress within knowledge-based economies. This collaborative effort has gained considerable recognition as a way to bridge the divide between academic research and real-world implementation, expediting the transformation of scientific breakthroughs into marketable offerings.

Nevertheless, knowing the importance of collaboration, there has been an increasing inclination towards establishing alliances and joint ventures between universities and industries. This collaborative methodology strives to leverage the synergistic capabilities of both domains, fostering technological innovation, boosting competitiveness, and tackling practical obstacles. UIC can come in different forms and can be examined from different points of view as stated by Morufu Abolaji Ali and Joshua Oluwasuji Dada, 2011. Collaboration between universities and industries was categorized based on continuous learning, business undertakings, knowledge transmission, research, and education (Thune, 2011). It was established that one of the major causes of unemployment in developing countries like Nigeria is that most University graduates are unemployable due to the mismatch between university curricula and industrial needs (Segun Joshua et.al., 2015). One of the study's recommendations highlighted the significance of engaging industrialists in crafting curricula and enlisting their involvement in delivering hands-on courses, potentially in a part-time capacity, within Nigerian universities. When this is done, Nigerian graduates will acquire the essential skills for the industrial sector of the economy.

## **2.0 Literature Review**

Multiple studies have explored the nature, mechanisms, and outcomes of University-Industry collaborations, striving to comprehend the factors that affect their effectiveness and the ways in which they contribute to innovation. However, nothing or little is known regarding the current condition of university-industry collaboration (UIC) in developing countries especially on Technological innovations. (Schiller & Lee 2015), did an analysis that compares University-Industry Collaboration (UIC) among different Asian emerging and developing economies. The industry and Universities collaboration is progressively seen as a means to enhance innovation by facilitating the exchange of knowledge (Samuel Ankrah and Omar AL-Tabbaa,2018). UIC is the motor for innovation (Lundberg and Oberg,2021). Universities are responsible for producing, transmitting, and diffusing knowledge (Sutrisna et al., 2021) while the industries are Regarded as the key factor in converting research and innovation into concrete products and services (Mirza et al., 2020). Discrepancy between academic curricula and the demands of the industrial sector in the economy are among the major factors contributing to an annual influx of graduates with uncertain employment prospects (Segun Joshua et al., 2015). Partnerships between academic institutions and industries, such as licensing and university-driven entrepreneurship, cultivate innovation in high-tech domains (Tian, M,2022). (Cudic et.al., 2022) examined the links between university-industry collaboration (UIC) predictors and the results of UIC cooperation.

The study concentrated on University-Industry Collaboration (UIC) within European Union member states and Western Balkan countries. By employing partial least squares structural equation modeling (PLS-SEM), the researchers analyzed data from three years, 2015 to 2018. The outcomes indicated that nations that invested in UIC displayed enhanced UIC performance. The statistical analysis performed in the study identified investments in knowledge, networking, and research and development (R&D) as the primary influential factors affecting UIC performance, as concluded by the authors. (Malik et.al., 2021) carried out an exploratory study to identify the latest barriers that impede University-Industry Collaboration (UIC) in Pakistan as well as outlining some recommendations to elevate such partnerships in developing countries, by introducing Empirical data gathered from Pakistan through a questionnaire survey encompassing twenty-four universities, conducting twenty-five interviews with industry managers, and extracting outcomes from a high-level workshop event. It was observed that a lack of synchronization between governmental bodies, universities, and industrial enterprises presented an obstacle to the successful transfer of knowledge between academia and industry. (Obanor and Kwasi-Effiah, 2013) conducted a survey to determine the issue of technology transfer between schools of engineering and sciences in universities and industries within the north-central, south-south, and western regions of Nigeria. Appropriate persons were asked a range of questions, and the investigation exposed a notably low level of technology exchange and collaboration between the predominant industries and universities in this particular geographic area. The factors contributing to this situation of UIC collaboration were underlined and recommendations were put forth to enhance technology transfer and collaboration effectively within Nigeria.

In a study conducted in 2010, Nieto and their team investigated how technological collaboration influenced the innovation efforts of technology-based firms (TBFs) (Nieto et al., 2010). They probed the effects of diverse technological partners on various facets of innovation results. Furthermore, they gave particular attention to the pivotal role played by universities in influencing the dynamics of technological partnerships. Their empirical research relied on the data from the Technological Innovation Panel (PITEC) spanning the period from 2004 to 2007. It was observed that the duty of universities is suitable for achieving findings from the exploration. Notwithstanding, the growing awareness of the importance of University-Industry collaboration, there is still a need for a deeper understanding of its impact on technological innovation as it plays a vital role in any country's economic growth and advancement. Existing research provides valuable insights, but there are gaps that need to be addressed. There is a need to examine the impact of this UIC on the technological innovation of a country.

Therefore, this research paper aims to add to the existing pool of information by examining the impact of University-Industry collaboration on technological innovation. Case studies, empirical data, and relevant literature will be analyzed, this study seeks to provide an extensive understanding of the end result, challenges, and good practices related to such collaborations. In this study, the term "industry" encompasses both private and government-owned companies, as well as governmental entities like Ministries, Departments, and Agencies (MDAs). On the other hand, the term "university" includes both traditional universities and research institutes. Technological Innovations play a significant role in the nation's economic landscape, as they allow the making of scientific discoveries, improving production, and creation of new products (Maxim Pasholikhov and Georgy Dudakov, 2020). The findings of this research can help policymakers, academic institutions, and industry management in designing powerful plans and policies that stimulate fruitful University-Industry collaborations and propel technological innovation for social and economic benefit.

Generally, investigating the impact of University-Industry collaboration on technological innovation is very important for improving our understanding of how the collaboration between academia and industry can be utilized to create a vibrant innovation ecosystem. By unraveling the dynamics and examining the various dimensions of these collaborations, we can unlock new opportunities for knowledge exchange, and technology transfer, and ultimately, shape a future where research and industry coalesce to drive transformative innovation.

Hence, this paper presents the outcomes of an investigation aimed at assessing the existence of UICs that impact technological innovation in Nigeria. The goal is to establish a basis for improvement and map out a forward trajectory. The paper begins with a review of relevant literature, followed by an explanation of the research methodology and the presentation of research findings. This is followed by an analysis and discussion of the results, culminating in a conclusion that includes recommendations.

### **Some of the Challenges of Universities and Industries Collaboration in the Country**

1. Lack of policies on University-Industry collaboration: National policy and innovation systems linking universities and industries should be made and implemented.
2. Financial implications: lack of funding for research and development activities for both universities and industries.
3. Lack of sustainability: Once there is a change in government, some collaboration and innovations stop.
4. Knowledge transfer and skill gap: Inability to share or disseminate knowledge When people find it difficult to apply the skills they've gained through training or practice in real-life, practical situations
5. Over-dependence on foreign innovation and technologies: Industries felt that consumers rely more on foreign innovation and technologies and this hinders the development of university-industry collaboration.
6. Academic Autonomy/ industry influence.

### **The research objectives are to:**

1. Evaluate the present condition or state of university-industry collaboration in Nigeria.

2. Identify the challenges of effective university-industry collaboration in Nigeria.
3. Assess the impact of collaboration on technological innovation in the country.
4. Analyze the socio-economic implications (generally) of university-industry collaboration in the country.
5. Develop strategies and recommendations for effective University-Industry collaboration in Nigeria.

### **3.0 Methodology**

This research investigated the impact of UIC on technological innovation in Nigeria. The study employed a survey research methodology. Primary data was gathered by distributing a structured questionnaire to targeted and relevant stakeholders. A sample of 185 respondents was selected using a stratified random sample technique. Prior to this, essential information was gathered through an extensive literature search and review. This process laid the groundwork for defining the criteria and variables utilized in formulating the questionnaire. In the context of the research, the population under scrutiny pertains to a database of firms engaged in engineering and technology practices, academia in universities, and research institutes located in the study area. In this study, Engineering and technology-based firms (scattered all over the country) represent the industry/company while University /Research institutes (is the University or institutions scattered all over Nigeria) represent the university. The study area covered about 20 states out of the 36 states and the federal capital in Nigeria. These states include Lagos, Ondo, Osun, Enugu, Anambra, Imo, Abia, Bayelsa, Abuja, Niger, etc. These states were chosen on a random basis as there is no particular reason for the choice of these states. The universities used in this study were chosen based on those that offer Engineering and Technology related courses. And some of them are the University of Nig. Nsukka (UNN), Enugu State University of Science and Technology, Enugu (ESUT), Nnamdi Azikiwe University Awka, Federal University of Technology Owerri (FUTO), University of Lagos (UniLAG), Federal University of Technology, Akure (FUTA), Projects Development Institute (PRODA) among others.

A total of 124 Practicing firms in the 20 states were surveyed. A complete enumeration of the lecturers in the selected institution was utilized for the academia as a preliminary examination of the respective institutions, their combined count amounted to 59. The questionnaire was thoughtfully designed with the aim of supplying responses to the research questions and achieving the impact of university-industry collaboration on technological innovation in Nigeria's study objectives. The inclusion of a cover letter with the questionnaire ensured that all respondents were adequately informed about the study's necessity and rationale, thereby meeting ethical requirements. They were also guaranteed that the data given was strictly for research purposes only. The questionnaire which was developed for online responses using Google form comprises two segments. The first segment comprises general information about the respondents, while the second segment addresses issues related to the study's objectives. The options chosen by the participants comprise dichotomous questions (yes or No) and subjective questions (Questions that invite open responses). The data collected underwent analysis in SPSS, which involved methods like creating frequency distributions, calculating percentages, and determining mean scores, and conclusions were drawn. The analysis was done using SPSS (Statistical Package for the Social Sciences), also known as IBM SPSS Statistics, a software package used to analyze statistical data. Frequency was used in this research as it showed whether the observations were high or low and also whether they were concentrated in one area or spread out across. Numerous research endeavors have utilized similar statistical approaches when analyzing survey findings.

## **4.0 Results**

### **4.1 Place of Work**

Outcome of the section one of the questionnaire which exposes the respondent's personal information which qualifies them as suitable respondents to this study is shown in tables 1 – 4. The online, google form responses were analyzed using the SPSS.



**Table 1: Place of work of respondents**

Place of work		Frequency	Percent	valid Percent	Cumulative Percent
Valid	Industry	124	67.0	67.8	67.8
	University	59	31.9	32.2	100.0
	Total	183	98.9	100.0	
Missing	System	2	1.1		
Total		185	100.0		

From Table 1, it can be seen that a total of 185 respondents' information concerning the place of work was collected out of which, 67% are from industry, and 31.9% are from University/Research institutes. This gives a total of 183 valid responses from the targeted University and industry workers with only 2 invalid entries. This is an indication that the research questionnaire was localized to only the targeted respondents to avoid biased or irrelevant responses.

#### 4.2 Qualification

The aim of seeking the qualification of respondents is to ensure that they have all passed through a higher institution and are knowledgeable enough both by education and experience to respond to the subject matter. The response gotten from the area of qualification are analyzed in Table 2.

**Table 2: Highest qualification of participants.**

Highest qualification		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		2	1.1	1.1	1.1
	Bsc/HND	69	37.3	37.3	38.4
	1;2	1	.5	.5	38.9
	Msc	73	39.5	39.5	78.4
	PhD	40	21.6	21.6	100.0
Total	185	100.0	100.0		

The bulk of the respondents (39.5%) had a master's degree (M.Sc) in their various fields, followed by a Bachelor of Science B.Sc/HND (37.3%), then 21.6% had a Ph.D. Based on this background information, the participants were deemed eligible and capable of furnishing the required data for the study, and the information they supplied can be considered trustworthy.

#### 4.3 Area of service

In order to determine if the respondents are technically inclined or not, the area of service was also collected, and results shown in Table 3.

**Table 3: Area of Service.**

Area of service		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Technical	146	78.9	80.7	80.7
	Non-technical	35	18.9	19.3	100.0
	Total	181	97.8	100.0	
Missing	System	4	2.2		
Total		185	100.0		

An analysis of the area of specialization of the participants (Table 3) shows that 78.9% of respondents have obtained technical training (Engineering/technologist) and also work in the technical department while only 18.9% work in the non-technical department/managerial positions. The interview revealed that these staff have at one time worked as technical staff and grown to managerial positions. Since the research focuses on technological innovation, the majority of the respondents come from technical backgrounds gives a better opportunity for deep insights into the subject matter.

#### 4.4 Existence/Nonexistence of UIC

The first research question asked was aimed at ascertaining the existing/nonexistence of linkage between the University and Industry. This is a Yes or No question to know if there is any form of University-Industry Collaboration. Table 4 shows the responses gotten.

**Table 4: The awareness of University-Industry collaboration in Nigeria.**

Is there any form of University-Industry collaboration in your establishment		
		Frequency & Percentage
	Yes	147 (79.5%)
	No	36 (19.5%)
Missing	System	2 (1.1%)
Total		185

Summary of the response of Table 4 indicate that UIC exist because 79.5% of the respondents answered YES while 19% answered NO while 1.1% were silent.

#### 4.5 Types of UIC

It was necessary to understand the type of collaboration that exists between the University and the Industry. This was why this question was raised to ensure a better evaluation of the case study. Table 5 shows the responses on the form of UIC that existed in the different institutions and industries used for this study. Ten different forms of UIC were considered and they include; Industrial Training (IT) which is a requirement by Nigerian Universities Commission (NUC) for Engineering students in their 4<sup>th</sup> year to have an experience working in the industries, Research and Development (R&D) which include the industry having a R&D unit which may or may not be linked to the University, Consultancy whereby qualified University staff who teach and supervise students also serve as consultants to the Industry, Industrial staff training whereby qualified staff of the industry also serve as visiting lecturers to the university, Tech transfer, whereby there is a technological transfer between the industry and the university, sponsored research which is situation where industry sponsor research that solves the problem existing in the industry, shared facilities where the industry share their facilities with the university for the purpose of students education and vice versa, scholarship which means the industry investing on the education of students, technological innovation which means industries taking their technological problems to the university for innovative solution and finally, infrastructural development whereby the industry invest in development of infrastructures like laboratories for training students.

**Table 5: Form of UIC**

What form of UIC is existing in your institution/industry			
		Responses	
		N	Percent
Forms of UIC	IT	113	(38.4%)
	R& D	53	(18.0%)
	Consultancy	25	(8.5%)
	Industrial Staff Teaching	14	(4.8%)
	Tech. Transfer	20	(6.8%)
	sponsored Research	21	(7.1%)
	Shared facilities	9	(3.1%)
	Scholarship	12	(4.1%)
	Technological Innovation	12	(4.1%)
	Infrastructure development	15	(5.1%)
Total		294	(100.0%)

Result of Table 4 shows that majority of the collaboration between University and Industry (38.4%) is through Industrial attachment (IT) which not even up to 30% of the students from different Universities get placement in Engineering firms. The other 70% of student get attached to places like business centers and non-engineering outfits. Only 18% of respondents agreed that UIC existed in the area of research and development (R&D) while 4.8% is on industrial staff teaching in the university. The list of all forms of collaboration under study is on technological innovation with a value of 4.1% which shows an obvious weakest form of existing collaboration. This means that there is little or no form of linkage between the problems in the industry and the research going on in the university. This will make it very difficult for any innovative research that addresses the existing problem in the industry.

#### 4.6 Challenges of University-Industry Collaboration

Some challenges of effective UIC in Nigeria were also considered and presented in Table 6

**Table 6: Some of the challenges of effective UIC**

What are some of the challenges of effective university-industry collaboration in the country?			
		Responses	
		N	Percent
Challenges of UIC	A policy of the Company/University	19	(33.9%)
	Over-dependence on foreign innovation and technologies:	5	(8.9%)
	Financial implication	11	(19.6%)
	Academic Autonomy/Industry Influence	3	(5.4%)
	Lack of sustainability	6	(10.7%)
	Knowledge transfer and skill gap	12	(21.4%)
Total		56	(100.0%)

It can be observed from Table 5 that the major challenge to effective UIC is University/industry policy, skill gap, and financial implication. To achieve effective university-industry collaboration, there is a need to have a policy for the linkage enforcing industries to contribute their quota in the areas of student education/training. There should be mandatory industrial posting from time to time during student training. Skill gap being the second highest challenge show that there is a wide gap between the teaching in the university and the required skill for the industrial workforce. This shows that even the industry may not be confident enough that the innovative solution to their industrial problems can be researched gotten from the university. Finance is another issue that may hinder UIC because for the industrial staff to teach in the university, payment may be required, and vice versa. These and more challenges are what may hinder an effective UIC in Nigeria but in all, if a good policy capturing this collaboration is put in place, it can be achieved.

#### 4.7 Socio-economic implications of university-industry collaboration

The socio-economic implication of UIC was also tested and responses summarized in Table 7.

**Table 7: The socio-economic implications of university-industry collaboration in Nigeria.**

What are the socio-economic implications of university-industry collaboration on technological innovation in the country?			
		Responses	
		N	Percent
Socio-Economic implications	Knowledge Exchange	31	(18.3%)
	Research and Development	16	(9.5%)
	Technology Transfer	23	(13.6%)
	Industry relevance	32	(18.9%)
	Talent Development	43	(25.4%)
	Economic Growth and Development	10	(5.9%)
	Societal Impact	14	(8.3%)
Total		169	(100.0%)

a. Dichotomy group tabulated at value 1.

Table 6 shows that the highest socio-economic impact that will be gotten from UIC was on talent development. The innovative ability of Nigerian youths will be developed and graduates will become better employable and relevant to the industry.

#### 4.8 Impact of UIC on Technological Innovation

Respondents' opinion was sampled to determine if the university-industry collaboration has any impact on technological innovation and their responses are summarized in Table 8.

**Table 8: Impact of UIC on Technological Innovation**

Do you think the university- Industry Collaboration will have any impact on technological innovation?			
	Frequency	Percent	
Yes	180	(97.3)	
No	2	(1.1)	
System	3	(1.6)	
Total	185	100.0	

The result of Table 7 shows that 97.3% of 180 respondents believe that UIC has an impact on technological innovation.

#### 5.0 Discussion

However, nothing or Limited information is available regarding the current condition of university-industry collaboration (UIC) in developing countries especially on Technological innovations. (Schiller & Lee,2015). However, there is a study that examined UIC's impact on firm innovation but with biased estimations as the inter-firm relationship was not considered (Mingyu Tian et al.,2021). This study investigated the impact of UIC on the technological innovation of university research as well as industrial solutions. The study result of Table 4 indicates that a significant proportion of the respondents, precisely 79.5%, reported the existence of University-Industry collaboration within their establishments. This finding suggests that collaboration between universities and industries is prevalent and actively taking place in the real world. The high percentage of respondents affirming its presence lends strong support to the notion that this collaborative relationship is a tangible and practical aspect of their respective organizations or institutions. The data provide empirical evidence that validates the existence and importance of University-Industry collaboration in fostering partnerships, knowledge exchange, and innovation between academic institutions and industrial sectors. Table 5 shows that the bulk of this collaboration between the university and industry is on industrial training placement occurring in the 4<sup>th</sup> year of engineering undergraduate study. This type of collaboration at this level, adds little or no value to technological innovation because real research occurs at the postgraduate level in Nigerian institutions.

The information presented in Table 6 highlights the distribution of challenges faced in University-Industry collaboration in Nigeria. According to the data, the most significant challenge is related to the policies of both companies and universities, accounting for 33% of the reported challenges. This suggests that the lack of aligned policies and practices between academic institutions and industrial organizations poses a considerable obstacle to effective collaboration. Insufficient government policies concerning University-Industry linkages is a big problem. It is essential to establish a national policy and innovative system that fosters strong connections between universities and industries. Moreover, there is a critical need for effective implementation of these policies to facilitate successful collaborations between the two sectors. The implications of these findings are substantial. The data suggests that addressing policy differences between universities and industries should be a top priority in fostering successful collaboration. Clear and coherent policies, regulations, and guidelines need to be established to facilitate smoother interactions and partnerships between the two sectors.

The second most prominent challenge, with a percentage of 21.4%, is related to knowledge and skill gaps. This indicates that there is a notable disparity in the expertise and competencies between universities and industries, making it challenging to bridge the gap and effectively collaborate on research and innovative projects.

The finding that 19.6% of the respondents identified financial implications as a challenge holds valuable insights regarding the perceptions and experiences of the participants in the study. This percentage suggests that a substantial proportion of the respondents recognize and acknowledge the presence of financial constraints as a critical obstacle in the context of University-Industry collaboration in Nigeria. The implications of this financial challenge are multifaceted. For universities and academic institutions, limited funding may hinder their capacity to invest in research and development activities, acquire state-of-the-art equipment, and attract talented researchers and industry collaborators. Insufficient financial resources can also curtail the ability of universities to offer relevant and innovative educational programs that align with the needs of industries and the job market. On the other hand, industries may face financial constraints that hinder their capacity to engage in research and development partnerships with universities. They might be less willing or unable to invest in collaborative projects, which can hinder the advancement of innovative solutions and the commercialization of research findings. Furthermore, the financial challenge may also affect the overall sustainability and longevity of University-Industry linkages. If the financial burden outweighs the perceived benefits of collaboration, institutions, and organizations may be less motivated to continue or initiate such partnerships. By recognizing and addressing the financial challenges associated with University-Industry collaboration, stakeholders can work towards creating a more supportive environment that fosters successful partnerships, knowledge exchange, and innovation, ultimately contributing to national development and economic growth in Nigeria.

The analysis of the socio-economic implications of university-industry collaboration on technological innovations in the country was conducted with a primary focus on the economy, recognizing its pivotal role in the overall development of any nation. A considerable percentage of respondents (25.4%) emphasized the importance of talent development as a result of university-industry collaboration. This finding suggests that such collaborations play a crucial role in nurturing and enhancing the skills and expertise of individuals, including students, researchers, and industry professionals. Nearly one-fifth of the respondents (18.9%) highlighted industry relevance as an essential implication of university-industry collaboration. This implies that collaborative efforts between academia and industries contribute to producing research and innovations that are directly applicable and beneficial to various industrial sectors. Such relevance enhances the practicality and real-world impact of research outcomes, leading to the development of products, services, and solutions that address industry challenges and societal needs.

A significant proportion of participants (18.3%) emphasized the importance of knowledge exchange resulting from university-industry collaboration. This implies that when universities and industries collaborate, there is a reciprocal sharing of expertise, information, and best practices between the two entities. Academic institutions can gain valuable insights into industry trends and challenges, while industries can access cutting-edge research and academic knowledge, fostering a symbiotic relationship that promotes mutual growth and advancement. The data revealed that technology transfer was identified by 13.6% of the respondents as an important implication of university-industry collaboration. This suggests that collaborative efforts facilitate the transfer of technological know-how and intellectual property from academic research to industrial applications. This transfer can lead to the commercialization of innovative technologies, creating new market opportunities, and driving economic growth. The implications of these findings are substantial and hold significant potential for national development. University-industry collaboration can foster a dynamic ecosystem that nurtures talent, encourages innovation, and accelerates technological advancements. By addressing industry needs and sharing knowledge, collaborative efforts can lead to practical solutions, boost economic competitiveness, and contribute to the overall progress and prosperity of the country. These implications highlight the importance of nurturing and supporting strong partnerships between academia and industries as a means of driving sustainable development and growth in the nation.

The data on developing strategies and recommendations for effective University-Industry collaboration in the country provides valuable insights into the perceptions of respondents regarding the potential impact of such collaborations on technological innovation. According to the findings, an overwhelming majority of

participants, precisely 97.3%, expressed a positive outlook on the influence of University-Industry collaboration (UIC) in driving technological innovation in the country. This high percentage indicates a strong vote of confidence from the respondents, suggesting that they firmly believe that fostering partnerships between academia and industries can have a substantial and positive effect on technological advancements in Nigeria. The implications of this data are highly encouraging. It signifies that key stakeholders, including researchers, industry professionals, policymakers, and educators, are enthusiastic about the prospects of collaborative efforts between universities and industries. This collective optimism bodes well for the future of technological innovation in Nigeria.

With such a strong consensus, there is a clear mandate for action and the development of strategic initiatives to promote and enhance University-Industry collaboration. Based on the data, it becomes evident that there is a strong appetite for strengthening these partnerships to capitalize on the vast potential for technological advancements and economic growth. Furthermore, establishing platforms for regular communication and collaboration between universities and industries can facilitate the exchange of ideas, expertise, and resources, leading to more effective partnerships and impactful outcomes.

## **6.0 Conclusion**

This paper has investigated the existence of UIC that promotes technological innovations in developing countries using Nigeria as a case study. Results obtained have shown that there are different kinds of UIC in existence in Nigeria majority of which was on the industrial attachment of undergraduate students and the least was on technological innovation with a value of 4.1%. This means that there is little or no existing link between the University and the industry in solving existing industrial problems so as to promote technologically innovative research. The overwhelmingly positive response from the participants, with 97.3% acknowledging the potential impact of University-Industry collaboration on technological innovation in Nigeria, provides a solid foundation for future endeavors. By harnessing this positive outlook and channeling it into actionable strategies, Nigeria can pave the way for a thriving ecosystem of research, innovation, and economic progress driven by effective University-Industry collaboration. Future work would include a UIC implementation framework that would promote technological innovation in developing countries.

## **7.0 Recommendations**

1. Moving forward, it is imperative for stakeholders, including governments, academic institutions, and industries, to work together to establish a conducive environment for University-Industry collaboration. This involves creating supportive policies, promoting knowledge exchange platforms, and providing financial support to foster research and innovation.
2. Addressing the financial implications of University-Industry collaboration requires strategic efforts from various stakeholders. Governments and policymakers could play a crucial role in creating funding mechanisms and incentives that encourage both universities and industries to collaborate. This may include grants, tax incentives, or public-private partnership initiatives aimed at promoting research and innovation. Moreover, fostering a culture of innovation and entrepreneurship within academic institutions and industries can help diversify funding sources through research grants, industry-sponsored projects, and technology commercialization.
3. By working together, universities and industries should create tailored educational and training programs that align with the needs of the job market, ensuring a workforce equipped with relevant and up-to-date knowledge and skills.
4. In light of these findings, stakeholders should focus on developing comprehensive strategies and recommendations that address the challenges identified in the study while building on the existing positive sentiment. Creating an environment that fosters knowledge exchange, talent development, and technology transfer becomes imperative to maximize the benefits of UIC.
5. Government bodies should take a proactive role in formulating policies that incentivize collaborative research and technological innovation projects.

6. Academic institutions should work towards aligning their curriculum with industry needs to produce graduates who are well-equipped with relevant skills and knowledge. Industries, on the other hand, can actively engage with academia to identify research opportunities and drive technology commercialization.

## 8.0 Acknowledgments

We wish to acknowledge Enugu State University of Science and Technology for creating the enabling environment to carry out this research work. Our thanks go to the Transmission Company of Nigeria for permitting their staff, Ijeoma Nwadike to enroll in further studies at EEE Department of ESUT. We also acknowledge the efforts of our respondents who were dedicated to answering our online questionnaires. Thanks to our families for their support and encouragement.

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## Value-driven Thinking Framework for Developing Responsible Management Learning and Education Programs in Business Schools

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### Abstract

Business schools need help to create appropriate programs for implementing concepts and principles of corporate social responsibility and sustainability. That is because there are not enough practical frameworks. This study presents a practical and adaptable framework for building Responsible Management Learning and Education (RMLE) programs in business schools. The study adopted a "value-driven thinking" oriented approach. The proposed framework is constructed around the interactions between the education and learning inputs (value stores) in phase one. This phase serves as the foundation for the framework. Phase two is the targeted learning outcomes (value promised to be delivered). Phase three deals with the learning and education process (value chain and value generation). Phase four deals with the actualized learning results, reporting, and feedback (or the value delivered). The proposed framework lays out a precise, flexible road map that business schools worldwide can use in various settings to create successful RMLE programs. The need for additional and future studies to examine the applicability and value of the framework in practical settings is urged.

**Keywords:** Business school; Responsible Management Education; Education for Sustainability; Value-driven Thinking

### Introduction

The needs of numerous stakeholders are causing quick changes in the commercial and educational worlds. Due to the growing stakeholder awareness of sustainability, corporate social responsibility (CSR), and business ethics, business schools now face new difficulties and hazards. According to Abdalla et al. (2020), stakeholders are becoming less and less tolerant of business schools that continue to prioritize profit maximization at the expense of their expected contributions to society and the environment. Future business leaders are expected to be aware of and understand the new risks and problems that face business organizations. This expectation applies to both undergraduate and graduate business and management students. Business and management schools are essential in developing the abilities and perspectives of future business leaders and maybe strong forces for sustainability and CSR, according to Edelman (2012). Since the 2008 financial crisis, there has been increasing pressure for such regulations on how a firm builds value over time to benefit stakeholders. Numerous business schools will be compelled to create Responsible Management Learning and Education (RMLE) programs to explain and express their solutions to the social and economic effects and repercussions of the COVID-19 epidemic.

According to the 2019 CEO research of UN Global Compact (UNGC) members, 86% of CEOs agree that the global economic system must prioritize equitable growth. Only 25% of businesses have corporate objectives that sufficiently serve societal objectives. Additionally, business support for Global Goals is kept outside of the overall business plan. Consequently, it has no significant impact on the UNGC's products, services, or business methods - the UNGC progress report (2019). The UN started the Principle of Responsible Management Education (PRME) program in 2007 at the UNGC Leaders' Summit in Geneva after realizing education's critical role in achieving the Sustainable Development Goals (SDGs). The PRME effort has grown to be the United Nations and business school partnership that is most formalized. The



mission of the PRME is to "convert business and management education, research, and thought leadership globally while promoting awareness about the SDGs and developing the responsible business leaders of tomorrow. "The PRME is categorized as purpose, values, methods, research, partnership, and dialogue.

The extent to which business and management education produces leaders and managers who are moral, effective, and efficient has come under intense scrutiny during the past ten years (2005). According to Ghoshal (2005), business and management education needs to do more to promote the knowledge and abilities related to sustainability. That is directly applicable in the workplace, Crawford and Wall (2018). The triple-bottom-line and social responsibility models have grown in popularity, but the idea that modern business and management education encourages profit-driven attitudes persists (2017d). Miller and Xu (2019) claim that alumni of MBA programs—the purported flagship postgraduate program of business schools—are blatantly more self-serving than other graduates.

Higher education institutions tend to declare in their policies that they are concerned with sustainability without implementing the required institutional and strategic changes. Akrivou and Bradbury-Huang; Snelson-Powell et al. (2016); Painter-Morland et al. (2018); Mburayi and Wall (2018); (2015). More efforts should be devoted to developing a comprehensive framework for designing RMLE programs in business schools. Previous works of Laasch et al. (2020), Wall et al. (2019), Rusinko (2010), and Wall et al. (2017b) concentrated on developing frameworks to learn how to practice, instruct, and conduct complex responsible management. The literature review above shows that more complete, adaptable, and flexible frameworks should be used globally to develop and administer a suitable RME program in business schools. This introduction's conclusion highlights the urgent need to devote more time and resources to developing practical and flexible frameworks so that business schools worldwide can strengthen their role in forming the talents and mindsets of future business leaders. Therefore, this study aims to help business schools develop appropriate Responsible Management Learning and Education (RMLE) programs by providing a practical and adaptable framework.

### **The Conceptual Framework: The Approach**

The study adopted an integrated research approach called "Value-driven thinking." This approach sees education and learning as providing more value to students or learners (The objects). The learning and education system comprises numerous integrated, interrelated, and complementary operations and activities where value is co-created, accumulated, and shared. Abdalla et al. (2020) empirical study developed an integrated framework for building the RME program in business schools, figure (1). The framework illustrates how values co-created and shared by RME connect with sustainability-related factors. The framework shows the desired learning set of competencies (outcomes) that business students can obtain through a suitable RME program. Porter and Kramer's (2011) paradigm calls these competencies "RME co-created and shared values," spanning the critical facets of responsible management and sustainability (i.e., economic, social, and environmental). Abdalla et al. (2020) further placed the framework into context by emphasizing the need to consider internal and external environmental elements surrounding the business school or institution. These elements are the country's level of development, political and social stability, environmental sustainability, and societal beliefs and values.

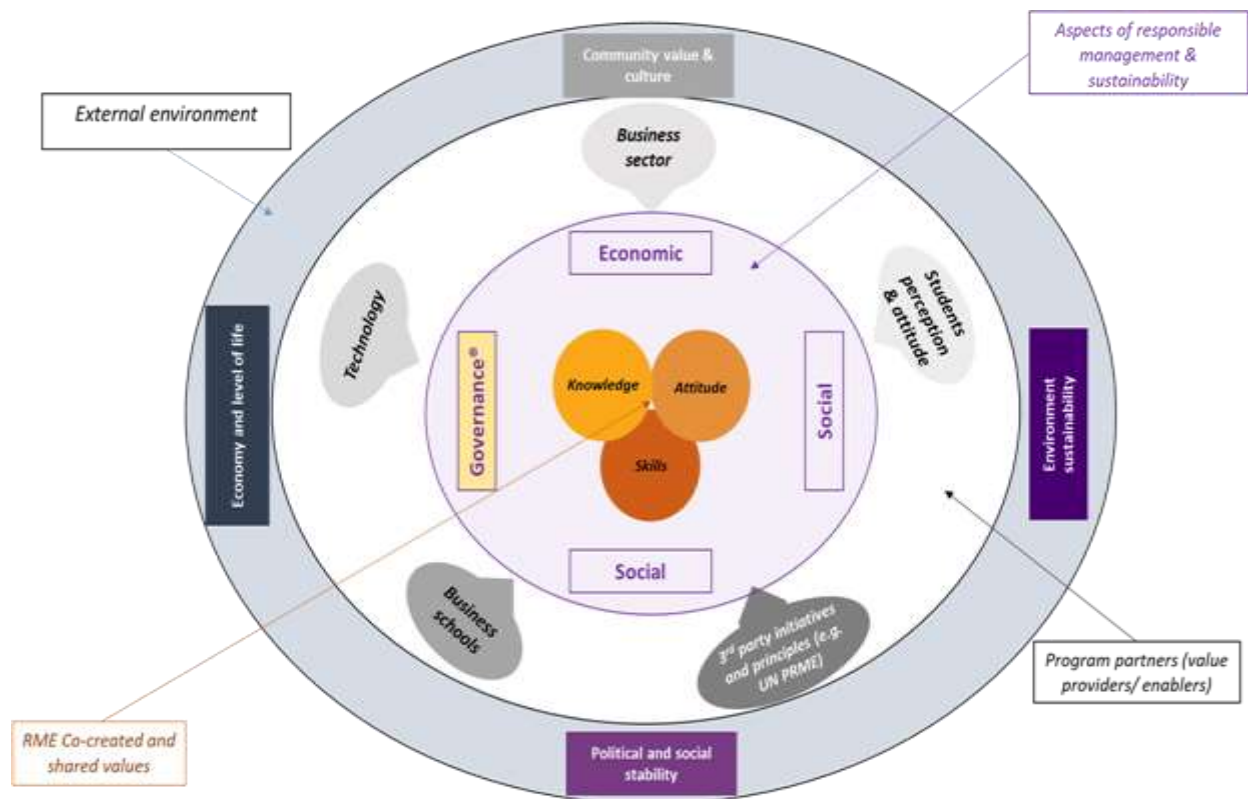


Figure 1: The framework for developing the RME program put into context.  
Source: Abdalla, et al. (2020)

### Meaning of Education and Learning

According to Ayansola and others (2020), education is the process of facilitating the acquisition of knowledge, skills, values, beliefs, and habits. While learning is defined as a new comprehension or appreciation of anything ( Kijpokin, 2017). Thus, learning includes both educational methods and their results. Teaching, training, discussion, guided research and assessment, and result evaluation are all examples of educational approaches. The public and stakeholders contribute to education's inputs and benefit from its outputs, Orlando et al. (2019).

Ayansola et al. (2020) argued that education and learning systems involve numerous interdependent, interrelated, and changing variables over time. Students, teachers, curriculum, content, and evaluation of learning objectives are all included in the educational system. Inputs to the education system serve as value reservoirs, and system activities use and employ these inputs to produce and deliver values (i.e., outcomes). The feedback component compares values given to society's and stakeholders' expectations and wishes.

Figure (2) portrays the main concepts and ideas for conceptualizing the proposed RMLE framework. The RMLE framework comprises four essential elements: input, process, outcomes, and feedback. The value concept is embedded in each element.

- Inputs (program value store): These are the materials or resources that the RMLE program needs to produce the outcome.
- Processes (sustainable value creation): The learning and education operations and activities (i.e., education value chain) that transform the inputs into the intended outcomes.
- Outcomes (values to deliver): represent the desired results, outcomes, or goals.
- Feedback is the element of control. If the desired outcomes are not achieved, the processes and the inputs must be adjusted to achieve the desired result.

The conceptual framework is contextualized to consider the stakeholders and the business school setup.

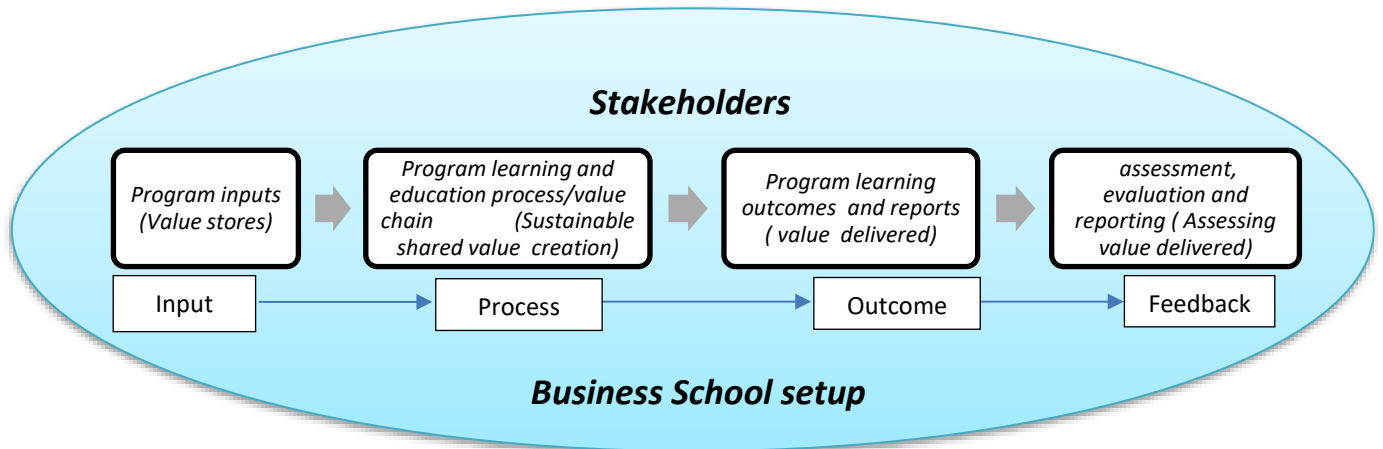


Figure 2: “Value-driven thinking” approach for developing RMLE programs.

Source: Field Survey, 2023.

**RMLE Program Development at Business Schools: A Value-driven Framework.**

As was previously mentioned, the input-process-outcome-feedback (or "value creation chain") elements form the foundation of the RMLE framework—additionally, adopting an interdisciplinary viewpoint and "value-driven thinking" approach.

**The phases and Components of the Value-driven RMLE Program.**

" Value-driven thinking" is further segmented into operations and activities clustered into phases. Therefore, as shown in Figure (3), the proposed framework comprises four primary interrelated and interconnected phases and substances. The framework was first built on the interplay and dependence between and among the inputs into education and learning (value stores) in phase 1. Second, the targeted learning outcomes (value promised to be delivered) as phase 2. Phase 3 is the learning and education process (value creation and delivery). Phase 4 includes the actualized learning results, reporting, and feedback (value delivered).

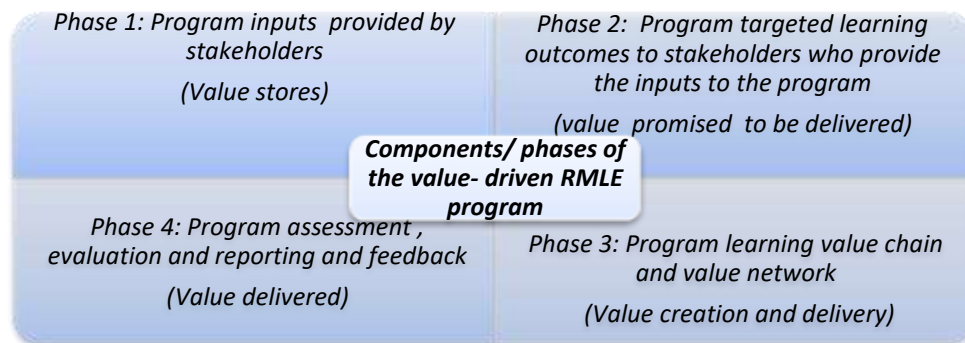
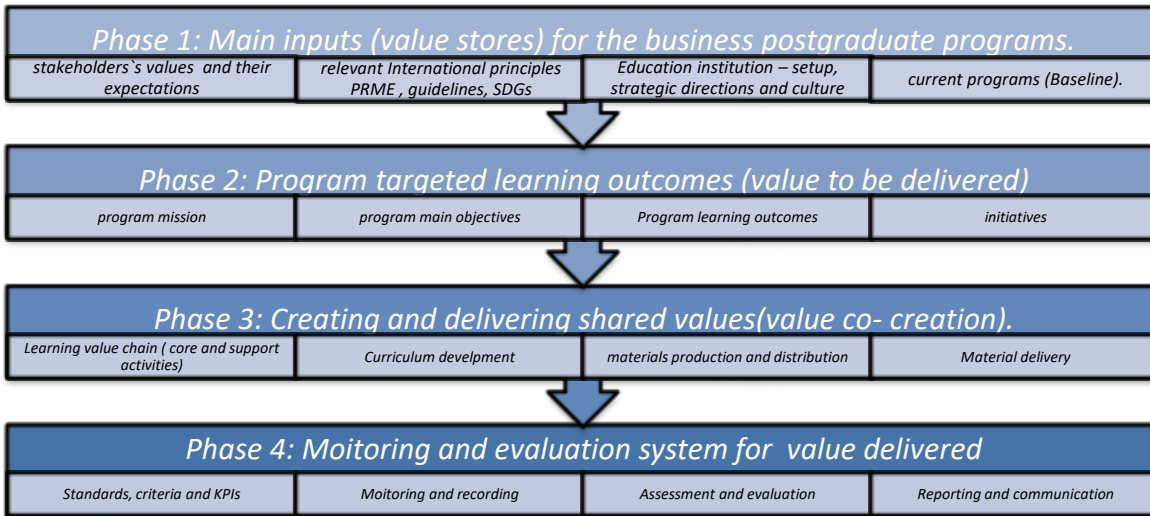


Figure 3: Phases and components of the value-driven framework for developing the RMLE program.

Source: Field Survey, 2023

For illustration, students are considered the framework's main stakeholders throughout development. In addition, references to earlier studies are given where needed. The main phases are broken down into steps in Figure (4).

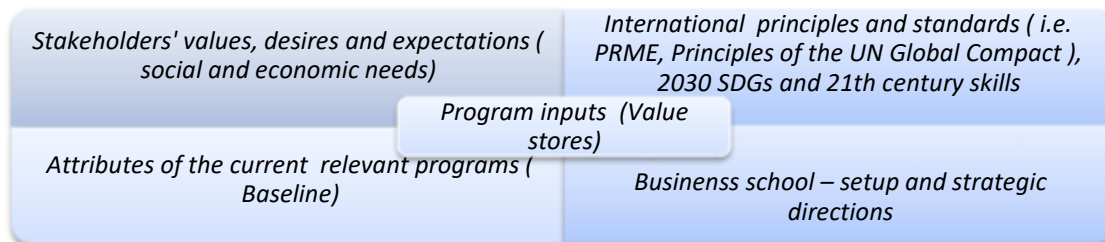


**Figure 4:** Phases and steps of building the framework.

Source: Field Survey, 2023

**Phase 1: Identifying the primary inputs (value stores) for the RMLE program.**

The primary inputs (value stores) for the program are shown in Figure (5).



**Figure 5:** Sources of the inputs (value stores) for the RMLE program.

Source: Field Survey, 2023.

**Step1.1: Identifying the program's stakeholders, values, and expectations- (social and economic needs).**

Step 1.1 symbolizes the beginning of the framework-building process. The expectations represent the driving force and the independent aspect of the stakeholders' framework, wants, and aspirations. Students, faculty, employers, accreditation agencies, administration, regulatory agencies, investors, professional associations, international organizations and institutions, international standard-setters, academics, researchers, and the public are typical stakeholders in business programs.

In contrast to Carroll's (1991) pyramid, students in the Macquarie Graduate School of Management (MGSM) research (2011) had a favorable attitude toward CSR. Most students agreed that a corporation should focus more on ethical issues than financial ones. Wang J. et al. (2020) study findings assert that the higher level of perception from private university students towards sustainability issues is due to active campus sustainability engagement and positive stakeholder relationships managed by university management. Students regarded ethical responsibility as essential, financial responsibility as second, and legal responsibility as third, according to a study by Abdalla et al. (2020).

**Step 1.2: Study relevant international principles and guidelines.**

After researching and comprehending the values and expectations of students and other stakeholders, we move to step 1.2. This step is complementary to step 1.1. It aids in identifying additional sources and types of inputs for the RMLE program. The emphasis in this step would be on the pertinent principles and guidelines related to RMLE. A particular focus should be placed on

1. the PRME initiative launched by the UN Global Compact (UNGC), Figure (6),

2. The ideas and concepts developed by UNESCO and
3. the Education for Sustainable Development (ESD).

These universal principles represent the fundamental values that business schools should embed in their RMLE programs. The 21st-century skills need to be considered when developing the RMLE program to foster achieving the 17 UN SDGs and agenda for 2030.

<b>Principles</b>	<b>Description</b>
<b>Principle 1: Purpose</b>	We will develop students' capabilities to be future generators of sustainable value for business and society and work for an inclusive and sustainable global economy.
<b>Principle 2: Values</b>	We will incorporate the values of global social responsibility as portrayed in international initiatives such as the United Nations Global Compact into our academic activities, curricula, and organizational practices.
<b>Principle 3: Method</b>	We will create educational frameworks, materials, processes, and environments that enable compelling learning experiences for responsible leadership.
<b>Principle 4: Research</b>	We will engage in conceptual and empirical research that advances our understanding of corporations' role, dynamics, and impact in creating sustainable social, environmental, and economic value.
<b>Principle 5: Partnership</b>	We will interact with business corporations' managers to extend our knowledge of their challenges in meeting social and environmental responsibilities and to explore jointly practical approaches to meeting these challenges.
<b>Principle 6: Dialogue</b>	We will facilitate and support dialog and debate among educators, students, businesses, government, consumers, media, civil society organizations, and other interested groups and stakeholders on critical global social responsibility and sustainability issues.

**Figure (6):** Categories of the PRME.

Source: Principle for Responsible Management Education Mission- UN- 2021

[www.unprme.org/about-prme/the-six-principles.php](http://www.unprme.org/about-prme/the-six-principles.php)

### **Step 1.3: Business school – setup, strategic directions, and culture.**

In step 1.3, the setup of the business school must be evident to the designer. That is, comprehending the current mission, vision, objectives, values, and instructional strategies used in the business undergraduate and postgraduate RMLE programs. In addition, one must research and comprehend the internal and external environment, particularly its strategic direction and policies.

### **Step 1.4: Study the current programs (Baseline).**

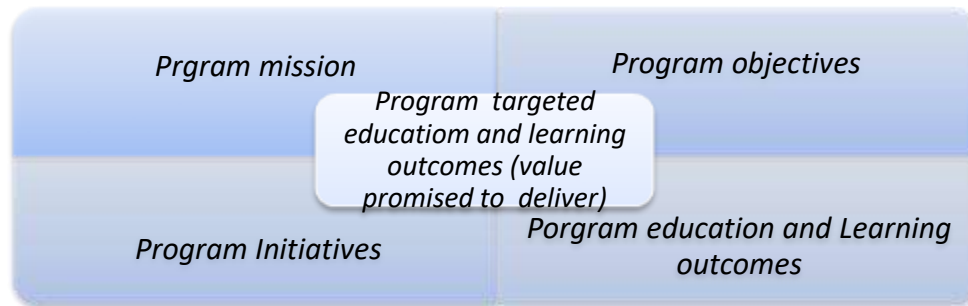
Before adjusting, this stage involves assessing the RMLE substances that are already available.

Worldwide and according to the MGSM (2016) study, the respondents felt that their schools met their RME expectations to a high degree or better and felt they were either well-equipped or very well-equipped to apply their CSR knowledge in real life.

The students in Sudan strongly agree with several changes they would like to be introduced in the current programs. The most significant agreed-upon change is encouraging professors to introduce more relevant case studies in classes. The students suggested providing students with corporate responsibility/sustainability internships, Abdalla et al. (2020).

### **Phase 2: Determine program-targeted learning outcomes(value promised to deliver).**

Phase 2 will determine the shared values to be delivered to students and, in turn, to other stakeholders. This phase constitutes the following steps-figure(7).



**Figure 7:** Program-targeted education and learning outcomes (value promised to deliver).  
Source: Field Survey, 2023.

### **2-1: Developing the RMLE program mission.**

The program's objective and purpose must be clearly defined. A strong mission statement explains precisely how, where, when, and for what shared values will be created and delivered. The program's mission must coincide with the outcomes of Phase 1 above.

### **2-2: Identifying the RMLE program's main objectives.**

The program objectives outline the students' knowledge, abilities, behaviors, and attitudes that the RMLE generally targets. The following are some examples of the substances that characterize the fundamental components of responsible leadership (see Wilson et al., 2006):

- Acting with integrity
- Caring for people
- Demonstrating ethical behavior
- Communicating with others
- Taking a long-term perspective
- Being open-minded
- Managing responsibly outside the organization.

The program objectives and targeted knowledge, skills, behaviors, and attitudes must align with the shared values stated in the mission.

### **2-3: Defining program targeted RMLE learning outcomes.**

It is necessary to assess each goal established in the previous step and identify the learning outcomes that support achieving it. Determine the competencies, an integrated collection of knowledge, skills, morals, and attitudes that help establish sustainable social, environmental, and economic values.

The program's core and elective courses, including RMLE concepts and methods, in turn, values, will be named in this step. The learning outcome for the RMLE program should be SMART (i.e., specific, measurable, attainable, relevant, and timely).

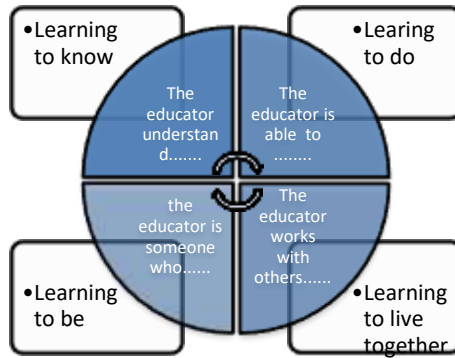
Additional findings from the MGSM (2016) study were offered, and they urged a change to the management paradigm that places the needs of people first. New skills would be needed to implement this paradigm. Future leaders should be able to act responsibly toward people and the environment. Thanks to the competencies, which encompass CSR and sustainability issues (such as economic, social, environmental, and governance).

Business school students must develop cognitive and affective competencies through the curriculum to practice responsible management. The competencies include

1. an awareness of how business, society, and the environment interact with one another,
2. the capacity to identify and address complex issues by considering a variety of viewpoints and
3. sympathy and empathy for those who suffer injustice.

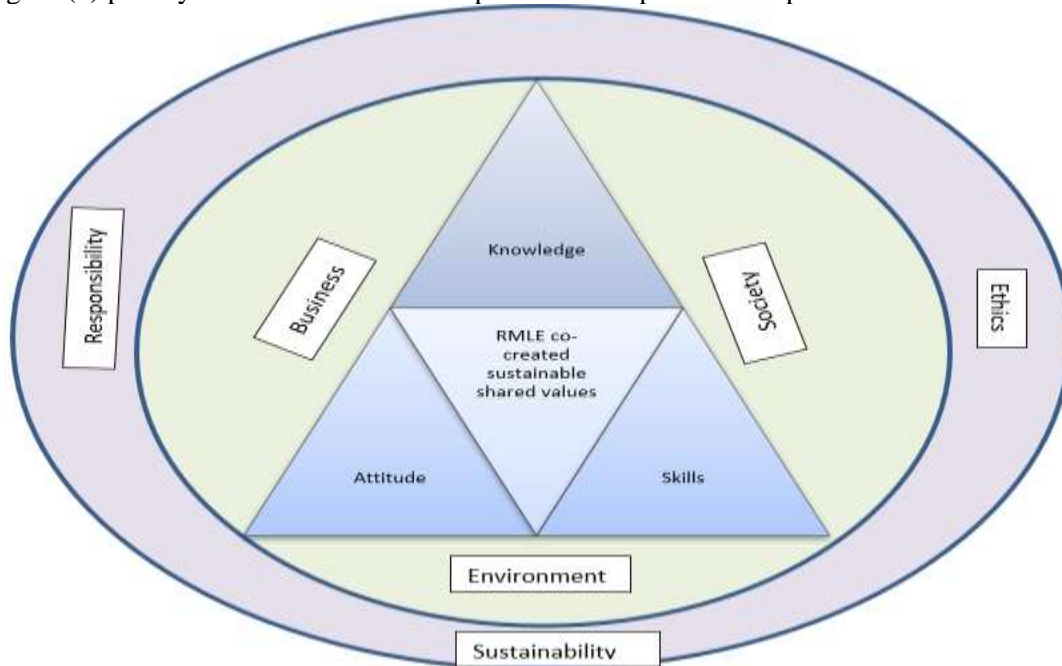
According to the Economic Commission for Europe's approach to learning, the program outcomes must also give students the knowledge, attitude, and skills necessary to know, do, be, and live together (Figure 8).





**Figure 8:** The Economic Commission for Europe’s approach to learning.  
 Source: United Nations Economic Commission for Europe Strategy for Education for Sustainable Development- 2021 [https://unece.org/fileadmin/DAM/env/esd/ESD\\_Publications/Competences\\_Publication.pdf](https://unece.org/fileadmin/DAM/env/esd/ESD_Publications/Competences_Publication.pdf)

Figure (9) portrays a framework to be adopted to accomplish this step.



**Figure 9:** Framework to identify the required RMLE competencies and the related aspects,  
 Source: Field Survey, 2023.

**2-4: Develop initiative to enhance RME.**

After determining the program's goal, vision, objectives, and results, the next step will begin with identifying the program's initiatives. The initiatives could be projects or activities that help students achieve the RMLE targeted learning outcomes, which will help the program carry out its mission effectively. To meet the PRME, for instance, the following activities were started by the Palumbo-Donahue School of Business (PDSB) at Duquesne University in the US.

- MBA Programs:
  - Professional MBA
  - MBA Sustainable Business Practices
- Specialized Master's Programs:
  - Master of Science in Accountancy
  - Master of Science in Information Systems Management
  - Master of Science in Supply Chain Management

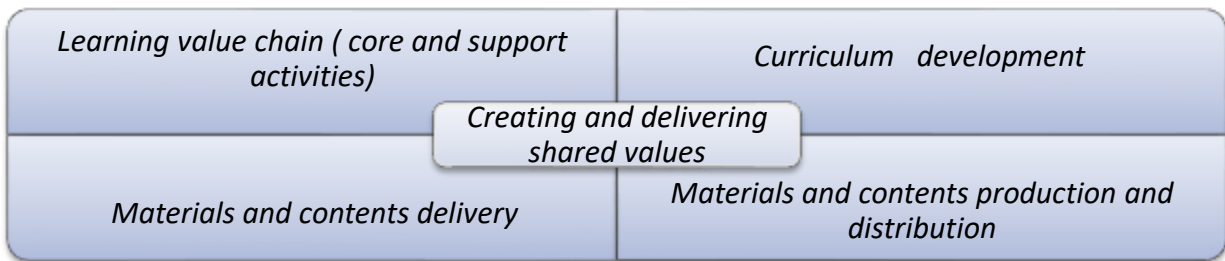
- Master of Science in Management (100% Online)
  - Executive Education Programs:
- Women's Executive Leadership Program
- Emerging Women's Leadership Conference
- Certificate in Financial Planning
- Professional Coaching Certificate

Phases 1 and 2 have been finished, suggesting that the RMLE program inputs have been established. After completing that, we can proceed to phase 3, the program's core, where the shared values are created and delivered.

**Phase 3: Creating and delivering the program with sustainable and shared values.**

Phase 3 will create and deliver the shared values once phases 1 and 2 have identified the RMLE program inputs.

The following actions define the program scope and boundaries (value chain), determine the program curriculum and courses, produce learning materials, and deliver the content to co-create and deliver the RMLE value, Figure (10).



**Figure 10:** Program value-creating and delivery  
Source: Field Survey, 2023.

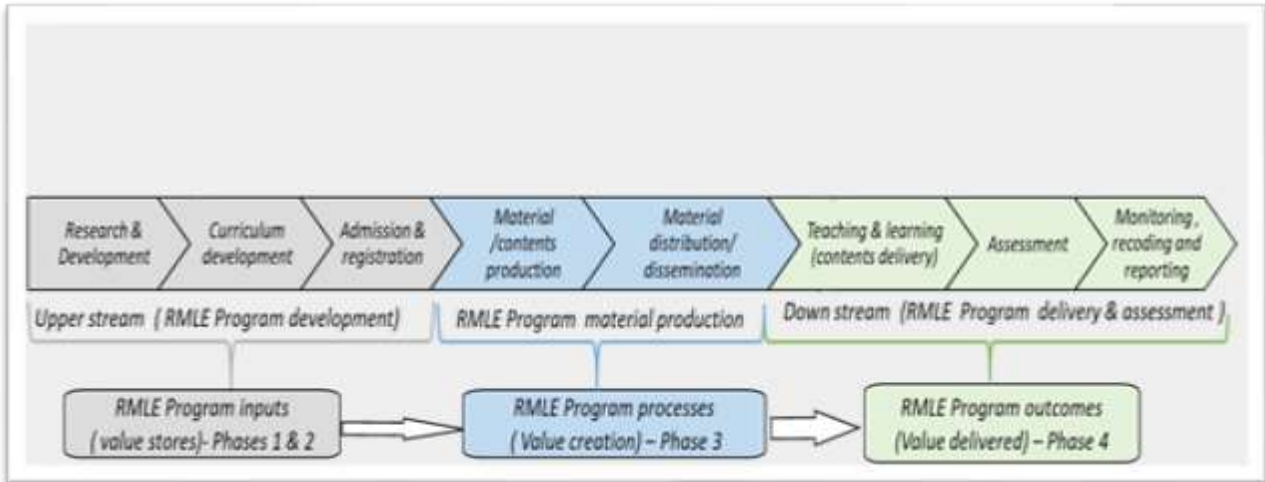
We propose viewing the creation and delivery of the shared values of the RMLE (i.e., the teaching and learning activities) as a "**Value Chain.**" The student is viewed as the "object" in this value chain. This "object" will be developed in several unique but sequential methods throughout numerous learning stages. As a result, the RMLE program is discussed in this study as a series of different educational and learning processes and activities.

**3-1: Determine Program Value Chain(s) Scope.**

Identifying the activities (core and secondary) that must be developed, planned, and carried out to jointly produce the desired RMLE learning objectives established in phase 2 is the first step in this phase of building the RMLE program.

The initiative created in phase 2 determines the type and extent of the learning and educational value chain. Any learning and education initiative or program's typical main activities include developing the curriculum and its contents, producing learning materials, delivering the courses and events, and assessing and evaluating the learning outcomes, Figure (11).





**Figure 11:** Program value chain  
Source: Field Survey, 2023.

### 3-2: Develop a program curriculum.

The creation and distribution of the course syllabi for core and optional courses are the topics of this step. The RMLE learning outcomes are specified for each course or event.

Consumer and marketing are the most frequently taught essential RME topics at Sudanese business schools, followed by ethical decision-making and business ethics. Stakeholder management, on the other hand, was the most popular elective, followed by environmental sustainability, according to Abdalla et al. (2020).

Business ethics and global responsibility, sustainable business practices, systems thinking and managerial decision tools, and strategic sustainability and models are all part of the PDSB curriculum.

### 3-3: Production and distribution of program learning materials and contents.

One of the most essential parts of learning and education is creating and delivering content (i.e., the learning value chain). The creation and distribution of self-educational materials for the program's numerous courses are handled in this step. It involves producing and sending out study materials to students on time. Additionally, it coordinates the production of materials and assignments, prints the necessary quantity, stores and keeps track of the materials, and sends them to each student (by course and delivery method) via the postal service. The fact that many students frequently change their addresses, the medium of instruction, and courses makes the entire endeavor problematic. To encourage pupils to use digital materials, the school may give them the option of e-materials.

### 3-4: Delivery of the courses.

This stage deals with whether the content is delivered in class or outside. An educational institution must choose the best method (i.e., strategies) for delivering courses. Challenging learning environments must be created to promote active, problem-based, and self-directed learning among students. During the program, the students must collaborate on a real-life case study (an assignment) and Real-Life Student Business Cases to blend academic learning and real-world experiences.

The findings of the MGSM (2016) study highlighted the need for schools to reevaluate and modify how the courses are offered by implementing more pragmatic tactics. Professors should introduce More pertinent case studies in class and through experiential and field learning. The report also urged professors to place more emphasis on active learning than passive learning. They could draw from students' involvement in real-world initiatives or simulations to emphasize the interdependence of business and society and highlight the difficulties of making ethical decisions. Varma's (2019) study suggests that a critical determinant of use-value is the workplace utility of the knowledge gained. Over time, consistent derivation of use-value translates to exchange value as long-term behavior changes in the individual create positive workplace outcomes.

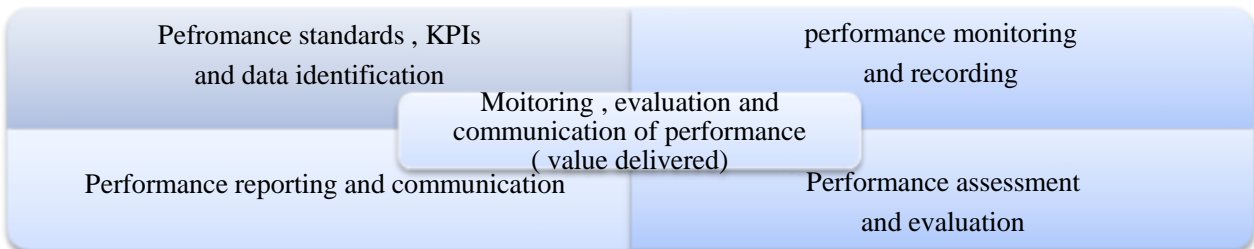
The findings of the MGSM (2013) study on RME provide some essential recommendations for the future. Preserving and broadening the breadth of RME in academic institutions' curricula would benefit postgraduate business programs. As a result, it would necessitate the participation of several necessary parties, including (1) business schools, (2) the business sector, (3) students, and (4) third-party initiatives (such as PRME). The study suggested that each group plays a particular function in supporting RME, Abdalla et al. (2020).

Critical thinking abilities, modeling uncertainty, and a deeper grasp of sustainability in action are all goals of the PDSB course materials. To speak to students about green, high-performance buildings, indoor air quality, dashboards, and other sustainability-related themes, the lecturers personally assemble eminent local experts, including engineers, architects, and construction specialists. Amreen et al. (2021) report that the COVID-19 pandemic has posed problems and caused disruption in the higher education industry, with university campuses closing and in-person instruction and evaluation moving to an online model.

**Phase 4: Monitoring, Assessing, and Evaluating Program Learning Outcomes (value delivered).**

This section begins the process of monitoring, analyzing, evaluating, and reporting program learning results after determining the RMLE program inputs in phases 1 and 2, the sustainable and shared value to be delivered, and the strategies to deliver in phase 3. (feedback). Precisely determine and appraise the delivered value, Figure (12).

An educational institution must choose the best strategy or approaches to measure, assess, evaluate, and report the program's performance based on the earlier phases' results. A combination of approaches (strategies) may be adopted depending on the desired learning objectives.



**Figure 12:** Monitoring, evaluation, and communication of performance.

Source: Field Survey, 2023.

**4-1: Performance standards, KPIs, and data identification.**

Choosing what data and information to get and how to gather and evaluate it are all covered in this stage. The desired goal and crucial success (focus) areas (i.e., drivers) established in the phases should be connected to the performance indicators. The degree to which the expectations of the education stakeholders are realized requires adopting an effective and efficient system. All parties participating in the teaching and learning processes must be measured, recorded, and reported in such a system. Abdalla and Khudar (2016). Any institution taking part in PRME has as one of its primary obligations to frequently update its stakeholders on the status of the Six PRME. Examples of the types of data to be gathered for each principle are shown in Figure (13). To that purpose, the global compact, Figure (14) architecture advocated by the PRME, and Sharing Information on Progress (SIP) could assist in identifying the data required for gauging and evaluating the performance of the RMLE program.

The SIP's goals include:

- disseminating knowledge about responsible management education.
- act as a vehicle for dialogue among stakeholders.
- Assist PRME signatories in creating a community of learning.

Additionally, different frameworks (such as 21st-century skills) may aid in determining the necessary data. One-on-one interviews, questionnaires, and regular in-person meetings are a few examples of data collection techniques.

Principles	Examples of what data to collect
Principle 1: Purpose	Statement of the school’s vision, including the school’s interpretation of what responsible management education means
Principle 2: Values	Reference to institutional values and principles, ethical guidelines, mission statements, codes of conduct, oaths, and pledges
Principle 3: Method	Description of strategy and systems in place to develop PRME-related course content and assess its collective impact on students and alumni
Principle 4: Research	Assessment of the extent to which student is involved in PRME-related research
Principle 5: Partnership	Description of strategy for stakeholder engagement and partnerships (including but not limited to community, government, and business)
Principle 6: Dialogue	Highlights of prominent or impactful events (e.g., forums, workshops, roundtables, conferences), including an assessment of their impact

**Figure 13:** Examples of data to be collected about PRME

Source: Principles of Responsible Management Education Mission - UN 2021

<https://d1ngk2wj7yt6d4.cloudfront.net/public/uploads/PDFs/PRMESIPPresentationSlides.pdf>

#### **4-2: Performance monitoring and recording.**

The next step is to record and compare actual performance to desired results after the critical performance criteria, descriptors, standards, and indicators (i.e., KPIs) have been decided.

#### **4-3: Performance assessment and evaluation.**

The evaluation methods use a range to score performance, which incorporates specific performance characteristics ordered in levels, showing either the level of a standard's fulfillment or the developmental sophistication of the employed technique. Monitoring the program's accomplishments, objectives, and targets is the goal of assessment and evaluation to promote ongoing progress.

#### **4-4: Performance Reporting and Communication (feedback).**

The stage is then prepared to generate reports outlining performance gaps, their reasons, and corrective measures to improve performance going forward. Feedback is crucial to this process since education is a complicated, information-based endeavor, and knowledge transmission is two-way. According to stakeholder feedback, working through questions is highly beneficial in identifying areas of weakness.

The following strategies can be used to track accomplishments, objectives, and targets between reporting periods:

- **Get stakeholders' feedback:** Contact other PRME signatories, regional PRME Chapters, academic institutions, local organizations, and businesses and request feedback on the report.
- **Review feedback and progress with the team:** Meet with the team after submitting the SIP to discuss and reflect on feedback.
- **Monitor usage:** Keep tracking those reading the report and stories of how the report is being used and shared.
- **Folders or documents** that the PRME representatives can update as initiatives develop.
- **Continually engage colleagues:** Regularly hold PRME-focused meetings and use these to discuss the SIP.

**Keep track and share progress made in between reports:** Maintain public relations.

<https://d1ngk2wj7yt6d4.cloudfront.net/public/uploads/PDFs/PRMESIPPresentationSlides.pdf>

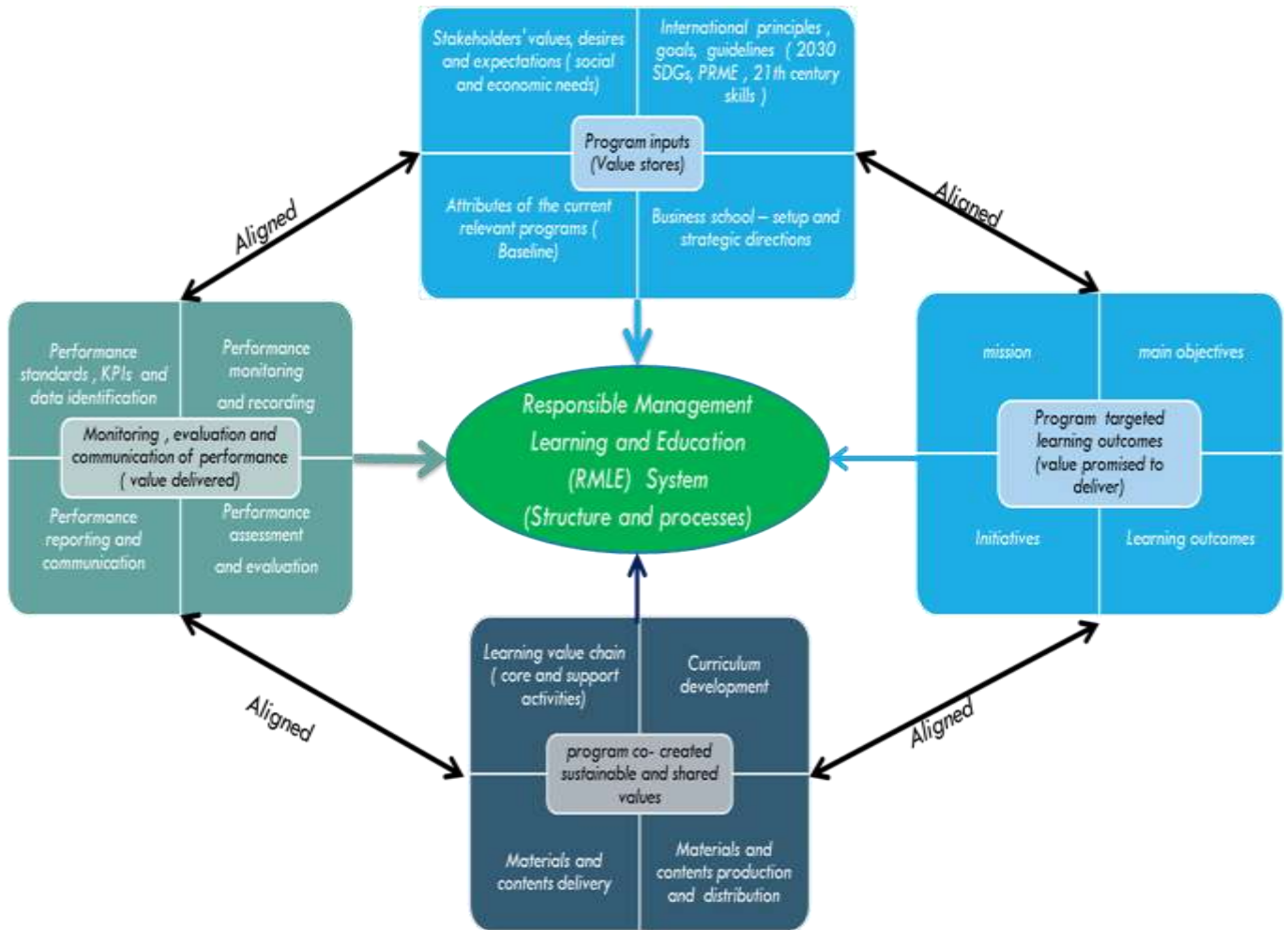
Business school	School Mission	PRME	Achievements	
Palumbo-Donahue School of Business (PDSB) - Duquesne University - the US	<p>Provide Transformative Education in a <u>Spiritan</u> Tradition</p> <p>We develop ethical business professionals who understand the global marketplace and serve others by leading with integrity to transform their communities, organizations, and society.</p> <p>We engage our students, alums, and business partners with passionate faculty members who create impactful scholarship and innovative educational experiences that connect theory to practice.</p>	Principle Purpose 1:	<ul style="list-style-type: none"> <li>- Professional MBA,</li> <li>- MBA in Sustainable Business Practice</li> <li>- Women's Executive Leadership Program</li> <li>- Emerging Women's Leadership Conference</li> </ul>	
		Principle Values 2:	<ul style="list-style-type: none"> <li>- Ethics and integrity</li> <li>- Change and innovation</li> <li>- Respect for the world.</li> </ul>	
		Principle Method 3:	<ul style="list-style-type: none"> <li>- Assignments that focus on corporate citizenship.</li> <li>- Case Analysis Principles Paper</li> <li>- Ethics Speaker Presentation Paper</li> <li>- Community-Engaged Project</li> </ul>	
		Principle Research 4:	<p>Example of publications:</p> <ul style="list-style-type: none"> <li>- Abboushi, S. (2017). Global Virtual Currency - Brief Overview. Journal of Applied Business and Economics, 19 (6), 10-18</li> <li>- Craciun, G., Shin, D., &amp; Zhang, J. Q. (2017). Safe driving communication: A regulatory focus perspective. Journal of Consumer <u>Behaviour</u>.</li> </ul>	
		Principle Partnership 5:	Partner	Objectives
			<u>Eat'n</u> Park Hospitality Group	Identify and evaluate opportunities to leverage waste-to-energy systems and other sustainable design elements for a soon-to-be-built, upscale suburban restaurant.
	Phipps Conservatory	Identify potential sites and recommend concepts and an action plan for turning regional eyesores into green urban parks and landmarks while improving the social and economic outlook of communities		
Principle Dialogue 6:		- The Annual Presidential Conference on the Integrity of Creation focuses on the <u>Global Sustainability Challenge</u> .		

**Figure 14:** Example of Sharing Information on Progress (SIP)

Source: Principles of Responsible Management Education Mission - UN 2021

<https://d1ngk2wj7yt6d4.cloudfront.net/public/uploads/PDFs/PRMESIPPresentationSlides.pdf>

A detailed representation of the value-driven framework used to create RMLE applications can be found in Figure (15). Additionally, it illustrates how its constituent parts and pillars relate to one another and interact.

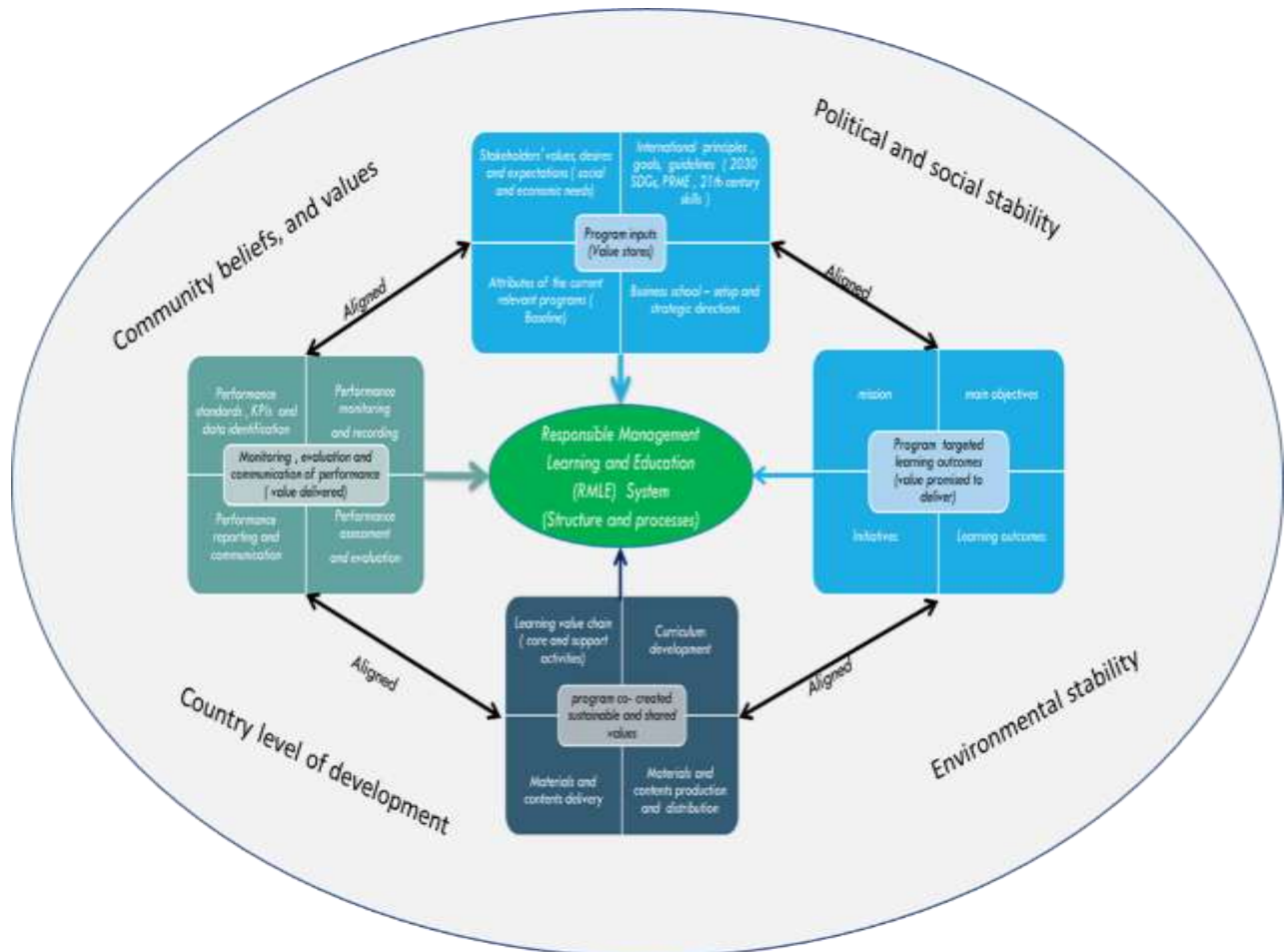


**Figure 15: The Value-focused Framework** for developing RMLE programs in business schools  
 Source: Field Survey, 2023.

**Placing the framework into context.**

Figure 16 illustrates how the surrounding internal and external environmental elements will impact the RMLE programs' pillars and constituents in business schools. These elements are the country's level of development, political and social stability, environmental sustainability, and societal beliefs and values.





**Figure 16: The Value-focused Framework** for developing RMLE programs in business schools put into context  
Source: Field Survey, 2023

### Discussion.

The methodological, practical, and theoretical consequences and insights discussed in this section stem from the study's outcome (the proposed framework) and its construction.

It is essential to approach the framework proposed by this study as a synthesis of conceptual and theoretical frameworks from the outset. The four pillars or phases that make up the framework represent the conceptual framework. On the other hand, the concepts, principles, and theories drawn from literature and overall trends comprise the theoretical side of the framework. The theoretical framework used stakeholders and value chain analysis, as well as related concepts and techniques, in addition to the global guidelines and principles (such as the PRME, SDGs, and ESD).

The methods used in this study and the results (the proposed framework) show that the overall purposes pursued and attained by the study were argumentation, explanation, and knowledge development. The development of the proposed framework is a dynamic, sense-making process that takes many different shapes and occurs in a non-linear stage, Riggan and Ravitch (2017). The studies' data came from the author's experience, the literature, earlier research, and global trends in sustainability and education.

In addition to the theories, the proposed framework relies on, aligns with, and is informed by global trends, principles, and guidelines. As a result, this study promotes the application of pertinent international RMLE concepts and recommendations. These universal principles represent the core concepts that business schools should incorporate into their RMLE programs.

The study's **value-driven** approach allowed system components (such as input, processes, and output) to be seen as stages in creating value. It assists in highlighting the interdependence and even interconnectedness of the different parts. A fresh way of thinking about education and how to help students grow into successful and content members of society around the world is provided by such a perspective. The **value-driven** approach promotes introspective, inspirational, and value-adding traits and attitudes. It enables students to become decent global citizens and prepares them for the working world by assisting them in discovering their best selves. Additionally, it strengthens the product's investment in students' capacity and self-responsibility.

In addition to the interdisciplinary approach, principles- and concepts-based approaches were also used in developing the proposed framework. The RMLE program needs to be viewed as a procedure that creates social and economic values in a mutually beneficial way. When doing business activities in the context of responsibility, ethics, and sustainability, consider business, society, and the environment equally. As a result, both economic and social value can be produced at once. To do this, the methodology used in this study uses ideas, instruments, and techniques created in management, CSR, sustainability, stakeholders, and value chain analysis.

The study utilized the general contextual conceptualization (context inside the context), Figures (3), (9), and (16). These conceptualizations and contextualizations are crucial to developing the proposed framework. Because it directs the process and emphasizes that many elements affect how RMLE programs are developed and implemented. That includes the domain and inquiry, the group of stakeholders inside the setting (i.e., the business school), and the external environment.

We combined business and education theories and concepts and constructed such a complete framework because of the interdisciplinary approach used in this study. The framework's comprehensiveness of its features and parts and how they interact offers insightful and novel viewpoints that could serve as a new paradigm for future research.

This study emphasizes the importance of stakeholders' expectations and aspirations when developing RMLE programs. The Macquarie Graduate School of Management (MGSM) study (2011), Wang, J. et al. (2020), and Abdalla et al. (2020) agree with this.

According to the study, the creation and delivery of the shared values of the RMLE (i.e., teaching and learning activities) can be seen as a "Value Chain." Considering this, this study examines the RMLE program as a network of diverse educational and learning processes where value is jointly created. Consequently, offering a novel idea and introducing a new concept, the "**Education Value Chain.**"

Phase 4 of this study involved evaluating and reporting the effectiveness of the RMLE programs and routinely informing its stakeholders of the developments in the program's implementation. As a result, it encourages using the PRME's Sharing Information on Progress (SIP) structure.

### **Conclusions and further research**

The "**Value-driven thinking**" framework proposed in this study would support the implementation of RMLE and PRME in business schools. Encourage the achievement of the 2030 SDGs and agenda. Additionally, it encourages business schools to play a more significant part in developing the abilities and perspectives of future business leaders. Provide strong motivators for corporate responsibility, management responsibility, business ethics, CSR, and sustainability in terms of knowledge, skills, and attitudes (i.e., economic, social, and environmental).

The methodology outlined in this study provides a precise, flexible road map that any business school, regardless of location, can use to create successful RMLE programs. The structure is thorough and adaptable to function in various situations. Additionally, it improved how closely the RMLE program adhered to pertinent international norms and concepts. Consequently, bringing new ideas, concepts, and frameworks expands the knowledge and literature already present in RMLE. As a result, this study will

contribute to the knowledge about responsible management education that may be used to create standards and measures for PRME.

In terms of methodology, the "**Value-driven Thinking**" approach combined with interdisciplinary viewpoints demonstrated its value in creating a suitable framework for RMLE. According to the methodology used in this study, RMLE programs are seen as a system with numerous factors that are interconnected, interrelated, and changing over time and geographically. As a result, different study fields can use this methodology and approach. Therefore, the method used to define and address the research problem lends credence to those who favor an interdisciplinary research approach.

Additionally, the methodology used in this study is distinctive in that it enabled us to define an issue from a real-world setting rather than a hypothetical one. The proposed framework focuses on the simultaneous consideration of theories and concepts from several disciplines and fields of knowledge. Most business schools have greater access to the fundamental data needed to apply the framework. Examining the circumstance and placing it within their surroundings is necessary. Additional and future research is required to evaluate these underlying assumptions and the framework's applicability in a practical setting.

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## Factors Influencing the choice of Islamic personal Financing in Sudanese Banks

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### Abstract

This study aims to provide insights into the factors considered important in selecting Islamic personal financing among Sudanese bank customers. Data is obtained using a self-administered questionnaire. A sum of 200 questionnaires were distributed; however, only 147 were found usable. The study uses descriptive statistics, factor analysis, and correlation to analyze the data. The findings reveal that "*Islamicity of the products- Halal*" is deemed the most critical factor in selecting Islamic personal financing as most customers typically select Islamic personal financing because the Islamic bank offers products that comply with Shariah. Additional factors customers perceived as important include "*service efficiency*," "*Attractiveness of the offerings*", and "*bank marketing performance*". By investigating the choice criteria for Islamic financial products, this study contributes towards a better understanding of the customers' preferences, which will help managers of Islamic banks better comprehend the factors they should consider when marketing and developing their products. Hence, more effective strategies can be set to attract customers and expand the customer base.

**Keywords:** Islamic banks, Personal finance, Shariah compliance, Halal, selection criteria.

### 1. Introduction

During the last four decades, the area of Islamic banking and finance has been flourishing; its growth has been remarkable in terms of the number of countries it invades, the domains of investment it covers, and the modes of finance it offers. Its expansion is not only in countries with majority Muslim populations but also in those where Muslims represent a minority, e.g., the UK and the US. On the other hand, in countries with pure Islamic financial systems, such as Iran and Sudan, Islamic banking is the only means of financial intermediation. In contrast, in other countries, Dual systems are applied, where Islamic banks exist along with conventional banks Elhoussein(2013). The Islamic finance industry has attracted the attention of Europe since the middle of the nineteen eighties, with several big multinational financial institutions such as HSBC and Citi Group opening Islamic windows with Islamic-based assets; Adel (2010) and Imam & Kpodar (2010). The area of Islamic finance investment grows and diversifies to include Islamic bonds (Sukuk), Hedging funds, Mutual funds, real estate, corporate finance, derivatives, future-forward markets, and assets and wealth management ( Elhoussein, 2013). In the quest for innovation and globalization, Islamic finance offers different modes of Islamic finance, including cost-plus financing, profit sharing, leasing, partnership, forward sale contracts, deferred payment sale contracts, deferred-delivery sale contracts, and spot sales.

The heart of Islamic finance is compliance with Islamic law (Sharia), which is the set of rules and regulations that govern Islam's social, political, and economic aspects. Socio-economic justice, equitable income distribution, and eradication of poverty, which are among the main goals of Islam, represent solid features of the Islamic economic system. While conventional finance places greater emphasis on the economic and financial aspects of business operations and emphasizes maximization of individual benefit, Islamic finance emphasizes spiritual values and social justice. Mirakhor and Krichene (2009) define Islamic finance as —the financial activity of an Islamic economy that mandates social equity. The core principles

of Islamic finance are the prohibition of interest (Riba), sharing of profits and losses, which entails both providers and users of funds sharing business risk, prohibition of uncertainty and ambiguity (Gharar) and speculation (Myser), banning of investment in areas regarded as illicit (Haram) such as alcohol and gambling, tangible asset backing of financial transactions and collection and payment of alms (Zakat).

Empirical literature exists about the attitudes of customers towards Islamic banks. Ample studies have been conducted to determine customers' perceptions of Islamic banking and the factors shaping their attitudes toward Islamic finance. However, as claimed by Sayani and Miniaoui (2013), it is evident that customer preferences do vary not only from one geographical location to another but also from segment to segment within the same locality. According to Saqib et al (2016), Sayani (2015), Ebrahimi and Moghadam (2012) Ullah and Lee (2012), Abduh and Omar(2012), Dusuki and Abdullah (2006), compliance with Shariah law and Islamic principles is the primary factor impacting consumers' choice of an Islamic bank. Religiosity and deep beliefs in divine reward and punishment are other influencing determinants, as claimed by Echchabi and Olaniyi (2012), Ebrahimi and Moghadam (2012), Abou-Youssef et al. (2015) and Usman et al. (2017). Factors such as reputation, quality and cost of services offered, privacy and confidentiality, the existence of a variation of financing options, high profitability, and economic and social development role are cited by Erol and EI-Bdour (1989), Gait and Worthington (2008), Rashid and Hassan (2009), Awan (2011), Mokhlis et al (2011), Amin (2013), Jalilvand et al. (2014) and Ltifi et al. (2016). These studies have validated the choice criteria for banking selection in general without referencing choice criteria for products offered by Islamic banks. To the researchers' knowledge, few studies have researched choice criteria for Islamic personal financing in Sudan. Selection criteria for personal financing products have yet to be investigated, and this study tries to fill this gap. More specifically, this study aims to determine the factors that influence banks' customers in making their decisions regarding the choice of personal financing.

The rest of the paper is structured as follows: The first section reviews the literature and develops the research hypotheses. Section three describes the data and methods of data collection and the analytical tools employed. Section four reports and discusses the results of the data analysis. Section five presents a summary of the study and concluding remarks.

## **2. Methods**

This study investigates the selection criteria influencing the decision to use Islamic personal financing in Sudan. 200 questionnaires were distributed, and only 147 were collected and used for the analysis, with a response rate of 74%. According to Sekaran (2003), the sample size can be between 30 to 500 units. Thus, the size of 147 respondents in this study was deemed quite suitable.

The questionnaire technique was utilized in collecting the primary data. The first section of the questionnaire captured the demographics of respondents, including age, gender, education, occupation, and banking experience. The second section captured information about their banking experience and behavior, while the third section consisted of selection criteria for Islamic personal financing. For estimating the selection criteria, a Five-point Likert scale ranging from (1) = strongly disagree, (2) = disagree, (3) = neutral, (4) = agree and (5) = strongly agree.

## **3. Results**

### ***Sample characteristics***

The volunteer participants from four banks' customers in Khartoum city were employed in this study. Four banks have been included: the Bank of Khartoum, Faisal Islamic Bank, Omdurman National Bank, and Albaraka Islamic Bank. Table I presents the information regarding the respondent's demographics. This table represents the frequency and percentile of variables. Concerning age, the majority of the respondents are under 50 years old, only 4% are less than 20 years old, 23% are in the range of 21-30 years old, 29% are between 31-40 years old group, 10% belonging to the 51-60 years old group. Gender-wise, the respondents consisted of 55% male and 45 percent female. Most of the sample was well educated, with more than 80% holding a bachelor's degree and above. About their occupation, most of the respondents are employees in the public sector (47%), or the private sector (34%). Most of the respondents are experienced

in dealing with bank services. 76% of the sample has more than three years' experience of dealing with their banks.

**Table 1: The sample characteristics**

Item	N(%)
<b>Age (years)</b>	
Less than 20	6 (4%)
21-30 years	32 (23%)
31-40 years	41(29%)
41-50 years	44(31 %)
51-60 years	15(10%)
60+	4(3%)
<b>Gender</b>	
Male	75(55 %)
Female	62( 45%)
<b>Education</b>	
Less than Secondary	8( 6%)
Secondary certificate	19( 13%)
Bachelor Degree	76( 54%)
Master Degree	31( 22%)
Doctorate Degree	6(4 %)
<b>Occupation:</b>	
Public sector employee	67(47%)
Private sector employee	47(34 %)
Business Men/women	18(13%)
Student	7 (5%)
Retired	1(,7%)
<b>Banking experience (years)</b>	
less than a year	24(17%)
1-3	38(28%)
4-5	21(15%)
6-10	24(17%)
more than 10 years	31(23%)

Source: field survey, 2022

### ***Characteristics of Banking Behavior***

As indicated in Table (2), most respondents (53%) have personal bank accounts, whilst 39% have corporate bank accounts and about 10% have both account types. The majority of the sample experienced ebanking services, mostly ATM services, with a percentage of 94. In the analysis of the service switching behavior, 70% of the respondents never switch their bank. In terms of awareness of the Islamic mode of finance, 19% of the respondents do not know about the Islamic mode of finance, while the knowledge of the rest ranges from little to excellent knowledge. The data also revealed that most (70%) respondents have never used bank financial products. Most of those who used the financial products have chosen "Murabaha", which is the most widely used form of Islamic financing in Sudan.

**Table 2: the respondents' banking behavior**

Item	N(%)
<b>Account type</b>	
Personal	59(52%)
Corporate	45(39%)
Both	10 (9)
<b>Banking services you use</b>	
Mobile banking	16 (12)
Internet banking	6 (4%)
ATM	94(70)
Traditional banking	19 (14)
<b>Do you switch your bank</b>	
Yes	41(30)
No	98(70)
<b>Are you aware of the Islamic mode of finance</b>	
No Knowledge	27 (19 %)
Little Knowledge	59 ( 42%)
Enough Knowledge	31(22 %)
Good knowledge	12 ( 9%)
Excellent Knowledge	12 (9 %)
<b>Do you know that your bank invests your money?</b>	
Yes	90 ( 75%)
No	30 (25 %)
<b>Do you ever use bank financing products?</b>	
Yes	37 ( 26%)
No	104 (74 %)
<b>What financing product have you used?</b>	
Murabaha	35( 70%)
Musharaka	11 ( 22%)
Mudaraba	1(2%)
Gardh Hasan	3 (6 %)

Source: field survey, 2022

#### ***Awareness of Islamic financial products:***

Data in Table 3 reflects the responses to the survey statements regarding awareness of the Islamic mode of finance. As evident from the data, awareness of the products of Islamic modes of financing is considered good in general, but the usage of these products is low. The majority of the respondents were moderately aware of Islamic financial products. The highest level of awareness is for "Wadi'ah" (75%), 65% for "Murabaha", 59% for "Musharaka", and 48% for "Mudaraba". Lower levels of awareness were reported for both "Igaraa" and "Salam" (42%). A Limited number of the respondents indicated that they used Islamic financial products (26%).

**Table 3: Respondents' Awareness and usage of Islamic financing products**

Islamic banking products (Halal)	Not Aware	Aware but do not use it	Aware and use it
Mudarabah	42%	54%	4%
Musharakah	41%	53.3%	6%
Murabaha	35%	48%	17%
Wadi'ah	25.4%	62.3%	12.3%
Igaraa	58%	40%	2%
Salam	57%	42%	1%

Source: field survey, 2022

### *Factor Analysis: Selection criteria for Islamic personal financing*

The findings of the reliability test revealed that Cronbach's alpha coefficient for all variables is 0.93 which indicates that the instrument used is consistent and stable. Besides that, based on factor analysis, Bartlett's test was found significant together with the Kaiser-Meyer-Olkin measure of sampling adequacy of 0.827, signifying that the sampling adequacy is greater than 0.5 and, therefore, considered acceptable and Bartlett's test shows an  $X^2$  of 1755.045 with a significance level of 1 percent. These findings confirm that the instruments used in this study are valid and reliable. Then, principal component analysis (PCA) was used for factor reduction, where the eigenvalue of a value of more than one was the criterion used in determining the number of factors. The result shows that four factors are extracted and explain more than half of the variance observed in the variables (71.7%), which meets the social science research criterion of percentage of variance. Each identified factor is based on the factor loading value which is more than 0.5. An accepted method of interpretation of factor loadings is to consider, as significant, any variable with a loading of 0.5 or greater as associated with the appropriate factor (Hair et al., 2010). Table 4 presents the four factors along with scores for each variable and to what the variables belong, together with a mean score, eigenvalues, and variation percentage explained. These identified factors are "Islamicity of product" which explains about 21% of the variance; "Service Efficiency," which explains about 19% of the variance; "Attractiveness of the offerings," which explains about 16% of the variance and "Marketing Performance" explains about 15% of the variance. The results of the reliability test data are presented in Table 4. The values of the Factors ranged from 0.89 to 0.86 which indicates that all factors extracted are found to be reliable.

Seven choice criteria highlighted the most important underlying variables which define Islamic principles behind Islamic banking were loaded in the first factor is "*Work according to Shariah principles*", "*Interest-free practices*", "*Shariah compliance services*," "*Investment in Halal Business*", "*Interest-free transactions*", "*Profit and loss sharing*", and "*Interest-free loans*". Thus this factor can be labeled as "**Islamicity of product**", which delineates the compliance of bank products to Islamic shariah principles (**Halal**). As this Factor has the highest eigenvalues and variance, (eigenvalues = 9.418), it is necessarily the most important factor that has influenced customers' Islamic personal financing selection decision.

The second factor included variables that related to bank efficiency in handling personal financing products such as "*Satisfaction of time waiting for service*", "*Speed of service from the cashiers*", "*Bank Reputation & Image*", "*Faster transactions*", "*Variety of financing options*", and "*High profit & Low service charges*". The nature of the highly loaded variable on this factor recommends that it can be labelled as "**Service Efficiency**" with (eigenvalues = 3.037). The third important factor describes a cluster of relationship attributes are "term and condition product flexibility", "High-profit rate", "Flexibility and low repayment penalty", "Longer financing period", and "lend amount". The nature of the highly loaded variable on this factor recommends that it can be named "**Attractiveness of the offerings**" with (eigenvalues = 2.088). Four choice criteria clustered to form the fourth factor; these are "Influence from relative / friends", "Influence from media advertisement", "Advertising & promotion", and "Islamic brand bank". These variables reflect the bank's marketing efforts, so it can be named "**Bank Marketing Performance**" with (eigenvalues = 1.229). Table 5 illustrates the rank of the important factors.

**Table 4: Factor analysis, Descriptive and reliability tests of selection Criteria**

Rank	Factors	Items	Factor Loadings	Mean
1	<b>Islamicity of product</b> $\sigma^2=21.250$ Eigenvalue =9.418 $\alpha= 0.894$ Mean=4.31	Work according to Shariah principles	.831	4.44
		Interest-free practices	.823	4.44
		Shariah compliance services	.804	4.25
		Invest in Halal Businesses	.703	4.31
		Interest-free transactions	.668	4.27
		Profit and loss sharing	.577	4.25
		Interest-free loans	.531	4.20
2	<b>Service Efficiency</b> $\sigma^2=19.328$ Eigenvalue =3.037 $\alpha= 0.887$ Mean=4.28	Satisfaction of time waiting for service	.867	4.48
		Speed of service from the cashiers	.859	4.43
		Bank Reputation & Image	.856	4,45
		Faster transactions	.781	4.27
		Variety of financing options	.746	4.23
		High profit & Low service charges	.667	4.01
3	<b>Attractiveness of the offerings</b> $\sigma^2=16.343$ Eigenvalue =2.088 $\alpha= 0.889$ Mean=4.09	Terms and conditions of product flexibility	.732	4.23
		High-profit rate	.702	3.94
		Flexibility and low repayment penalty	.694	4.08
		Longer financing period	.675	4.11
		Lend amount	.584	4.11
4	<b>Marketing Performance</b> $\sigma^2=14.772$ Eigenvalue =1.229 $\alpha= 0.858$ Mean=3.50	Influence from relatives/friends	.851	3.44
		Influence from media advertisement	.848	3.75
		Advertising& promotion	.802	3.51
		Islamic brand bank	.728	3.29

Source: field survey, 2022

**Table 5: Ranking of the selection factors**

Rank	Important Factor	Mean
1	<b>Islamicity of the product (Halal)</b>	4.31
2	<b>Service Efficiency</b>	4.28
3	<b>Attractiveness of the offerings</b>	4.09
4	<b>Marketing Performance</b>	3.50

#### 4. Discussion

The objective of the study is to provide insights into the factors considered important in the choice of personal financing among Sudanese Islamic bank customers. The results obtained determined four factors deemed important in the section of the bank. For instance, in agreement with (Al-Ijarah Thumma AlBay) and Yusoff et al (2013), the Islamicity of the product (Halal) is the most important factor in selecting an Islamic personal financing product. This finding implies that banks that strictly operate according to Shariah principles will be preferred by customers in their selection of personal financing. Service efficiency comes second in terms of relative importance indicated by the respondents. Similar results are arrived at by Amin (2008) and Amin et al (1989), who reported fast and high-quality bank services as the most significant selection factor. In line with Ali et al (2015), the attractiveness of the offering in terms of its cost and financial benefits is among the important factors in respondents' selection preferences. Finally, the result that bank marketing performance is an important factor in personal financing decisions is in line with results documented by Mylonakis (2007) and Mokhlis (2009).

#### 5. Conclusions

With the recent drastic political change in Sudan, the Islamic banks are expected to face strong competition from both the existing national banks and the expected incoming foreign conventional banks offering Islamic products and services. Thus it is crucial to be knowledgeable about the factors that influence Sudanese bank customers' selection decision of Islamic personal financing products. This paper is an

attempt to determine such factors and indicate the kind of relation they have with the process of determining which mode of personal financing to use.

Data is obtained using a self-administered questionnaire and analysis is conducted using descriptive statistics, factor analysis, and correlation analysis. The findings reveal that the Islamicity of the product, service efficiency, Attractiveness of the offerings, and bank marketing performance are the determinant factors in the selection of Islamic personal financing products. The study also confirms a significant positive relationship between all the factors and the selection process.

The study has a number of implications for academics and practitioners. It advances existing knowledge by shedding light on important factors that influence the selection of Islamic personal financing in the context of Sudan. While religious factor is the key determinant of Islamic personal financing Products, the study highlights other factors as also being of relevance in shaping customers' personal financing decisions and should be taken into consideration by bank managers when setting their strategies and plans. Managers of Sudanese Islamic banks need to place more effort into marketing their products and services, providing a variety of competitive and attractive financing offers and enhancing the efficiency and quality of their services.

The study suffers from some limitations which can be considered by future studies. The research is limited to customers of national banks in Khartoum state. Furthermore. Only bank customers who have previous experience with banking services are included in the sample. Future studies are recommended to expand their samples to include potential bank customers and cover more states. Further inclusion of customers of foreign banks and their branches will increase the sample and lead to more generalizable results.

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