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Editorial

The Wisconsin Journal of Arts and Sciences (WJAS) aspires to be a vehicle for inspiring and disseminating multidisciplinary research papers (research articles, case studies, reflective essays, review articles, research briefs, policy and practice briefs) by academics, research scholars, corporate and practitioners with substantial experience and expertise in their respective fields. The journal seeks to become the leading journal in higher learning education within Africa and beyond. We are pleased to bring you the first edition of the 5th volume of the WJAS. After some years of dormancy, the journal has been revamped and revitalized to provide readers with captivating articles.

The first article, “Deception and Extortion: Exploring the Effects of Impersonation Through Parody Social Media Accounts”, is authored by Nana Kofi Annan, Samuel Aboagye Mensah, and Jonathan Nii Barnor Barnor. This paper examined the dark side of parody accounts. Twelve former and six active parody account handlers were interviewed for this study. In addition, the researchers covertly engaged fraud parody accounts while also entreating individuals who have had interactions with such people to voluntarily provide screenshots to unveil their modus operandi. Miles and Huberman’s Qualitative Data Analysis was utilized as the data analysis technique. Findings from the study indicate that parody is an essential part of the social media ecology with clear guidelines in the creation and management of such accounts. While individuals take advantage of this provision to build brands for themselves, others also ride on the anonymity provided by such to engage in fraudulent activities. This study deviates from previous studies on parody accounts as a satirical tool in politics and crisis to study the phenomenon in relation to fraud. Lastly, considering the scarcity of literature in this stead, this study serves as a starting point for researching the area of parody social media accounts and fraud

The title of the second article is “Information Technology solutions used in revenue mobilization in an emerging digital economy”, which is authored by Nora Agyei-Ababio, Eric Ansong, and Patrick Kudjo. This study sought to explore digitalized processes in revenue mobilization in Ghana. Specifically, the research investigated the information technology solutions that have been used in revenue mobilization in an emerging economy. The study used a qualitative case study as a methodological stance. Data was collected from the Ghana Revenue Authority (GRA), the agency in charge of revenue mobilization in Ghana. The findings of the study revealed that the information technology underpinning revenue mobilization in Ghana currently is known as the Total Revenue Integrated Processing System (TRIPS) which has recently been launched and deployed in many GRA offices to support tax administration. TRIPS supports a total regime of revenue collection and management including all direct and indirect taxes with its series of processing modules designed to support the business needs of the Ghana Revenue Authority (GRA). The study contributes to the literature on Information Systems and revenue mobilization, which has seen very few studies conducted in Africa, especially in Ghana, and hence calls for more future studies on the use of e-revenue systems in developing countries.

The third article, authored by Daniel Afealete Kpodo and Louis Doe Atsiatorme, is entitled “Chemical liquid waste management in Senior High Schools and educational research institutions in the Accra Metropolis”. The study explored to what extent, chemical liquid waste was managed in the senior high schools and some research institutions in the Accra Metropolis. In addition, the study sought to establish the means of disposal of chemical liquid waste in educational and research institutions in the Metropolis, and to ascertained the policy guidelines of the Ghana Education Service (GES) and the Ghana Association of Science Teachers (GAST) on the management of chemical liquid wastes in senior high schools in the Metropolis. The study which involved thirteen (13) Senior High Schools and five (5) educational research institutions employed a descriptive research design with questionnaires as instrument for data collection. The study revealed that chemical liquid waste was not properly managed from the institutions and recommends the development of Educational Chemical Waste Management Guidelines by the GES and GAST and the monitoring of liquid chemical wastes generated by universities and research institutions by the Environmental Protection Agency (EPA).

“A framework for the adoption of Geographic Information Systems (GIS) in service delivery: A case of Harare city council, Zimbabwe” is the fourth article and is authored by Itai Dhedheya, Samkeliso Suku Dube, and Ian Sanders. The goal of this research was to develop an adoption framework for GIS that can be employed by developing countries culminating in the delivery of quality service to ratepayers. The triangulation research design, which is the use of more than one approach for the investigation of the research questions, was used in this research. Data was analysed using content analysis that identified the emerging themes as well as SPSS for the quantitative data component. The study revealed that there is a link between GIS utilization and service delivery. A proposed GIS adoption framework that was informed by research findings and literature review/documentary analysis of archival records was then developed. The proposed adoption framework has five important components that need to be addressed for the successful adoption of GIS in local authorities in developing countries.

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The fifth article was "The effect of service guarantee on customer satisfaction: Evidence from elected companies in the Ghanaian courier industry" and was authored by Irene Armah, Eric Ansong, and Esther Ntumi Lartey. This research examined how courier companies in Ghana use service assurances in their operations while serving consumers. It investigated how service reliability, responsiveness, certainty, and empathy impact customer satisfaction. In this study, a quantitative research technique was applied. Questionnaires were given to 120 customers from 10 Ghanaian local courier businesses to get first-hand information on internal procedures and consumer impressions of service guarantee. Correlation and regression analyses were used to investigate the impact of a variety of service quality parameters on customer satisfaction. All the traits, including reliability, responsiveness, certainty, and empathy, were found to be positively associated to customer satisfaction. Again, the study found that courier companies in Ghana lack a systematic way to track the efficiency of their service guarantee initiatives, relying instead on user feedback. Furthermore, these Ghanaian courier firms concentrated on breakdowns while ignoring time and human mistakes, which account for most reported failures.

"Organizational change and its effect on employee performance. A study at the Ghana Broadcasting Corporation" is the sixth article authored by Kwasi Addei Mensah, Eunice Elinam Ahiaxonu, and Eric Twum. Using the Ghana Broadcasting Corporation as a case study, this study evaluated organizational change and its effect on employee performances. With convenience sampling, structured questionnaires were used to collect data from 278 respondents. Descriptive statistics and linear regression were used to analyze the data. The study discovered that organizational changes done by the Ghana Broadcasting Corporation were primarily characterized by the establishment of new divisions that are capable of producing whatever the market require, peer-examination of the culture and habits of workers, and changing technology to suit business needs and technological advancements. Results also showed that together, structural change, strategic change and technological change contribute significantly to change in employee performance.

We would like to take this opportunity to express our gratitude to the distinguished members of the Editorial Board, for their commitment and for sharing their knowledge and experience in supporting the WJAS. Finally, we would like to express our gratitude to all the authors (including participants of the 1st Africa Graduate Conference), who submitted their work, for their insightful visions and valuable contributions. A special appreciation goes to the Dean of the School of Research and Graduate Studies – WIUC, for the insight and support in reviving the WJAS.

We hope that you, the readers, find the Wisconsin Journal of Arts and Sciences an interesting and valuable source of information for your continued work.

The Editor-in-Chief,

Eric Ansong, PhD

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Deception and extortion: Exploring the effects of impersonation through parody social media accounts

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Abstract:

The study aimed at expanding the literature on parody and fraud by examining the dark side of parody accounts. To this end, we adopted a qualitative approach by interviewing twelve former and six active parody account handlers. Further we also covertly engaged fraud parody accounts while also entreating individuals who have had interactions with such people to voluntarily provide screenshots to unveil their modus operandi. We further adopted Miles and Huberman's Qualitative Data Analysis Interactive Model to analyse data. Findings from the study indicate that parody is an essential part of the social media ecology with clear guidelines in the creation and management of such accounts. While individuals take advantage of this provision to build brands for themselves, others also ride on the anonymity provided by such to engage in fraudulent activities. This study deviates from previous studies on parody accounts as a satirical tool in politics and crisis to study the phenomenon in relation to fraud. Lastly, considering the scarcity of literature in this stead, this study serves as a starting point for researching the area of parody social media accounts and fraud.

Keywords: Parody; Social media; Fraud; Twitter; Covert Research; Deceit

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1. Introduction

Access to information and the development of opinions have fundamentally changed as a result of social media. While social media presents avenues for individuals and organizations to disseminate and receive information to improve product development and services, it also presents individuals with opportunities to connect with family and friends whiles also having fun. Social media has evolved beyond its original purpose of connecting prominent personalities like politicians, celebrities, and athletes with the general population (Pershad et al., 2018). Statista (2022) for instance reports that over 3.6 billion people are using various social media platforms worldwide and that figure is projected to increase by almost 22 per cent in 2025. Further, according to Statusbrew (2021), Facebook had about 2.8 billion daily active users in the third quarter of 2021 while Twitter totalled 211 million daily active users in the same period. Twitter is a social media platform that facilitates computer-mediated online communication and helps to develop a new social structure. Unlike on most online social networking sites, such as Facebook or MySpace, following and being followed requires no reciprocation (Karami et al., 2020). The increasing usage of social media platforms such as Twitter has sped up the process of exchanging information and expressing opinions about current events. However, due to the ease of the creation of user accounts and the significant increase in the number of fraudulent accounts, parody accounts, and accounts used for hate speech and violence, recognizing a user's identity on social networks is becoming a major issue.

Parody accounts have become an important part of the Twitter ecology, becoming both popular and controversial (Roig & Martorell, 2021; Thomas, 2016). They have established their presence on Twitter, providing a means to lampoon public figures and contemporary issues. These accounts post comments framed within the context of their fictional universes or stereotypes of their subjects, responding in character to topical events (Highfield, 2016). Such accounts can provide irreverent responses to topical discussions using devices such as juxtaposition, incongruity, popular culture references, intertextual content, parody, and irony (Stein et al., 2014). These responses can be both participatory, in that others can create their versions, and spreadable comments of interest across networks of friends and followers (Highfield, 2015). For example, Prince George, the son of Prince William and Catherine, Duchess of Cambridge, is born to a flurry of media attention throughout the world. Regular tweet updates are provided by Queen Elizabeth II (Elizabeth Windsor: @Queen UK). Unless, of course, this is not the real monarch of the United Kingdom.

Parody accounts are not new within the Ghanaian Twitter space as prominent personalities such as Ghana’s President and key public institutions have had their accounts parodied for various reasons best known to the handlers of parody accounts aside from satires. While such accounts are managed following Twitter’s parody account guidelines, there exist numerous parody accounts that are used for deceitful intents. The literature on parody accounts has covered a wide range of areas including politics (Denisova, 2017; Maronikolakis et al., 2020), misinformation and fake news (Shuraddin & Abd Latiff, 2022; Young, 2018), social media culture and satire (Highfield, 2013), Covid 19 (Roig & Martorell, 2021), among others. Studies on the use of parody accounts to commit fraud however seem missing in the literature. To expand the literature on parody and fraud, this study aims at examining the dark side of parody accounts by interviewing twelve former and six active parody account handlers, and also covertly engaging fraud parody accounts to unveil their modus operandi.

The rest of the article is laid out as follows: A brief overview of parody social media accounts is presented in the next section. We discuss the methodological approach adopted for the study in the following section, followed by a summary of findings, and we conclude with discussions, conclusions and implications.

2. Literature Review

Parody is a figurative device that is used to copy an entity for comic or critical purposes, and it has become a huge phenomenon on social media thanks to a slew of prominent parody accounts (Maronikolakis et al., 2020). They purport to present the views of the official spokesperson while posting satirical messages (Wan et al., 2015). Denisova, (2017) for instance, avers that alternative voices can use the digital space to reach out to the public and compete on an equal footing with hegemonic mouthpieces. Whereas the concept of parody is not new in the social media space, research on the phenomenon seems sparse. Again, there seems not a clear direction of literature on parody in social media space. However, the few studies conducted so far have been largely politically focused (Denisova, 2017; Lim & Golan, 2011; Maronikolakis et al., 2020). For example, Highfield (2013) used exploratory research to assess the role of parody accounts in Twitter discussions about political communication, pop culture, sporting events, and other media events, including political campaign coverage. The study, which used a mixed-method approach and data collected between 2011 and 2013, discovered that hilarious or satirical content, as well as content from professional comedians (or rebroadcast by them) and parody or gimmick accounts, accounted for the majority of retweets. Even though the findings of the study are relevant for the conduct of the current study, they remain circumstantial. In another study to examine the impact of humour used by brands and brand parody accounts on social media, Eckman (2018) suggested that parody Twitter accounts, particularly those using disparagement-style humour, may be advantageous to the real brand in terms of viewers' purchase intentions and intentions to spread positive word of mouth about the real brand. Yet, brands' own use of disparagement-style humour on Twitter could lead to lower purchase intentions in comparison. Again, while the findings of the study are valuable and set a fertile ground for further studies to build on, it implores future researchers to continue exploring the effects of parodic tweets so that public relations and social media professionals will have a better understanding of how humour can affect the brands for which they are cultivating mutually beneficial relationships. In a similar study, Wan et al. (2015), using the Social-Mediated Crisis Communication model as a theoretical lens, sought to examine parody social media accounts and their impact on organizations in times of crisis. The authors concluded that organizations need to determine when to take action against parody accounts and when to leave them alone.

As a selected social media platform for this study, Twitter is not new to parody accounts as the social media company embraces the creation and management of parody accounts under strict guidelines outlined by the company. The company's policy states explicitly that *"Users are allowed to create parody accounts…"* provided that the accounts follow the company's parody account requirements. The policy states as follows:

Bio: The bio should clearly indicate that the user is not affiliated with the subject of the account. Non-affiliation can be indicated by incorporating, for example, words such as (but not limited to) "parody," "fake," "fan," or "commentary." Non-affiliation should be stated in a way that can be understood by the intended audience.

Account name: The account name (note: this is separate from the username, or @handle) should clearly indicate that the user is not affiliated with the subject of the account. Non-affiliation can be indicated by incorporating, for example, words such as (but not limited to) "parody," "fake," "fan," or "commentary." Non-affiliation should be stated in a way that can be understood by the intended audience.

Inasmuch as Twitter embraces the concept of parody as captioned above, there exist a myriad of challenges that accompany such accounts. Such include impersonation, the spread of false and fake news and fraud. As earlier pointed out, the literature on parody social media accounts even though is gaining ground in academic studies remains silent on its dark side. Thus, how individuals use the concept of parody for deceit and other ill-intended motives on social media platforms.

3. Methodology

To achieve the purpose of this study, a qualitative approach of enquiry was adopted. This approach is best suitable for studying individuals and entities within the context in which they act. Again, a qualitative study is appropriate in studying complex situations where the relevant variables associated with an outcome are not apparent. This is geared toward increasing our understanding of the phenomena (Black, 1994). In this regard, two approaches to data collection were used. First was the use of semi-structured interviews with twelve former and six active parody account handlers. A purposive sampling technique was adopted in identifying the first respondent and subsequently snowballing in identifying the active parody account handlers. Interviews were scheduled and held between forty-five minutes to an hour with the respondents.

The second approach is the use of covert research with suspected fraud parody Twitter accounts. Despite the ethical dilemmas associated with the use of covert research in past years (Calvey, 2017; Marzano, 2021), it has been touted as a go-to approach when covering sensitive topics in ways that traditional ethnographies would have been stifled by ethical regimes (Calvey, 2017). In adopting this approach, we engaged some suspected fraud parody Twitter accounts. These accounts were parody accounts of prominent Members of Parliaments in Ghana. We also sought screenshots of conversations of Twitter users who have been contacted by such accounts and chronicled their experiences.

Data analysis was done using Miles & Huberman's (1994) qualitative data analysis technique. This entails four iterative stages: data collection, data reduction, data display and drawing conclusion and verification. At the data reduction stage, the raw data obtained in the field was organized via coding, which compressed the data into meaningful parts and given labels for further research. The following step was to generate summaries of the coded data, which involved condensing the weighty comments made by our respondents into fewer words in order to get closer to the goal of our research. While doing so, we were careful not to lose the data's substance as a result of data reduction. We also made use of tables and diagrams to help simplify the nature of the phenomenon. We finally drew conclusions from the data collection, reduction and display. However, conclusions drawn at this point remained tentative pending further review and were organized for presentation during analysis when all data had been collected and reduced.

4. Summary of Findings and Analysis

Parody accounts are not new to the Ghanaian Twitter space as individuals have created various accounts to shadow prominent people in society as well as public institutions for various reasons. Data for this study was in that regard collected from twelve respondents who had managed parody accounts in the past and six active parody account handlers. For ethical reasons, the identities of the respondents and their accounts are not disclosed in the discussion. To achieve the purpose of this study, we also engaged accounts suspected to be engaging in parody fraud. This section of the study presents the evidence of data collected and subsequent analysis.

4.1 Parody Accounts: The Numbers Game and Expensive Jokes

For an account to pass for a parody account, it must follow Twitter’s parody account requirements. That is, the bio of the account must state a clear non-association from the original account. Further, the account name must state clearly that the account is a parody account so as not to stray followers of the said account. While these are a few of the guidelines for running parody accounts, many accounts created in the name of parody accounts have been used several times to peddle false and fake news about celebrities. For example, during the height of the Covid 19 pandemic in 2020, with flights grounded as a result of border closures for Ghanaians and other nationals, a Twitter account, @TracySarlcess, ostensibly parodying the spouse of the Ghanaian rapper Sarkodie posted *“Welcome to Ghana. @sarkodie and myself with Titi have arrived in Ghana. Thank you for the travelling mercies.”* This post was however responded to by the parodied account; @TracySarkcess amidst public backlash *“Can you stop this nonsense and fake account please? Impersonating someone is a crime! If* *it's a parody account fine but let it be known and stop deceiving people. It's my name you are playing with. Thank you & good morning".* The parody account was since reported and taken down.

Another instance involving a prominent figure and an issue of pronounced public interest is a post by a parody account @ASAMAOH_GYAN3 ostensibly shadowing the former National Soccer Team Captain Asamoah Gyan (@ASAMOAH_GYAN3) that *"I intentionally missed the penalty because of my ex. I wanted to break her heart."* Again, being an issue of national interest, the tweet received huge attention despite being posted by a parody account. The original account, therefore, responded to the post *"Disregard this fake and criminal page portraying my image as my official Twitter handle. My account is duly verified. Pls take note and deal with that faceless person accordingly as criminal, anyone with info about him should alert my manager Samuel Anim Addo to take action,"* The account has subsequently been suspended.

Data collected over the period of this study was indicative of the fact that individuals who create parody accounts do so for various reasons. One of such reasons is to garner followers. A former owner of a parody account avers that *"Twitter is a fun place to be … the larger the audience you have, the more influential you are in that space".* Attracting followers according to the respondents is spontaneous and demands a lot of effort from the handler of the accounts. Thus, *"… from the creation of the account, you must know what you are aiming to achieve with the account you are creating"* a respondent claimed. Further, this venture demands one *"to have a great sense of humour not to take everything people say personal because you will defeat the purpose of Twitter parody accounts if you do…"* another handler stressed. Gaining huge followership on social media accounts enables individuals to switch from being parody account handlers to becoming social media influencers. These further aids account owners to monetize their accounts.

4.2 Parody Accounts: Exposing the Dark Side

Even though running parody accounts is an activity that is accepted by Twitter and the social media community at large, it is important to note that there are individuals who engage in running such accounts to defraud unsuspecting social media users. Such people most often than not pose as political figures and use their position of influence to defraud individuals through schemes such as employment fraud by using social media platforms as a medium for such duplicitous motives. Whereas accounts meant for satirical activities may follow the Twitter guidelines, such accounts do not, whiles mirroring the appearance and bios of the original accounts. A cursory search of the fraud account engaged for his study indicated about six different accounts a Member of Parliament (MP) impersonated. Such exercises by fraudsters make it near impossible to identify the original account if it has not been verified by the social media platform.

Figure 1: A screenshot of a chat with a parody fraudster

In order to identify such accounts, it is important to note that they are more often than not first to initiate conversations which is uncharacteristic of politicians and as such MPs (See figure 1). Further, they ask of the allegiance of their targets to establish the legitimacy of their contacts by asking if they are affiliated with the sitting government and whether they are registered members of the party. While at this, they also prey on the needs of their targets by asking which forms of assistance they could offer them. These conversations may travel for as long as the target is willing to engage.

It is worth mentioning that parody fraudsters have different schemes. These include but are not limited to scholarship, loan assistance, employment fraud, travelling and visa fraud among others. In all the schemes, they ask their targets to contact their assistants who in most instances are the faces behind the accounts to acquire *protocol order/endorsement forms* (See figure 2).

Figure 2: A screenshot of a chat with a parody scammer

Evidence from the data collected was also indicative of the fact that while many accounts operate under such schemes on the Twitter platform, there seems to be consistency in their mode of operations. However, we could not authenticate if the accounts are related as the phone numbers provided under each circumstance seemed different. Our inquiry however pointed to the fact that the scammers keep single numbers for particular schemes. For example, recruitment scams have a dedicated phone number and a consistent name to be contacted and so are scholarship scams. Finally, it is essential to note that scammers in these scams are insufferable and will fling invective at the slightest sign of resiliency or exposure. They also block their targets when exposed and are first to report their targets' accounts to Twitter; again, using their supposed positions of influence.

5. Discussion of Findings

According to Highfield (2016), a parody account is a recognized, actual person who is used for blatantly comic purposes. These accounts play with misconceptions of these personalities or juxtapose their public image with a different, behind-closed-doors persona; there should be no risk of mistaking their tweets for their subject's true beliefs. Analysis of the findings points to a number of reasons why individuals create parody social media accounts. This includes the need to amass followership on various social media platforms which in itself is not the end but to transmogrify into influential accounts for business purposes. In several cases analysed for this study, it was revealed that many Twitter posts have in the past been misconstrued to be emanating from the original owners of the accounts hence creating public disaffection. Again, the analysis was indicative of the fact that parody accounts have most often than not misled to a large extent even media houses into carrying news which were originally meant to be satirical. Presented in figure 3 is a tweet by a then parody account of the President of Ghana attributing a quote to Peter Drury; an English football commentator and a subsequent carriage by a media house in Ghana. While this may sound misleading or a misrepresentation of facts, previous literature with regards to the prosecution of parody accounts projects that parody accounts are shielded by the first amendment as evident in the case of Levitt v. Felton; where a fake account mocked Levitt by making references to drinking and partying, casting doubt on his legal ability. The court, on the other hand, determined that the narrative was clearly a parody when read in context. Levitt's standing as an attorney, as well as his performance as a professor, are all mocked in the tweets. No rational person would view them as anything other than an attempt to mock and caricature Levitt's own tweets when read in context (Lux, 2021).

Figure 3: A parody tweet and a subsequent carriage by a media agency

Second, our analysis of the data revealed that malicious actors use the anonymity provided by parody accounts to engage in fraudulent activities, deceiving their targets into parting with huge sums of money in what appear to be employment, travel and visa, and scholarship scams via social media. While the literature on this seems non-existent this study presents a worthwhile starting point for starting scholarly engagements in parody accounts and fraudulent activities on social media platforms. As indicated by Keretna et al. (2013), the use of parody accounts to engage in criminal actions creates moral and legal difficulties that affect the social lives of innocent individuals. Electronic identity framing is common among celebrities in the media, entertainment, and political realms. Due to the ease with which fraudulent accounts may be created, the growing use of social media has added to the complexity of the situation.

While we could not validate the demographics of the faces behind the accounts, we established that such fraudulent accounts target mostly unemployed young individuals by using political figures and key institutions. Again, analysis of the findings was indicative of the fact that such scammers may not be entirely illiterates but are unaware of minor details of the engagements of the political figures they impersonate. For example, while the Minister of Finance is not a member of Parliament and as such does not attend parliamentary sittings, the account usually requires their targets to meet him at the Parliament House. Furthermore, scammers in these schemes do not pay attention to the fact that phone numbers given out could be tracked for subsequent deactivation or apprehension.

6. Conclusion and Implications

The study sought to explore the operations of parody social media accounts and to unveil the dark side of a phenomenon meant to be satirical in nature. Using a qualitative approach, eighteen individuals; twelve of whom are former parody Twitter account handlers and six active parody account handlers were interviewed for the study. Further, we employed a covert approach in investigating the activities of such fraudulent parody accounts.

The findings of the study revealed that parody is an essential part of the Twitter ecology and as such there are various reasons that individuals associate with the creation of parody social media accounts. This includes but is not limited to the amassing of followership which later translates into becoming social media influencers and subsequent monetization of the accounts. While this is evident with individuals who follow Twitter's guidelines concerning the management of parody accounts, some of these accounts largely have misled the public on some occasions. Again, analysis of the findings revealed that scammers also take advantage of the anonymity provided by the creation of parody accounts and running on the back of political figures, use this opportunity to scam unsuspecting individuals.

The originality of this study stems from the fact that it serves as a pioneering study towards understanding the activities of fraudulent parody social media accounts considering the fact that research in this area seems sparse if non-existent. This contribution cannot be overlooked as the study contributes to the existing knowledge of parody accounts in social media space.

Concerning practice and policy, this study seeks to serve as a basis on which social media platforms can rely to amend their policies on the creation and keeping of parody accounts by individuals. Again, it has become imperative for government agencies responsible for communication to protect the images of Members of Parliament and key government appointees by establishing cordial contact with social media platforms to verify such people to avert running down the hard-earned images of same.

Despite the valuable contribution of this study to the body of knowledge, there seem to be a few limitations that future studies can build on. For instance, owing to the embryonic nature of the phenomenon of parody social media accounts and fraud, future researchers can build on this by exploring how social theories can aid in better understanding the phenomenon in other contexts.

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Information Technology solutions used in revenue mobilization in an emerging digital economy

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Abstract:
Digital economy – the use of information technology in all aspects of the economy to support business processes – has become essential for the growth of many economies. Governments, especially in developing countries are now adopting the use of technology in their operations. This study sought to explore digitalized processes in revenue mobilization in Ghana. The research investigated the information technology solutions that have been used in revenue mobilization in an emerging economy. The study used a qualitative case study as a methodological stance. Data was collected from the Ghana Revenue Authority (GRA), the agency in charge of revenue mobilization in Ghana. The findings of the study revealed that the information technology underpinning revenue mobilization in Ghana currently is known as the Total Revenue Integrated Processing System (TRIPS) which has recently been launched and deployed in many GRA offices to support tax administration. TRIPS supports a total regime of revenue collection and management including all direct and indirect taxes with its series of processing modules designed to support the business needs of the Ghana Revenue Authority (GRA). The study contributes to the literature on Information Systems and revenue mobilization, which has seen very few studies conducted in Africa, especially in Ghana, and hence calls for more future studies on the use of e-revenue systems in developing countries.

Keywords:
Digitalization; electronic revenue mobilization; E-government; Emerging economy; Total Revenue Integrated Processing System.

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1. Introduction

Developments in Information and Communication Technology (ICT) are radically changing the way businesses are done as compared to previous times. Knowledge and the use of technology have been deemed important for socio-economic growth (Zhao, Wallis, & Singh, 2015). Digitalization of business processes has emerged as a great phenomenon which has had a transforming effect on society (Gomez-Reynoso & Sandoval-Almazan, 2013). The growth of digitalization was initially due to private sector interests, but governments have recently developed great interests and are quickly adopting the use of technological advancements in their operations. Governments have been able to develop more sophisticated ways to digitalize their business processes with the help of the revolutionary changes that Information and Communication Technologies (ICTs) have brought to the global society (Adegboyega, 2011). An "umbrella term that comprises all uses of information and telecommunication technologies in the public sector is broadly referred to as digital government" (Garson, 2006). Digital economy is one aspect of digitalization which focuses on an economy that is based on digital computing technologies.

In Ghana, revenue mobilization is handled by the Ghana Revenue Authority (GRA), a government institution tasked with tax administration and revenue generation for accelerating growth and improving the quality of life of citizens. GRA has adopted automated systems for its operations especially for revenue generation and collection which is its core duty. Studies have associated a significant positive impact of digitalization in reducing high costs, time inefficiency and ineffective manual procedures associated with revenue mobilization (Vasudevan, 2007; Zineldin, 2007). Many attempts to study e-revenue have been geared towards its emergence, adoption, creation of new markets in the digital environment and its development (Szewczak, 2014; Giebel, 2013; Missingham, 2009). Turban et al. (2007) and Lee (2009) also conducted studies on transforming organizations into the digital economy and its cultural acceptance by citizens. On the other hand, further studies examine the relationship that exist between digital economy and revenue mobilization (Zhao, Wallis & Singh, 2015) while others attempt to capture and understand trust issues concerning the adoption of e-revenue (Teo, Srivastava, & Jiang, 2009). From these studies, it is clearly seen that the emergence of digital economy, its adoption, development and in depth understanding on trust issues concerning its application has received thorough research in diverse ways. However, very few studies have been conducted on the use of digitalization, especially with the use of e-revenue systems. As much as the adoption of digitalization is important, its application and use are equally essential. Hence the need arises for further research on the use of digitalized processes in revenue mobilization.

In many ways, businesses in developing countries are gradually transforming and operating in a digital interconnected space. This emphasizes the need for further research on the use of e-revenue systems taking into consideration the institutional environment affecting the use of these systems in revenue mobilization and applying the new institutional theory to bridge the theory gap created. This study attempts to track the information technology solutions that have been used in revenue mobilization at Ghana Revenue Authority and its impact on the growth of the digital economy.

This study specifically, answers the question "What information technology solutions have been used in revenue mobilization at Ghana Revenue Authority? Revenue mobilization in Ghana is very crucial to the growth of the economy. This study contributes to the limited literature in the area of digital economy from a developing country. This serves as a steppingstone for subsequent studies. Secondly, the findings of this study map out the technology used by Ghana Revenue Authority in revenue mobilization and investigates the technology-oriented business processes involved in revenue generation.

2. Literature review

Albright (2008) in his study established a positive theory justifying the relationship between a state and its economy. The effective mobilization of available human and material resources by a government serves as a major factor to national development. Revenue mobilization in most local governments is principally derived from tax (Adejoh & Sule, 2013). Tax, as defined by Nkote and Luwugge (2010) "is a compulsory levy by government on goods, services, income and wealth". It provides a definite source of revenue for government expenditure, in other words funds generated by government to finance its activities. Public revenue mobilization is one of the keen issues for most governments. Revenue mobilization encompasses activities such as revenue generation, revenue collection and the allocation of revenue for the government's developmental projects (Adejoh & Sule, 2013). Alu and Bretschneider (2011) argued that revenue generation is an essential component of fiscal policies formulated to satisfy economic and social needs. Thus, any financial and a viable tax system means increased revenue generation backed by effective revenue collection strategies. According to Malecki and Moriset (2008), effective revenue generation must aim at strategies such as: the introduction of additional sources of revenue; providing incentives for extra efforts of staff involved in revenue generation; efficient and effective collection of existing taxes; taking advantage of business or commercial opportunities in local areas; public enlightenment and campaign that will educate the tax payer on the importance of prompt payment; tapping all available opportunities in the areas and periodic raiding by officers in charge of revenue generation. In Ghana for instance, revenue is generated through various taxes and levies such as the Valued Added Tax (VAT), company tax, capital gain tax, vehicle income tax, gift tax etc. (Nkote & Luwugge, 2010). These taxes are known as domestic taxes and are expected to be paid by citizens and organizations operating in the country. In addition, revenue is also generated from international transactions such as collecting excises and trade taxes which includes custom duties and VAT on imports (Holniker, 2005). Revenues from these income taxes serve as an important source of income for governments.

2.1Digitalization and Revenue Mobilization

Digitization of revenue mobilization is derived from the general concept of automation, a concept that describes a process of acquiring machines to accomplish tasks performed wholly or partly by humans (Gutierrez, 2002). Digitalization aids the conduct of complex processes accurately, efficiently, and effectively (Hollingum, 2006). In the study of majority of governments have implemented e-government Digitization of revenue mobilization is derived from the general concept of automation, a concept that describes a process of acquiring machines to accomplish tasks performed wholly or partly by humans (Gutierrez, 2008). Digitalization aids the conduct of complex processes accurately, efficiently and effectively (Hollingum, 2006). In the study of Shivakumar (2007) and Gutierrez (2008), emphasis was placed extensively on digitalization of business processes and procedures and how it contributed to rapid economic growth. Research has shown that digitalization has been a major contributor to economic growth (Brynjolfsson & McAfee, 2011). Alongside the advancements of digitalization, majority of governments have implemented e-government initiatives. Digital economy and e-government are most likely to be used interchangeably especially where digitalization is on public administration. Zhao, Wallis and Singh (2015) studied the nature of the relationship between e-government development and the digital economy and concluded that there is a strong positive reciprocal relationship between the two concepts. This finding provides empirical evidence to support the general notion of co-evolution between technology and organizations. Ajape et al. (2017) and Gutierrez (2002), emphasis was placed extensively on the digitalization of business processes and procedures and how it contributed to rapid economic growth. Research has shown that digitalization has been a major contributor to economic growth (Brynjolfsson & McAfee, 2011). Alongside the advancements of digitization,

The World Bank (2008) defines e-government as the use of information and communication technology to improve business processes and service delivery by government departments and other government entities. The e-government trend offers a unique opportunity to create self-sustaining change in a broad range of closely connected technological, organizational, cultural, and social effects (Dunleavy et al., 2006). According to Holniker (2005), digitalization of revenue mobilization includes the development of electronic procedures to carry out revenue assessments and computations; and to determine revenue at high levels of speed and accuracy (Guido, 2007). Digitization acts as a catalyst for revenue mobilization. Revenue mobilization is primarily part of an overall tax administration reform and modernization programme (Guido, 2007; Gutierrez, 2008).The study of Booze et al. (2007) saw the core functions of digitalization of revenue mobilization to include: controlling cross-border flow of goods, revenue collection from domestic and public entities, ensuring compliance with government rules and regulations, appropriate allocation or revenue for development, collection of the duties and taxes and protecting a country against any illegal transactions related to the importation of goods and materials. The overarching benefit of adopting digitalization to support business processes is directly or indirectly linked with the reduction in administration cost and increased effectiveness in revenue mobilization. Vasudevan (2007) observed that digitalization of revenue mobilization leads to increased collection of revenue due to the uniform adherence and application of rules and regulations, the automated calculation of tax due and in-built security provided by information systems. The use of digitalized processes also improves foreign trade and reduces corruption due to transparency and digitalized procedures.

2.2 Digitalized Processes in Revenue Mobilization

One way to think about revenue mobilization is as a multiple-input, multiple-output process where the outputs include not only revenue but also such important intangible products as equity and principal inputs are people, materials and information (Haltiwanger & Jarmin, 2008). Although the revenue mobilization process may be further broken down into a number of separable components, only a few key aspects are generally noted. The general tax mobilization functions include taxpayer registration, tax audit, revenue protection system, revenue collection and tax compliance. These processes were identified to generally capture all other processes that may be involved in revenue mobilization. Table 1 summarizes studies conducted on e-revenue and highlights on the activities involved in revenue mobilization and the technologies adopted to facilitate these activities.

Table 1. Digitalized Processes in Revenue Mobilization

Author (s)	Revenue Activities	Technology adopted
Guido (2007)	-Taxpayer registration -Tax payment and collection -Daily reconciliation -Alerts on possible revenue problems	Automated Revenue Collection System
Holniker (2005)	-Revenue Assessment -Revenue collection from domestic and public entities -Control of cross-border flow of goods -Tax code generation	Commercial Tax System
Fossat and Bua (2013)	-Taxpayer registration -Account management -Electronic filing -Electronic payments and refunds -Tax audit	Standard Incorporated Government Tax Administration System (SIGTAS)
Dias (2009)	-Customs declaration -Transit and suspense procedures -Tax audit -Electronic cargo tracking system	Automated System for Customs Data (ASYCUDA)
Adejoh and Sule (2013)	-Clearance duty -Transit declaration	Revenue Authority Digital Data Exchange (RADDEX)
Nkote and Luwugge (2010)	-Taxpayer registration -Processing returns and payments -Revenue collection -Tax audit	Integrated Tax Management System (ITMIS)

Source: Authors' construction

The study adopted the qualitative approach to investigate the technology underpinning revenue collection in Ghana. The choice of a qualitative approach was as a result of its ability to provide insight and gain answers to the "how" and "why" questions about phenomena that the researcher can either have control of or no control (Walsham, 2006). Ghana Revenue Authority (GRA) was selected as the case for the study. The selection was due to the fact that the Authority was in charge of revenue mobilization in Ghana and had implemented e-revenue services in its operations. The study employed purposive sampling as propounded by Creswell (1994) as its sampling design. In addition, the snowball sampling technique was also used to select people from one stage to the other to get information. This technique was adopted based on confidentiality and anonymity as the investigations went further to gain in depth information. Face-to-face interviews were mostly conducted with participants who were involved in the implementation and use of technology within the case institution. Interviews and field notes that were taken and recorded during data collection were read thoroughly in order to identify emergent concepts and themes. This was to aid the researcher to develop a clear connection between and among concepts and themes.

3. Research methodology

The study adopted the qualitative approach to investigate the technology underpinning revenue collection in Ghana. The choice of a qualitative approach is a result of its ability to provide insight and gain answers to the "how" and "why" questions about phenomena that the researcher can either have control of or no control over (Walsham, 2006). Ghana Revenue Authority (GRA) was selected as the case for the study. The selection was because the Authority was in charge of revenue mobilization in Ghana and had implemented e-revenue services in its operations.

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4. Data analysis and discussion

The Ghana Revenue Authority (GRA) is the official agency in Ghana charged with tax administration and revenue mobilization. Before its establishment in 2009, tax administration and revenue mobilization in Ghana were handled by three different agencies namely; Internal Revenue Service (IRS), Value Added Tax Service (VATS), and Customs, Excise, and Preventive Service (CEPS). The Ghanaian Government established the Ghana Revenue Authority by merging the three agencies by the Act of Parliament in 2009, Act 791. The aims of merging the three agencies were to; integrate IRS and VATS into domestic tax operations on functional lines, integrate the management of domestic tax and customs, and modernize domestic tax and customs operations through the review of processes and procedures with ICT as the backbone (Ghana Revenue Authority, 2022). The Authority performs functions to achieve its objectives and these functions include the assessment and collection of taxes, interest, and penalties on taxes due to the Government with optimum efficiency; paying the amounts collected into a consolidated fund unless otherwise provided; promoting tax compliance and tax education; combating tax fraud and evasion and co-operating with other competent law enforcement agencies and revenue agencies in other countries; advising district assemblies on the assessment and collection of their revenue; preparing and publishing reports and statistics related to its revenue collection; making recommendations to the minister in charge on revenue collection policy and performing any other function concerning revenue as directed by the minister in charge (Ghana Revenue Authority, 2022).

4.1 Structure of Ghana Revenue Authority (GRA)

The Ghana Revenue Authority is segmented into three divisions that are:

- Domestic Tax Revenue Division
- Customs Division
- Support Services Division

The Domestic Tax Revenue Division of the GRA is a merger of the operational wings of the Value Added Tax Service and the Internal Revenue Service. This division is charged with the administration of domestic revenue. As a division of the GRA, it is very strategic in the achievement of national goals. The division has functional roles such as identifying taxpayers, assessing taxpayers, and collecting taxes and levies. The Customs Division serves as the frontline institution at the country's borders. The Division also plays an essential role in protecting and maintaining the territorial integrity of Ghana. Customs Division is identified as part of the country's security network. The core function of the division is to perform revenue agency duties and to ensure the enforcement of rules and regulations governing import and export transactions on behalf of other government organizations and ministries. The Support Services Division is mainly charged with the administrative operations of the Ghana Revenue Authority. The division constitutes an administrative unit, finance unit, research, planning, and monitoring unit, information technology unit, and human resource unit. As its name suggests, the division exists to support the main revenue agencies at GRA.

4.2 ICT Infrastructure in erstwhile agencies

Prior to the integration of the revenue agencies into a single governing body in 2009, the individual agencies operated using different information systems. In an attempt to improve the services of the Government of Ghana and its citizens concerning revenue mobilization, various information systems were employed by the erstwhile agencies responsible for the revenue mobilization to support their business processes. These systems were introduced to suit the functions of each revenue agency. Table 2 illustrates the information systems used by the erstwhile agencies.

Table 2. Information Systems used by erstwhile Agencies

System	Agency	Date Introduced	Purpose
Ghana Customs Management System (GCMS)	CEPS	2000	• Employed to centralize operations on importation and exportation.
TradeNet	CEPS	2000	• Used for electronic issuance and management of permits. • Used concurrently with GCMS. • Helped to curb fraudulent activities in permit acquisition.
VAT Information Processing System (VIPS)	VATS	2000	• Adopted to support electronic records of VAT transactions.
Ghana Integrated Tax Management Information System (GITMIS)	IRS	2001	• Used as an electronic payment and collection system.
Large Taxpayers Information Processing System (LTIPS)	LTU	2001	• Used for the processing and assessing of direct and indirect taxes.
Tax Identification Number (TIN) System	LTU & CEPS	2002	• Registration and issuance of TIN. • Used concurrently with LTIPS.

Source: Authors' construction

4.3 The Ghana Electronic Government (GeGov) Project

In 2006, the Ministry of Communication developed an initiative to use Public-Private Partnership (PPP) to enhance automation amongst government agencies, which was referred to as electronic services (e-services), with support from the World Bank. This initiative was undertaken to improve business processes, provide ICT channels for citizens to interact with the government in all transactions, and improve transparency. The first government e-services PPP with regards to the revenue-generating agencies was signed with Ghana Community Networks (GCNet), a supplier and Private Partner in customs software deployment in December 2009 after the integration of the revenue agencies into one body as GRA.

4.3.1 GeGov Project Scope and Infrastructure

The project was to purview the extent to which technology can be used to assist the business processes of government institutions. The project sought to;

1. Develop an integrated e-registration software
2. Develop an integrated software for GRA
3. Provide ICT infrastructure and equipment
4. Develop an e-services portal
5. Provide shared services infrastructure
6. Provide training and change management policy
7. Create business process re-engineering
8. Provide a data warehouse

Government institutions that were involved in the GeGov project included the Registrar-General's Department (RGD), Ghana Revenue Authority (GRA), Ministry of Communications (MoC), and National Information Technology Agency (NITA) and Ministries/Departments/Agencies (MDAs). Private companies involved in the project included Ghana Community Network Services Limited (GCNet), Ernst and Young (E&Y), Reform Implementation Committee (RIC), and Modernization Programme Office (MPO). World Bank sponsored the GeGov project, where the government of Ghana in partnership with GCNet was to design, finance, build, operate and transfer ownership of an e-government system with its technical partners for RGD and GRA. The main objectives of the project were to computerize business registration, enhance revenue mobilization, and provide citizen-friendly services. The project was to emphasize pertinent ICT infrastructure that was deemed appropriate for the execution of the project. Table 3 summarizes the GeGov infrastructure and objectives.

Table 3. GeGov Infrastructure Scope

Infrastructure	Objective
Data Centre	Facility to house computer systems and associated components such as telecommunications and storage systems.
Disaster Recovery Site	Facility to recover and restore technology infrastructure and operations when the organization’s primary Data Centre is unavailable
Hardware Devices	These include personal computers, servers, switches, routers, printers, scanners, etc. needed to support the use of systems.
Networks	These include WAN and LAN setups at the various sites
Power Cabling	Electrical conductors are used for the transmission of electrical power.
Server Room Refurbishment	Renovating the server room to be suitable for the continuous operation of computer servers.

GCNet, being the Private Partnership Project (PPP) was tasked with the development of a system to support the business processes at GRA. Out of the GeGov project evolved the development of the Total Revenue Integrated Processing System (TRIPS) to be used by GRA to enhance revenue mobilization.

4.4 Total Revenue Integrated Processing System (TRIPS)

TRIPS was designed to support an integrated regime of revenue collection and management including all direct and indirect taxes. It is based on an Oracle database and is available on a variety of platforms. A TRIP was launched in April 2010 as a follow-up to the contract signed by GCNet as the selected partner. TRIPS is based on the concept of distributed data processing with standard multi-user facilities. It consists of a series of processing modules and reports programs to support the business needs of GRA, with a specialty in the DTRD. Table 4 outlines the modules of TRIPS and their respective uses.

Table 4: TRIPS Modules and their uses

Module	Use
Taxpayer Registration	Used for the registration of taxpayers and the issuance of TIN.
Revenue Collections	Used for profiling taxpayers and collecting taxes to be lodged into a designated account.
Returns Processing	Used for the processing of revenue collected into a designated account.
Taxpayer Accounting	Provides a complete picture of the status or profile of taxpayers across all revenue areas at GRA.
Revenue Accounting	Provides all accounting facilities for monitoring revenue, tracing funds, and reconciling accounts.
Risk	Enables intelligence gathering, risk identification, and tracking of criminal activities.
Audit	Supports risk management through visit selection and provides an online recording of visits.
Compliance Enforcement & Debt Management	Identifies non-compliance and generates automatic revenue recovery measures.
Objections & Appeals	Used to keep records of any appeals or objections tied to taxpayers' accounts.
Exemptions	Used to keep records of all taxpayers who are exempted from the payment of specified taxes.
Case Management	Manages special cases related to profiling taxpayers and tax collection.
Refunds	Identifies and keeps records of all refunds made to taxpayers.
Management Information System	Provides a comprehensive set of reports that allows management to monitor the performance of all revenue streams.

Source: Authors' construction

The modules of TRIPS were developed to support the functional activities of the GRA with additional features and non-functional requirements. Tax identification is one of the core functions of TRIPS from which all other modules interface. GRA launched a program with the Registrar General Department in 2010 that saw the re-registration of all companies onto TRIPS. All re-registered companies and their directors were issued with TINs. Through the registration module, TRIPS provides unique numbers for the identification of all taxpayers and manages a database of all registered taxpayers. The taxpayer registration module is an integrated functionality with the National Identification Authority (NIA), Electoral Commission (EC), and the Drivers and Vehicle Licensing Authority (DVLA). The taxpayer services provided by the DTRD use the TIN to identify taxpayers, profile taxpayers, process returns, collect taxes and pay or lodge the amounts collected into a designated bank account of GRA. Through the revenue collection module, taxpayers are able to complete their returns, make payments online and hence avoid the inconvenience of visiting DTRD offices for that purpose. The revenue collection module is integrated with the Ghana Integrated Financial Management Information System used by the Controller and Accountants General Department (CAGD) of the Ministry of Finance and also with the Ghana Interbank Payments and Settlement Systems (GhIPSS). The taxpayer accounting module is linked with the Ghana Customs Management System used by CEPS. This enables the management of GRA to have access to the profiles of all taxpayers in every division of the Authority. The revenue accounting module is also linked with the Ghana GIFMIS used by CAGD to enable management to account for all revenue and funds collected by the government of Ghana. Since tax payment is a legal responsibility, it is a very important duty of the GRA to enforce all taxpayers to discharge this responsibility. The compliance enforcement and debt management module generate reports on tax debtors to comply with their obligations. The risk and audit modules allow for sharing of information among all divisions to track all activities that are undertaken at respective divisions and also to protect the integrity of the Authority. It provides an automated risk profile of all taxpayers. The objections and appeals, exemptions, case management, and refunds modules are portals that handle specific cases of tax filing, overpayments, and procedures and also ensure that as much as the Authority is bent on enforcing compliance with tax obligations, appropriate measures are also meted out to taxpayers. Figure 1 illustrates the workflow of the TRIPS modules.

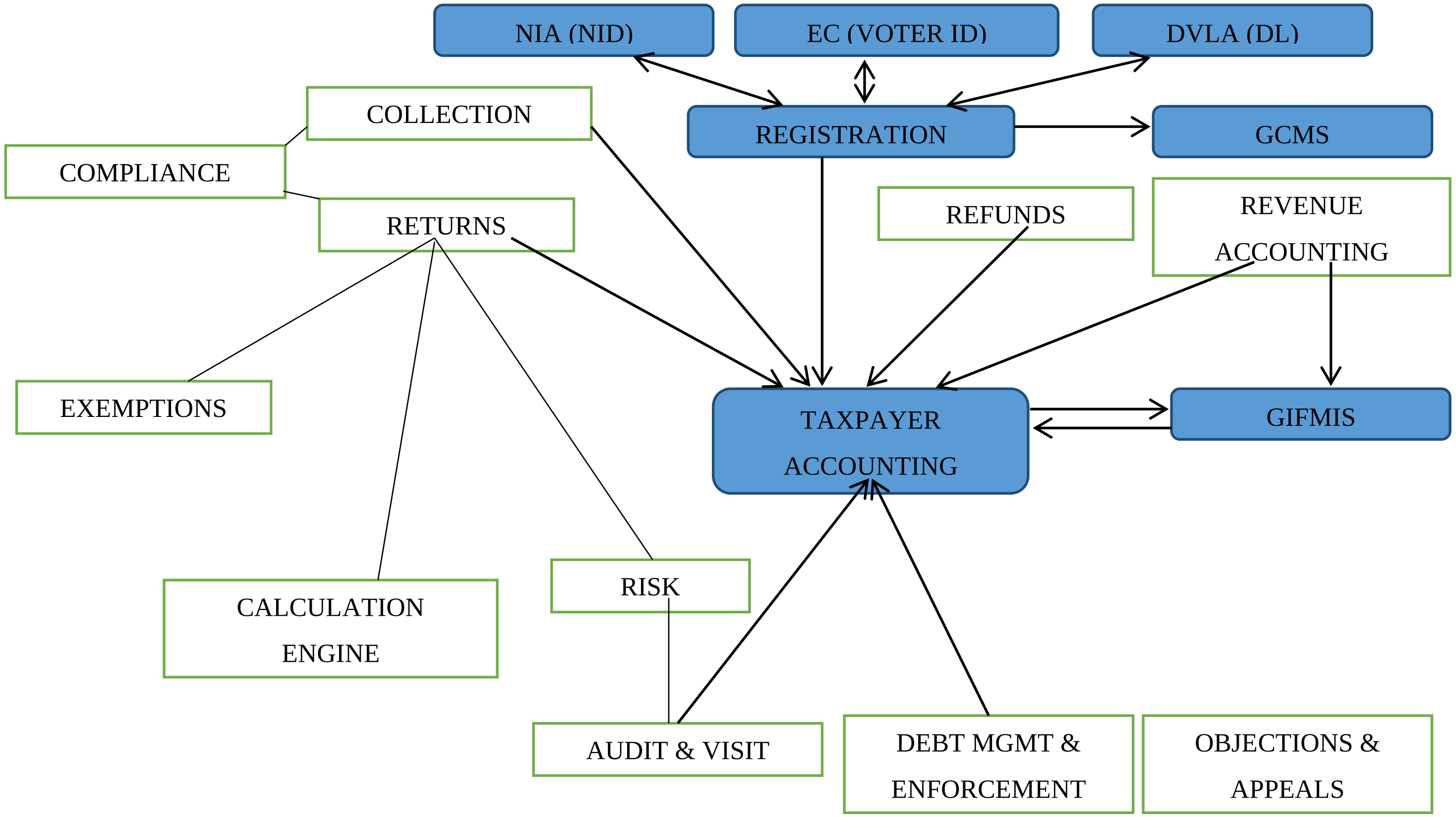

Figure 1: The workflow of the TRIPS modules

TRIPS requires the involvement of other government institutions for its registration module. The system verifies the identity of taxpayers through online databases from NIA, EC, or DVLA. This verification is done to validate the identity of taxpayers before issuing them with TINs. The registration module of TRIPS is integrated with that of GCMS used by the customs division of GRA. This ensures that taxpayers do not register both with TRIPS and GCMS concurrently and prevents issues of taxpayers bearing multiple TINs. The system permits the issuance of a unique number for every taxpayer regardless of their tax type. Additional features of TRIPS such as the calculation engine facilitate the calculation of all tax filing procedures to ensure accuracy in tax payments. TRIPS also provides e-services in addition to its modules. It provides GRA with an e-services portal with applications that include e-filing, e-registration, e-payment, chat, appointments, and scheduling. These services are discussed below.

4.4.1 The E-Services Portal

E-filing permits registered portal users to file their tax returns online. Taxes available on the portal currently include VAT, personal and corporate income tax, communication service tax, mineral royalties, and withholding tax. According to a team member on the project during an interview:

> *"With the e-filing service, a taxpayer is expected to have a TIN, a portal user account, and tax type to be able to assess the service".*

The portal allows a user to log in with his credentials, fill out a form for filing of returns, verify if all tax calculations are correct, submit the form to be captured into the system, and send feedback to the user to confirm a successful transaction. The service also allows users to check their taxpayer accounts for viewing and printing. E-registration is a service that provides taxpayers an avenue to register for TINs online. The TIN registration online is a two-stage process; create temporary credentials and register for TIN. With stage one, the portal establishes your identity and verifies it against one of three online databases which could either be the voters' register (EC), drivers' license (DVLA), or national identity (NIA). If the user's identity is successfully established, the system creates temporary credentials based on the email address of the user and a password of your choice. Stage two of the e-registration process allows a user to log in to the portal with his temporary credentials, fill out an online TIN form and submit it into the system. A respondent who was part of the project team added that:

> *"Before starting registration, a user should make sure that he has a valid ID card and a personal email address because a shared email address is not permitted and may result in the failure of the registration".*

After successful completion of the registration, the system generates a report which summarizes the user's TIN registration details and automatically sends a notification message through e-mail to the user for confirmation of successful registration. The e-payment portal permits registered portal users to pay their taxes online through the Ghana Electronic-Payment Portal (GEPP). Payments may be made using either one of the following methods; eTranzact, visa, master card, bank transfer, cash, or cheque. The portal grants access only to users with registered TINs and portal user accounts.

A user logs in with his credentials and is allowed to fill out a payment form, confirm the type of payment requested, and is redirected to the GEPP page to verify tax details, view billing, and payment information, and submit the completed form to the system. Upon successful completion of the payment process, the system sends a congratulatory message to the user. In response to the question of how these e-payments were reliable and secured, the project team manager responded that:

> *"The National Information Technology Agency (NITA) regulates all electronic transactions through the Electronic Transaction Act established by the Agency. The Act governs all transactions that are undertaken electronically and ensures its authenticity to protect both GRA and taxpayers with regards to online payments".*

The e-payment service makes payments of taxes convenient to taxpayers who are technology inclined by avoiding the physical visitation to a GRA office to pay taxes. The chat portal is intended to allow taxpayers to have live online conversations with GRA personnel to express their concerns on tax issues. It however came to light that the chat application is not effectively used. The project team manager explained that:

> *"We decided to include the chat application to establish personal relationships with taxpayers but we realized that we would need personnel who would be actively online 24/7 behind the system to chat with clients. This has been our challenge with the chat application. Currently, personnel responsible for the chat application can have live online chats with taxpayers only during working hours. They however respond to messages that come after working hours the next working day. We hope to improve on this".*

The appointments and scheduling portal enable taxpayers to secure appointments with GRA staff online. This usually has to do with visitation to organizations for inspection, business registrations, revenue collection, compliance, and debt management. Organizations sometimes re-schedule appointments with a designated team from GRA when the dates assigned for their visitation are inconvenient for them. With this application, the system allows users to log in with their credentials or create accounts to have access to the service. All these additional services support the core functions of GRA, especially that of the DTRD. Time-saving and fast services improve work efficiency and productivity and hence GRA has adopted technological innovations to improve its services and serve customers efficiently.

4.4.2 The Development of TRIPS

Due to the nature by which TRIPS was decided upon, a project team was set up to oversee the development of the system and most of the development issues and decisions were left to the discretion of the development team. The project team comprised of selected personnel from the former revenue agencies and personnel from GCNet, the sole developers of the GeGov project. The team members from the former revenue agencies were selected based on their experiences with the erstwhile systems used by the erstwhile revenue agencies. An interview with the project manager revealed the rationale behind the selection of the team members stating that;

> *"We selected personnel who were in charge of the systems used at the former revenue agencies in order not to build a completely different system to be used by almost the same people after the integration. It is easier for people to get attached to legacy systems and be reluctant to adopt new ones. We wanted to minimize the effects of different business cultures, change, and human elements on the use of TRIPS, hence the decision to involve people who could make known to the developers the issues arising from the use of the erstwhile systems to aid in the development of an improved and integrated system".*

The team was formed solely to develop, implement and deploy TRIPS and subsequently had meetings to discuss its progress. The project was funded by World Bank through the GeGov project. The development team evaluated the erstwhile systems and gathered requirements from stakeholders through formal and informal means. Interview sessions and corporate meetings were held to know how the erstwhile systems had worked for them and how they wanted TRIPS to support their business processes. The team also sought other information systems relevant to revenue mobilization and digitalized business processes that could serve as benchmarks. The requirements and feedback gathered by the development team from the interviews and meetings with stakeholders, observations of erstwhile systems used, and benchmark systems were then developed into a new system requirements specification document. TRIPSTM was developed by Crown Agents, a UK-based company, and this software was used as a yardstick for the development of TRIPS. Proposals were prepared by the project team which stated the specific problems that the TRIPS sought to address. The proposals also gave a brief overview of the estimated timelines and budget for the project. A comprehensive project management plan was also developed which detailed the project schedule, cost plan, quality management plan, communication plan, risk management plan, and change management plan. Procedures for how the project will be executed, monitored, controlled, and closed were also clearly defined for the team to stay focused throughout the project. The development of TRIPS was done in modules, in order of relevance and urgency to adequately address the issue of limited time which was a major concern for the management of GRA. The development team commenced this project in April 2012, with a full geographical rollout into offices in April 2014. Table 5 summarizes the sections of the implementation process.

Table 5: Implementation of TRIPS

Implementation Section	Required Resources
Infrastructure	-Appropriate location of Offices to accommodate system installation. -Networks for connectivity -Power stability -Help desk -IT infrastructure
Applications	-System testing -Configuration procedures -Deployment process -System Maintenance
Facilities	-Civil works e.g., server rooms -Logistics, procurement, and fleet management -Power support systems
Change Management	-Preparation for change -Re-enforcing change -Managing change
Tax Expert	-Evaluation of business and system requirement specifications -User Acceptance Testing

Source: Authors’ construction

5. Discussion of findings

This section discusses the findings obtained from the analysis of data.

5.1 Mapping of Information Technologies used at GRA

This section maps out all information technologies that were used by the former revenue agencies and the information technology that is currently in use after the integration of the agencies into one Authority. The section answers the first research question stated in chapter one of the study which seeks to investigate the information technology underpinning revenue mobilization at the Ghana Revenue Authority (GRA). Table 6 summarizes the various information technologies that have been used by GRA.

Table 6: Mapping of Technologies at GRA

Application	**Purpose**	**Date Introduced**	**Current State**	**Challenges in Implementation/Use**
GCMS	-Employed to centralize operations on importation and exportation.	2000	Replaced (Integrated with TRIPS)	-System did not support TIN operations which was a function of the CEPS unit.
TradeNet	-Used for electronic issuance and management of permits. -Used concurrently with GCMS. -Helped to curb fraudulent activities in permit acquisition.	2000	Replaced (Integrated with TRIPS)	-Limited functionality in the processing of documents. -Data inconsistency.
VIPS	-Adopted to support electronic records of VAT transactions.	2000	Not in use	-System did not fully complement the processing of all taxes. -Data inconsistency -Lack of quality and untimely submission of data.
GITMIS	-Used as an electronic payment and collection system.	2001	Not in use	-System was restricted only to the collection and payment of direct taxes. -Irregularities in taxation procedures.
LTIPS	-Used for the processing and assessing of direct and indirect taxes	2001	Not in use	-Limited tax coverage and functionality. -No integrated TIN [illegible]tion model.
TIN System	-Registration and issuance of TIN. -Used concurrently with LTIPS.	2002	Not in use	-Lack of automatic updates to the systems. -Data inconsistency.

TRIPS	-Integrated system to support all operations of GRA as a holistic body.	2010	Currently in use	-Cultural challenges. -Change management. -Computer illiteracy. -Legacy Systems.

5.2 Rationale for Digitalized Revenue Processes

As noted by Zhao et al. (2015), the acceptance of digitalization and the use of information systems go beyond its usefulness and technical quality to engulf complex issues such as the social and cultural composition of the organization in question, including national regulations on the management of information. The case described above indicates that the information technology that underpins revenue mobilization at the Ghana Revenue Authority is known as the Total Revenue Integrated Processing System (TRIPS). The prime rationale for adopting this system was due to the integration of the three former revenue agencies into one body which required the need for a holistic system to serve the purpose of integrating all business processes related to revenue mobilization. However, there are other benefits associated with adopting and using this technology both to the organization and to taxpayers. Each of these benefits is discussed in detail in the following sections.

5.2.1 Project Benefits to the Organization

This section discusses in detail the benefits GRA derives from the use of TRIPS in connection with its business processes and duties of revenue and tax administration.

Integration of Processes

Findings from this study suggest that the organization opted for the use of TRIPS due to its integrated modules and properties to resolve the poorly integrated systems that were formerly used. Similar to the work of Guido (2007) which emphasized the integration of processes as a benefit of IS, TRIPS integrates the processing of all taxes including direct and indirect taxes and provides common processes across the functional areas of the Divisions at GRA. The system incorporates all businesses processes associated with revenue mobilization and enhances the duties of specific units of the Divisions. The system has reduced the rate of inconsistencies in the information on tax filing and payments, tax audit, debt management, and enforcement. The data received from these units are consistent as compared to former systems which provided individual tax information and resulted in data inconsistencies. With the use of TRIPS, the organization is being assured of data integrity and confidence in reports generated by the system (Berman & Marshall, 2014). In addition, the integration of TRIPS with the GCMS used as an additional system by the Customs Division as a preventive measure allows all foreign-based taxpayer transactions to be accessed by Management for a complete report on revenue generated within a particular period. The integration of the system with government institutions responsible for validation checks on taxpayer registration enables Management to attain a complete view of persons behind companies and other related entities being registered. This to some extent prevents fraudulent activities that could be encountered during TIN registration and also eliminates the tendency of issuing multiple TINs to an individual taxpayer which could be attributed to a deficiency in the use of Information Systems (Steadman, 2013).

Increase in Revenue Collection

The use of TRIPS has reported enhanced revenue collection processes and resulted in an increase in revenue collected over a while. The amount of money collected through the system has continued to grow with peaks at the end of each quarter as income tax declarations and interim quarterly payments are made based on self-assessment declarations. The amount of revenue collected through the system increased considerably (Ghana Revenue Authority, 2022). The use of TRIPS also streamlines all revenue collection processes into a single process that is accessible to all officers responsible for the collection of any tax type. Leakages that occur due to untimely collection, under-collection, or fraudulent activities are reduced by the streamlining and digitization of the revenue process (Guido, 2007). TRIPS generates reports on daily cash received and due to payments to be collected and also applies penalties automatically to late payments of revenue collected into the designated GRA account. This compels all officers in charge to comply with the collection process. TRIPS allows for a controlled collection process (Carrera & Dunleavy, 2010) where revenue is tightly controlled to avoid evasion of taxes, fraud, and under-collection. TRIPS has improved the revenue collection process, introducing transparency, efficiency, and accountability with the use of the system (Guido, 2007).

Cost Effectiveness

Prior to the development of TRIPS, Management considered the cost involved in the patronage of a new system compared to the continuous use of the former systems for revenue mobilization. With the huge amount projected to cater for the development, implementation, and deployment of the system, and soliciting funds from the government and World Bank, Management decided to do away with the erstwhile systems and opt for a new and improved system based on the comparative analysis done on the cost-effectiveness that comes with the use of the new system. As intimated by Bayaga (2022), adopting a holistic system with integration with the interfaces of several other systems for information sharing and validation checks was deemed to be a cost-effective strategy. In addition, the cost involved in its maintenance would be relatively lower than maintaining two or more systems concurrently. The cost involved in using a system to manage all activities on revenue and tax administration drove Management to settle for TRIPS. Furthermore, the implementation of a mimicked system has been cited as involving a relatively low cost which informed the decision of the Authority to opt for TRIPS. Last but not least, measuring the amounts collected with the use of the system within a period makes it more appropriate to measure its cost-effectiveness (Ghana Revenue Authority, 2022).

Effective Communication and Information Sharing

TRIPS ensures effective communication among staff and taxpayers as well as effective information sharing, which is deemed a major benefit of IS (Carrera & Dunleavy, 2010). Information on registration, tax filing and payments, tax audit, and debt management and enforcement are made easily acquired through the system without necessarily being in a particular unit that deals with the information. This promotes transparency and data integrity and furt (Berman & Marshall, 2014). Through the chat service provided by TRIPS, the staff is given the avenue to have conversations with taxpayers concerning tax administration or any other related issues. The help desk also serves the purpose of addressing any issues or challenges taxpayers encounter with the use of the system. This medium promotes the use of the system by taxpayers and staff are also able to establish cordial relationships with their clients. These and many other benefits informed the decision of the Authority to adopt and use TRIPS to support its business operations and reportedly, the system has been very effective within the period of its deployment.

5.2.2 Project Benefits to Taxpayers

This section discusses in detail the benefits taxpayers derive from the use of TRIPS in connection with the fulfilment of their tax obligations.

Online Business Transactions

Developments in Information and Communication Technology are radically changing the way businesses are done as compared to previous times (Bayaga, 2022; Zhao et al., 2015). Previously, taxpayers could only visit tax offices for any business transaction concerning TIN registration, tax filing, or payments. However, digitization has emerged as a great phenomenon that is continuously having a transforming effect on society (Gomez-Reynoso & Sandoval-Almazan, 2013). The introduction of TRIPS has brought about easy ways of transacting businesses on the part of taxpayers.

The e-registration portal of TRIPS allows taxpayers to register for TINs online through the GRA e-services platform. The system has made available guidelines and steps to follow to complete registration. Taxpayers can also pay their taxes online with the help of the e-payment portal through GEPP with assured security and confidence in electronic documents and signatures. The e-filing portal also permits registered portal users to file their tax returns online. These e-services ensure convenience with business transactions concerning tax administration with the use of technology (Nkwe, 2012).

Effective Communication

Similarly, with the communication benefit for the organization, taxpayers are also availed of this benefit. The chat portal allows taxpayers to have online conversations with GRA personnel to express their concerns on tax issues. However, due to constraints on human resources, the chat application is currently not in use and this stalls the effectiveness of the portal. In addition, the appointments and scheduling portal enables taxpayers to secure appointments with GRA staff online. According to Deakin (2012), and effective communication medium derived from the use of an information system promotes its use. Taxpayers feel involved with the operations of the organization and this increases their urge to fulfil their tax obligations. The Authority also makes available on its website information regarding tax administration, news on the operations of the organization, and updates on relevant issues for viewing by customers. Effective communication is an important benefit of IS which cannot be overlooked (Carrera & Dunleavy, 2010).

Effective Customer Service

Customers are the priority of most businesses be it profit-making organizations or non-profit making organizations (Giebel, 2013). Effective customer service can be achieved with the effective use of services made available on TRIPS. User-friendly interfaces and guidelines on accessing the system promote user involvement (Bayaga, 2022; Zhao et al., 2015). Guidelines available on the TRIPS platform are undeniably very essential tools to enhance the interest of taxpayers to use the system. Notwithstanding, officers of the organization need to make use of other services on the system to attract and lure taxpayers to sign on to the portal in order to reduce issues of inconvenience and time wastage encountered by visiting GRA offices. This forms part of the reasons for using TRIPS.

6. Conclusions and recommendations

The study provided a thorough discussion of the Ghana Revenue Authority as the selected case for the study and discussed its structure and operations. The case institution was primarily chosen to investigate the information technology underpinning revenue mobilization. The study also discussed the rationale for adopting digitalized processes and further explained some benefits of digitalization to both GRA and taxpayers. Analysis of the findings brought to light the Total Revenue Integrated Processing System (TRIPS) as the technology adopted for use to support revenue mobilization processes at Ghana Revenue Authority. TRIPS was designed to support an integrated regime of revenue collection and management including all direct and indirect taxes. It is based on an Oracle database and is available on a variety of platforms. TRIPS was launched in April 2010 as a follow-up to the contract signed by GCNet as the selected partner. TRIPS is based on the concept of distributed data processing with standard multi-user facilities. It consists of a series of processing modules and reports programs to support the business needs of GRA, with a specialty in the DTRD. TRIPS was developed with thirteen modules to support functional business activities at GRA. Some of the organizational benefits derived from the use of the system include integration of business processes, increase in revenue collected, cost-effectiveness, and effective communication and information sharing. Other end-user benefits derived from the use of the system also include access to online business transactions, effective communication, and effective customer service.

6.1 Implication of the study

With regards to research, this study contributes to the body of knowledge on the emergence of the digital economy by exploring the use of e-revenue systems and procedures which had received little attention. This study brings to bear the need for IS researchers to extend their studies on the use of digitalization in revenue mobilization within Government institutions within developing economies. This study has highlighted the very ambitious efforts of a government in a developing economy that has developed various innovative digital solutions aimed at revenue mobilization. In terms of policy, the government should in the near future consider how to handle the legacy systems, change the management process as well as integrate business and organizational cultures to facilitate the use of digitalization in revenue mobilization. The study advocates for government to institute very effective policies and guidelines and ensure its compliance to achieve effective use of information technology.

Conflict of Interest Statement

The authors declare no conflicting interest in the conduct of the study.

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Chemical liquid waste management in Senior High Schools and educational research institutions in the Accra Metropolis

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Abstract:
Chemical liquid wastes are generated as a result of teaching and research activities in science educational and science research institutions. It is however not immediately clear how these chemical liquid wastes are treated by schools and educational research institutions before they are discharged into drains. The study explored to what extent, chemical liquid waste was managed in the senior high schools and some research institutions in the Accra Metropolis. Again, the study sought to establish the means of disposal of chemical liquid waste in educational and research institutions in the Metropolis, and also ascertained the policy guidelines of the GES and GAST on the management of chemical liquid wastes in senior high schools in the Metropolis. The study which involved thirteen (13) Senior High Schools and five (5) educational research institutions employed a descriptive research design with questionnaires as instrument for data collection. The study revealed that chemical liquid waste was not properly managed from the institutions and recommends development of Educational Chemical Waste Management Guidelines by the GES and GAST and the monitoring of liquid chemical wastes generated by universities and research institutions by EPA.

Keywords:
Chemical Wastes; Educational Institutions; Environmental Protection Agency (EPA); Ghana Association of Science Teachers (GAST); Ghana Education Service (GES); Research Institutions.

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1. Introduction

Science and technology are the backbone for the development of a country. Consequently, Ghana places a lot of emphasis on the study of science with Chemistry as one of its components. The teaching of chemistry includes theory and demonstration classes. In the demonstration classes which are carried out in the laboratory, chemical liquid wastes are generated and are discharged into sinks. These wastes are washed away into gutters and eventually enter streams affecting water quality. Key contaminants that could result from the educational institutions and research institutions are chlorides, phosphates and sulphates of copper because of their extensive use in chemical analysis. Some people use water from these water bodies especially in urban areas for irrigation of vegetable and fruits and other food crops, producing chemically contaminated food which could create all sorts of diseases including some cancers (Bahri, 2009; Keraita et al., 2002; Keraita, 2003; Mosley et al., 2004). Chemical liquid wastes discharge from educational and research institutions in the Accra Metropolis could therefore be a source of water pollution. It is however not immediately clear how these institutions manage their chemical liquid wastes before discharging them into the drains. The study therefore aimed at finding out how schools, colleges, universities, and other research institutions manage chemical liquid wastes generated during the course of their laboratory activities.

The study specifically was set: to explore to what extent, chemical liquid waste was managed in the senior high schools, universities and some research institutions in the Accra Metropolis, to establish the means of disposal of chemical liquid waste in some educational and research institutions in the Accra Metropolis, to ascertain the Ghana Education Service (GES) and Ghana Association of Science Teachers (GAST) Policy guidelines on the management of chemical liquid waste in senior high schools in the Accra Metropolis and ascertain the EPA Environmental Quality Policy Guidelines on effluent discharge for educational and research institutions.

2. Review of related literature

High chloride concentration in water and wastewater can inhibit the growth of plants, bacteria and fish in surface waters; high levels can lead to breakdowns in cell structure (APHA, 1992; Bosnic et al., 2000). High chloride content may indicate pollution by sewage or industrial wastes. A high chloride content has a corrosive effect on metal pipes and structures which makes it harmful to most trees and plants (UNEP/WHO, 1996). Chlorides are relatively harmless to organism except when converted to Cl2 and ClO3- which are toxic (Ampofo-Nuako, 2012). In Ghana, Ampofo-Nuako, (2012) reported that the levels of chloride in all the effluents were greater than the EPA, Ghana maximum permissible level which is 250.00 mg/l in senior high schools in the Kumasi metropolis. Ampofo-Nuako et al (2012), however did not establish how the schools managed their chemical liquid wastes before discharging into the environment.

Phosphorus present in domestic wastewater is an important macro-nutrient for plant and microorganisms' growth. The discharge of large quantities of this nutrient, into natural receiving sources, raises the growth of algae and results in eutrophication of lakes and streams (Mervat and Logan, 1996) as cited by Ampofo-Nuako et al, (2012). Ampofo-Nuako et al, (2012), observed that in Kumasi Metropolis, all schools exceeded the EPA permissible level of phosphate discharge into river bodies, which is 2.00 mg/l. The knowledge of the management of these chemical liquid wastes by the schools and educational research institutions will go a long way in recommending effective methods of managing chemical liquid wastes to keep the chloride and phosphorus levels within permissible levels

Usually, water-soluble copper compounds occur in the environment after release through application in agriculture (ATSDR, 1990). In surface water copper can travel great distances, either suspended on sludge particles or as free ions (Skipton et al., 2008). High levels of copper can be harmful. Very-high doses of copper can cause damage to the liver and kidneys, and can even cause death (Wong, 1988; ATSDR, 2004,). Its release into water bodies has been found to have a high chronic toxic effect on aquatic life even as low as a level of 0.3 mg/L total copper (Bosnic et al., 2000). The level of copper in some schools in the Kumasi Metropolis were observed to be above the EPA Ghana permissible limit of 5 mg/l for copper (Ampofo-Nuako et al, 2012). This level recorded by Ampofo-Nuako et al (2012), may be due to the fact that copper sulphate is used a lot in chemistry demonstration lessons in the schools and therefore if the chemical liquid wastes are not treated before discharging into streams, can be a source of pollution to affect aquatic life.

3. Methodology

Descriptive design was used in this research work as it relies on observation by the means of collecting data. Questionnaires were used to collect data for this research. Thirteen senior high schools were purposively selected for this research. The schools selected all offered the general science program with the option of teaching chemistry and the presence of science laboratories. The chemistry department of the public university and the science laboratory technology department of the polytechnic were also selected since they offered courses which demanded the demonstration classes and the subsequent generation of chemical liquid waste in their laboratories. Two educational research institutions which carry out research work using a lot of chemicals in their laboratories were also selected for this work. The government agency responsible for environmental protection but also having a laboratory for environmental quality was also selected for this work.

3.1 Instrument, Data collection and analysis technique

The questionnaire was used as an instrument for data collection. The questionnaires were structured into three (3) sections. The first section covered the demography of the school or the institution. The second section was on the chemicals frequently used in chemistry laboratories for practical classes and the third section covered the treatment and disposal of chemical liquid waste in the various chemistry laboratories in the senior high schools and educational research institutions.

The questionnaire was administered in each senior high school and the educational research institutions. The questionnaire was pretested in two (2) senior high schools and was modified to suit the objectives of this research. The Chemistry teachers in the senior high schools whilst the heads of Chemistry Departments formed the respondents in the research institutions.

The data collected were analysed using SPSS and statistical descriptive were used in expressing the results.

4. Data analysis

The analysis of the data collected from the field is presented in this section. The analysis is followed by a discussion which is presented in relation to literature.

4.1 Management of chemical liquid waste in schools, universities and some research institutions in the Accra Metropolis

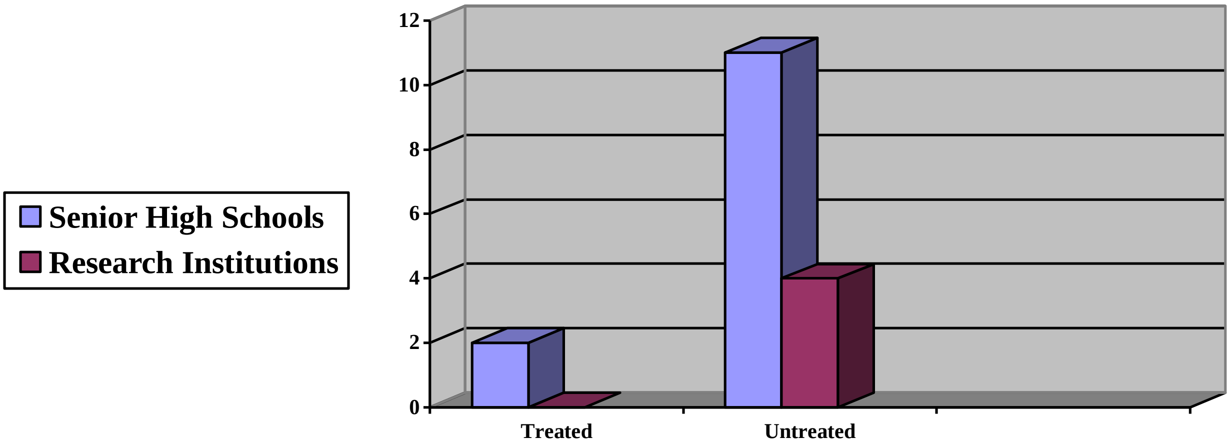

Figure 1: Treatment of chemical waste in senior high schools and educational research institutions

Concerning management of chemical liquid wastes, figure 1 indicates that in some senior high schools in the Metropolis, majority of respondents (84.62%) indicated that chemical liquid wastes from their laboratories was not treated before discharged into the sinks in the laboratories. Fifteen percent (15.38%), however responded that chemical liquid wastes from their laboratories were treated before disposal. The latter response may probably have come from some of the well-endowed schools with well-trained Laboratory Assistants and environmentally conscious Headmasters or Headmistresses. In the educational research institutions, all four (4) institutions reported the absence of facilities for the treatment of chemical liquid waste. These responses seemed to suggest that liquid chemical wastes were not treated by the schools and educational institutions before they were discharged into the environment. This may be due to the fact that, most laboratories were built without treatment facilities and these institutions might have taken for granted the impact of these chemical liquid wastes on water quality due to the amount discharged into the environment. This however could be problematic bearing in mind that small amounts of these chemicals in the liquid waste could affect water quality.

4.2 Methods of disposal of chemical liquid waste

Table 1: Where chemical waste finally ends from the laboratories of senior high schools and educational research institutions

Location	Frequency (SHS)	Percentage	Frequency (Research Institutions)	Percentage
Open drain	10	76.93	3	75
Septic tank	1	7.69	1	25
No idea	2	15.38	-	-

Concerning disposal of chemical liquid waste in senior high schools and educational research institutions, most of the respondents (76.93%) in senior high schools indicated that chemical waste from practical activities is disposed of in open drains, a few (7.69%), however indicated that the sinks in their schools were connected to sceptic tanks where these chemical liquid wastes finally end. The effects of these chemicals on the chemical reactions in the sceptic tank was beyond the scope of this paper and thus no attempt was made to that effect. The rest 15.38% of respondents however had no idea where the chemical liquid waste generated leads to after their demonstration classes. In the educational research institutions, 75% of respondents as in the senior high schools indicated the chemical liquid waste generated ended in the open drains after their demonstration classes whereas 25% of respondents indicated the chemical liquid waste ended up in septic tanks.

The disposal of untreated chemical liquid waste into the environment, results in bioaccumulation and biomagnification of some persistent organic compounds in the tissues of some organism. These persistent organic compounds could consequently be found throughout the food chain in the ecosystem. The presence of chlorides in the chemical liquid wastes could inhibit the growth of plants, bacteria and fishes in the surface waters (APHA, 1992, Bosnic et al, 2000). The presence of high nitrates in the chemical liquid wastes disposed into the environment untreated could result into eutrophication when phosphates are also present. The high nitrates in drinking water are of immense health risk to babies leading to methemoglobinemia and also interrupt with the normal body processes in some infants. (UNEP/WHO, 1996).

The high percentage of open drain disposal of chemical liquid waste in the senior high schools and educational research institutions could partly be attributed to the poor design of most educational laboratories in the country before the promulgation of the Environmental Assessment Regulation (LI 1652, 1999) which enjoins all undertakings to be environmentally permitted. The Environmental Assessment Regulations (LI 1652, 1999) as amended (2002) requires that all activities likely to have an adverse effect on the environment must be subjected to environmental assessment and issuance of a permit before commencement of the activity. Even though the LI make provisions for undertakings that existed before the enactment of this law to be permitted ex post facto, the authors are not sure whether this was done by the authorities.

4.3 Awareness of Policy Guidelines on Chemical waste management for educational and research institutions

Table 2: Knowledge of GES/GAST policy guideline on treatment and disposal of chemical waste

Option	Frequency (SHS)	Percentage	Frequency (Research Institutions)	Percentage
Yes	4	30.77	2	40
No	5	38.46	2	40
No idea	4	30.77	1	20

Schools operate under the Ghana Education Service (GES) whiles educational research institutions operate under the Ministry of Education. The science teachers teaching in the senior high schools belong to a professional Association, Ghana Association of Science Teachers. As part of this study, the researcher sought to find out the existence of policy guidelines regulating the management of chemical liquid wastes and the means of its disposal for senior high schools and educational research institutions from the GES, GAST, MoE and EPA and the awareness of its existence by the respondents. It was established that apart from the EPA, the MoE, GES and GAST did not have any policy to that effect.

5. Summary of findings

The study established that chemical liquid waste from the laboratories of senior high schools and educational research institutions undergo little treatment or none at all before they are discharged into the environment. Again, the GES and GAST do not seem to have any policy guidelines on the management of chemical liquid wastes for educational institutions. The schools themselves do not have any except some guidelines on handling of chemicals and safety precautions on the preparation of some gases like chlorine.

The EPA has guidelines for the management of health care and veterinary waste which are deemed to be using almost similar chemicals as used in the senior high schools and educational research institutions. The Environmental Quality laboratory of EPA also has guidelines for effluent discharge for industries that make use of chemicals that can pose danger to public health. But there is no policy guideline on the effluent discharge from senior high schools and educational research institutions that use chemicals of the same composition and characteristics.

6. Recommendations

Chemicals are generally poisonous to life depending on the quantity taken into the body over a period of time. It is very important and as a matter of urgency that the treatment and disposal methods of chemical liquid wastes be taken seriously through the country.

Based on the findings of this research, the following recommendations are made:

- The EPA must develop environmental quality standards guidelines of effluent (Chemical Liquid Waste) discharge for educational and research institutions in the country.
- The MoE, GES and GAST using the EPA Ghana standards develop safety guidelines for the treatment and disposal of chemicals and chemical liquid waste from the laboratories of research institutions and senior high schools.
- The proper management of chemical liquid waste must be included in any training programme of science teachers and researcher scientist in chemistry.
- The Ghana Education Service and Ghana Association of Science Teachers should organize periodic training workshops for chemistry teachers, laboratory assistants and laboratory technologists on the best practices of treatment and disposal of chemicals and chemical liquid waste.

Conflict of Interest Statement

The authors declare no conflict of interest in the conduct of this study.

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A framework for the adoption of Geographic Information Systems (GIS) in service delivery: A case of Harare city council, Zimbabwe

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Abstract:
Geographic Information System (GIS) can be used to enhance service delivery in local authorities through exploiting geographical features on the earth's surface to efficiently and effectively manage, plan and maintain infrastructure. The proliferation and implementation of GIS has rapidly advanced in developed countries where as in developing countries, the utilisation of spatial technologies has proceeded at a slow pace. The goal of this research was to develop an adoption framework for GIS that can be employed by developing countries culminating in the delivery of quality service to ratepayers. The triangulation research design, which is the use of more than one approach for the investigation of the research questions, was used in this research. Data was analysed using content analysis that identified the emerging themes as well as SPSS for the quantitative data component. The study revealed that there is a link between GIS utilisation and service delivery. A proposed GIS adoption framework that was informed by research findings and literature review/documentary analysis of archival records was then developed. The proposed adoption framework has five important components that need to be addressed for the successful adoption of GIS in local authorities in developing countries. Recommendations on how local authorities in developing countries can successfully adopt/ implement GIS technology were made. Chief among the recommendations is for the local authorities to adopt e-governance, which has become a prominent and critical success factor as well as an important global element in the ease of doing business.

Keywords: GIS; Adoption Framework; Spatial Data; Local authorities.

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1. Introduction

The research is aimed at developing a framework to assist in the adoption of Geographic Information System (GIS) to enhance service delivery for Local Authorities in Developing Countries. According to Dempsey, a Geographic Information System (GIS) is a computer system, or a technological field of geographical science that incorporates geographical features with data. These geographical features are used in order to map, analyse, and assess real-world problems. Dempsey (2018) also states that the key word in GIS is geography, meaning that some portion of the data contain spatial information referenced to some place on the Earth.

It is indeed without doubt that GIS is quite a significant tool that has the potential to assist in managing the planning and maintenance of infrastructure within municipalities or local authorities. How GIS is applied to examine the equity in distribution of public services to various segments of the community is also important in the context of this study. Furthermore, the development and adoption of GIS by different government, parastatals and private organisations worldwide, shows enormous progress in the last two decades (Cavric, 2002). However, most of these positive trends in the GIS global arena has rapidly advanced only in developed countries.

It is so disheartening that in many African countries GIS adoption, diffusion and utilisation of spatial technologies has proceeded at relatively lower rate. Little attention has been given to improve current situation along the line of flexible approaches and efficient organisational frameworks. Numerous factors such as financial, political, technical, technological, educational, organisational, and human behavioural obstacles have restricted the implementation of GIS (Cavric, 2002).

1.1 Problem Formulation

There seems to be no well-defined GIS adoption framework that can be used by institutions in developing countries that can utilise this technology to enhance service delivery. Researchers have used many conceptual frameworks to explain the process of GIS adoption and implementation in various organisational settings. These frameworks differ to a greater or lesser extent in their terminology and approach (Noongo, 2007). GIS has the potential to transform and assist the city in its planning endeavours as well as a municipal decision-making tool that can enhance service delivery to its clients and stakeholders.

Thus, it is against this background that the researcher seeks to establish whether there exists a link between effective utilisation of GIS and service delivery and examine the factors that influence GIS adoption. The research will also interrogate available GIS adoption frameworks leading to the development of a proposed GIS adoption that will be suitable for local authorities in developing countries.

2. Related work

A review of literature suggests that while there have been a number of systematic studies of GIS diffusion in developed countries (Onsrud & Pinto 1991, Masser & Onsrud 1993, Campbell & Masser 1995, Chan & Williamson 1996 & 1999) as cited by Noongo (2007), there has not been enough work in developing countries in the relative sense. Where such studies have occurred, focus has mainly been on critical organisational problems that inhibit successful application of GIS in developing countries (Nkwambe, 1991; Ramasubramanian, 1991; Sahay & Walsham, 1996) as cited in Noongo (2007).

2.1 Link between GIS Utilisation and Service Delivery

GIS is being used to provide solutions in numerous branches of government service as well as in businesses and industry to enhance service delivery. Geo-information technology is being used in surveying, engineering, planning and logistics for the collection, processing, management and presentation of spatial information. The main reason organisations are investing in GIS is their potential to increase efficiency. These systems can be used to help develop and deliver new types of services such as better transportation and service information for citizens.

According to a white paper by ESRI, Local Governments, whether large or small, have departments that perform hundreds of business functions in providing services to the community. Most of these business functions have location as an aspect of their operation. The effectiveness and efficiency in the delivery of information and services can be improved by taking advantage of GIS (ESRI, 2007).

The digitalisation of maps and other forms of spatial information opens up new possibilities for GIS to be used to visualise geographic knowledge and to transform geographic information. They provide users with a range of analytical tools that are only provided by GIS to explore spatial relationships in data, including data collection, data modelling, data manipulation, data analysis and data storage. This combination of both basic and advanced spatial data analysis functions is not found in generic information systems. The functionality offered by GIS is often required to understand and to manage activities and resources for highly specific purposes.

2.2 The applications of GIS

According to GISCENTER as cited in Azaz (2011), GISs have been used for several years in the natural resources, forestry, and environmental industries, only recently have they begun to be used for a broader array of business and management functions such as logistics, site and facilities management, marketing, decision making, and planning. GIS can help a retail business locate the best site for its next store. It helps marketers find new prospects. It allows you to view understand, question, interpret, and visualize your data in ways simply not possible in the rows and columns of a spreadsheet (Azaz, 2011).

GIS technology may be seen as a means to automate spatial operations or as a tool for obtaining better information about business operations. For example, the Harare Water Department will use GIS to support routine maintenance of water and sewer pipe networks. Thus, the ability by the Engineers to expeditiously locate a burst pipe or a hydrant is critical to their ability to continue to provide a satisfactory service to the clients. GIS based technology can be used to automate the search procedure for pipe or hydrant location, thereby making operations more efficient.

2.3 Factors that influence GIS adoption

Accurate and timely spatial and socioeconomic data are difficult to obtain and, as a result, require a significant financial investment by any organisation seeking to use GIS. Furthermore, in most cases an investment in GIS hardware, software, and data will not lead to tangible benefits until long after the initial investment is made (Deichmann, 1996) as cited in Mennecke (2001)).

Another resource constraint that developing countries face is that of the availability of trained personnel. Training is not only expensive and time consuming, but it also can lead to retention problems.

Organisational politics have been observed to have a significant impact on the implementation of GIS in public sector organisations in the United States (Pinto, 1996) as cited in Mennecke (2001)) and it is to be expected that this influence is not unique to developed countries only.

3. Theoretical Frameworks

The research will be founded on the theoretical underpinnings of the Technology-Organisation-Environment framework or model (TOE) theory. The theoretical framework will form the basis or reference point upon which the GIS adoption or implementation framework will be developed.

3.1 Technology- Organisation-Environment (TOE) Framework

Technology-Organisation-Environment framework or model (TOE) depicted in Figure 1, is an Information System theoretical framework proposed by DePietro (1990) to analyse adoption of technological innovations by firms and organisations. According to DePietro (1990), the TOE framework states that: adoption of information technology by organisations is influenced by three different contextual groups namely; technological, organisational, and environmental contexts.

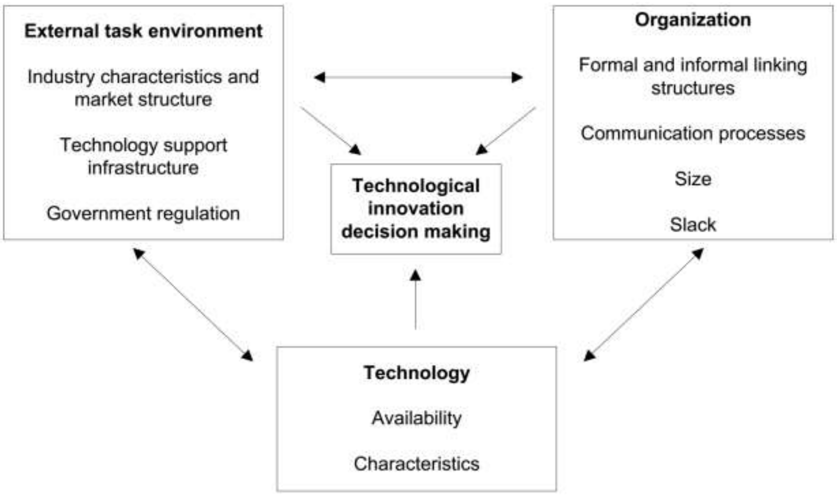

Figure 1: Diagram or Schematic of TOE Theory

Source: DePietro et al. (1990)

TOE emphasizes the context of an innovation. Technological Context is defined as both the existing technologies in use and new technologies relevant to an organisation. Organisational Context could be described as descriptive measures about the organisation such as scope, size and the number of slack resources available internally. Environmental Context refers to the arena in which an organisation conducts its business - its industry, competitors and dealings with government (DePietro, 1990).

4. Research Methodology

A combination of qualitative and quantitative research design was used. The quantitative method was employed in the study so as to quantify respondent's answers in defined variables to draw statistical conclusion and comparisons. The research process is depicted in Figure 2. The researcher used an interview guide, observations, questionnaire and archival records (documentary review) as research instruments for collecting qualitative and quantitative data.

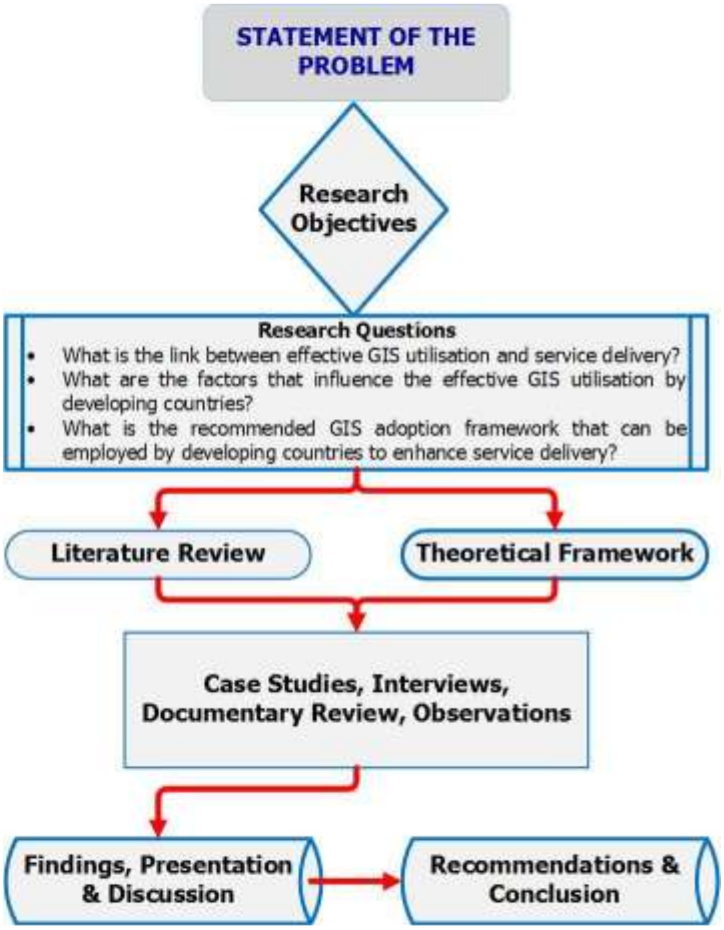

Figure 2: Research Process

Source: Kwaramba (2012)

The research population was derived from Land Information Officers, Cartographers, ICT personnel, Town planners, Surveyors, Environmentalists and relevant university students.

5. Research Findings and Results

5.1 What is the link between effective GIS utilisation and service delivery?

It emerged from both the findings and results that indeed there is a link between effective GIS utilisation and service delivery. Respondents indicated that GIS can improve the efficiency and effectiveness in service delivery for Local Authorities. This view is also supported by literature review. According to (ESRI, 2007), the effectiveness and efficiency in the delivery of information and services can be improved by taking advantage of GIS since most of these business functions have location as an aspect of their operation.

The research results and findings are consistent with the findings by (Azaz, 2011), who established that with geo-data on a map, you can ask more questions. You can ask where, why, and how, all with the location information on hand. You can then make better and informed decisions to improve service delivery with the knowledge that geography and spatial analysis presents.

5.2 What are the factors that influence effective GIS utilisation by developing countries?

It emerged from the key informant interviews, documentary review and semi-structured questionnaires that successful GIS adoption can be influenced by a number of factors that include staff compliment and training, availability of resources, top management support, planning and communication among many other factors. These findings are discussed in detail below:

5.2.1 Staff Compliment and Training

The research results and findings established that most Local Authorities do not have the required qualified personnel to help in the adoption and implementation of the GIS system. The Local Authorities should make deliberate efforts to train their staff, sending them to national, regional and international seminar/workshops or conventions where they are equipped and exposed to relevant and modern skills. Another suggestion was made for Local Authorities to collaborate with First World Cities through twinning arrangements and they could establish or initiate exchange programs for knowledge sharing and transfer.

5.2.2 Availability of Financial Resources

The research also established that there should be allocation of financial resources and other logistical support for GIS adoption to be operational. A suggestion was made from the findings that local authorities should include major Information Systems like GIS in their long-term financial planning through allocation or provision of a reasonable budget.

The research findings are consistent with a study conducted by Aminuzzaman (2010) in Bangladesh that revealed that some of the critical institutional challenges facing service delivery at the level of Local Authorities include limited work force and financial resources. He further elaborated that considering the workload and responsibilities, local authorities are understaffed. GIS undoubtedly consists of proponents that leads to improved geographic distribution of services as well as efficiency and effectiveness in service delivery.

However, evidence from various countries has revealed that GIS adoption or implementation without supporting resources from the government as well as local sources of revenue will not improve services delivery. City of Harare should be commended for making deliberate efforts in allocating resources towards the adoption and implementation of GIS, this is attributed to a $500 000 GIS strategy project as reported in The Herald dated 11 November 2016.

5.2.3 Top Management Support

In the research findings, the respondents argued that GIS adoption and implementation involves substantial investment in hardware and software infrastructure thus, there is need to have a strong buy-in or support from the top management so that financial resources and other resources can be channelled towards this worthy cause.

5.2.4 Planning

The research findings revealed that Information Systems like GIS technology requires Local Authorities to capture them in their strategic planning documents and the source of funding should also be identified followed by a work or project plan.

There is evidence from literature by Aminuzzaman (2010) who found out that there is a problem of lack of planning and coordination between local authorities and extension service delivery workers of the government at the field level. This was established to be the same case with City of Harare vision drivers, employees and the relevant stakeholders.

It was noted that there are no formal links between stakeholders. Such isolation makes lots of the services of local authorities dysfunctional and ineffective. Poor planning of processes therefore brings a lot of confusion in day-to-day operations especially pertaining to roles and responsibilities of various stakeholders in the GIS adoption process.

5.3 Utilisation of GIS Technology by Zimbabwean Local Authorities

Figure 3 shows responses given by the respondents on the current utilisation of the GIS technology by Zimbabwean local authorities. The majority of respondents suggested that the technology is not being fully utilised with also a considerable number of respondents accepting that they did not know anything on the utilisation of this technology.

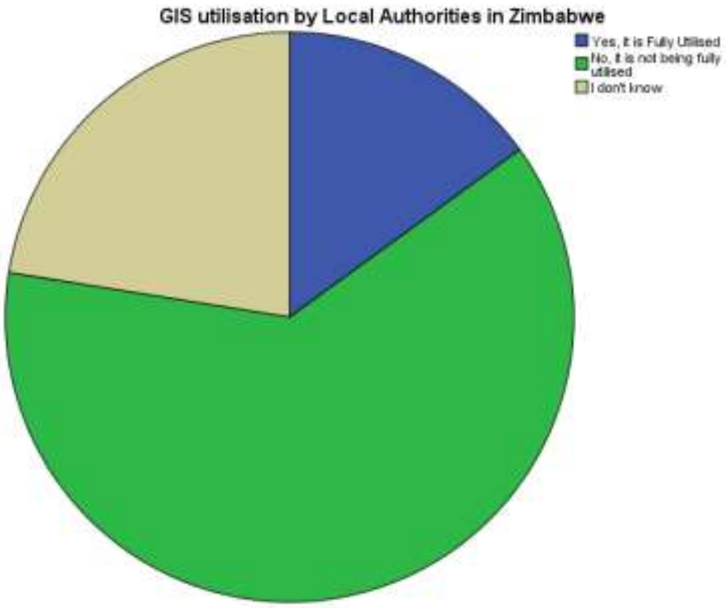

Figure 3: GIS Utilisation of GIS by Zimbabwe Local Authorities

5.4 Link between Service Delivery and GIS Technology

As show in the bar chart below, 71.8% of the respondents suggested that there is a link between GIS technology and service delivery.

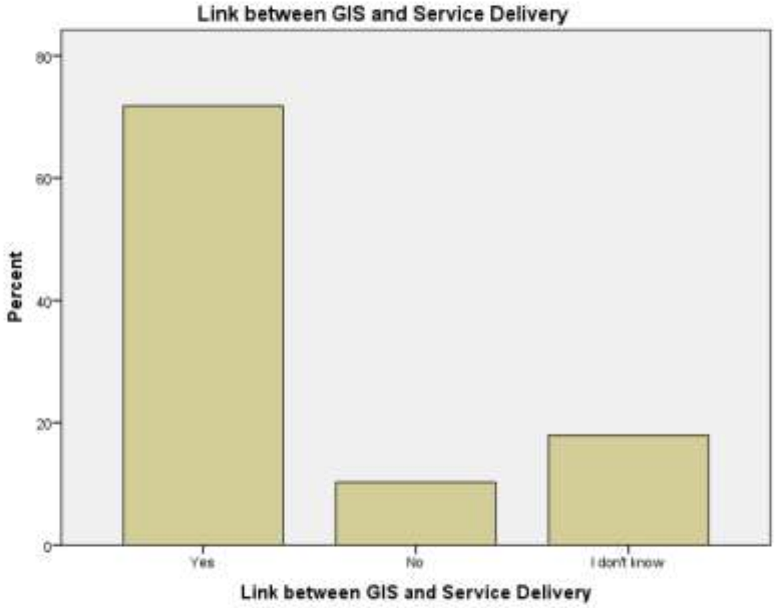

Figure 4: Link between GIS and Service Delivery

6. Proposed GIS Adoption Framework

The proposed GIS adoption framework is depicted in Figure 5. Development of the proposed GIS adoption framework was influenced by research findings and results as well as literature review on the TOE theoretical framework and the existing GIS adoption frameworks. The researcher believes that for successful adoption or implementation of the GIS technology, there are five components that should be satisfied, namely:

6.1 Organisational Setting

This component is the cornerstone in the GIS adoption or implementation matrix. It consists of the organisation's vision, mission and values. The organisation should make deliberate efforts to align its vision and or objectives with its Information System (IS) strategy. The alignment process will set the tone for allocation of IS budgeting and top leadership support in the adoption and subsequent implementation of the GIS technology and other ISs that could improve productivity, competitiveness and the generally accepted service delivery standard in Local Authorities. Recruitment and training of staff to equip them with relevant skills and knowledge is also of significant importance.

6.2 Stakeholder Engagement or Participation

Stakeholders are important in any organisational setup. Their engagement, involvement and participation in the operations of the organisation is key. This component consists of consultations with key stakeholders, twinning arrangements and exchange programs that can foster knowledge transfer.

6.3 Enabling Infrastructure

This component consists of setting up of networks for connectivity and internet services, hardware that may include servers, desktop computer and GIS related infrastructure. The software is also equally important and it needs to be procured e.g., ArcGIS for drawing maps by Cartographers.

6.4 Government Support

The research findings and results were very clear on the involvement of government in GIS technology adoption and implantation. The government should create an enabling environment for Local Authorities to execute their mandate as spelled out in the Urban and Rural Councils Acts. There is need for the State to formulate IS policies that could be used by Local Authorities to attract foreign direct investments or Private Public Partnerships (PPPs). Over and above the highlighted roles government should play, the State should also provide municipal grants to Local Authorities for the procurement or setting up of GIS related or enabling infrastructure.

6.5 Conducive Environment

According to DePietro (1990), the environmental context includes structure of the industry, competitors, and government's regulations and policies. DePietro further highlighted that the relationship between organisations and trading partners, competitors, government, pressure from trading partners, and industrial community may affect adoption decisions.

7. Conclusion

7.1 Framework of Operation

All the identified five competing and equally important components highlighted above, feeds into the government Framework of Operation (FoP). The FoP defines the role of GIS in the organisation its kind and level. Thus, these elements combined, will help the Local Government to make an informed decision that will lead to the generation of a technologically inspired innovation. The Technological Innovation will then lead to GIS Design or GIS Application Design and the design could be that of an Urban Planning GIS, Surveying GIS to mention but just a few. The framework of operation is presented in Figure 5.

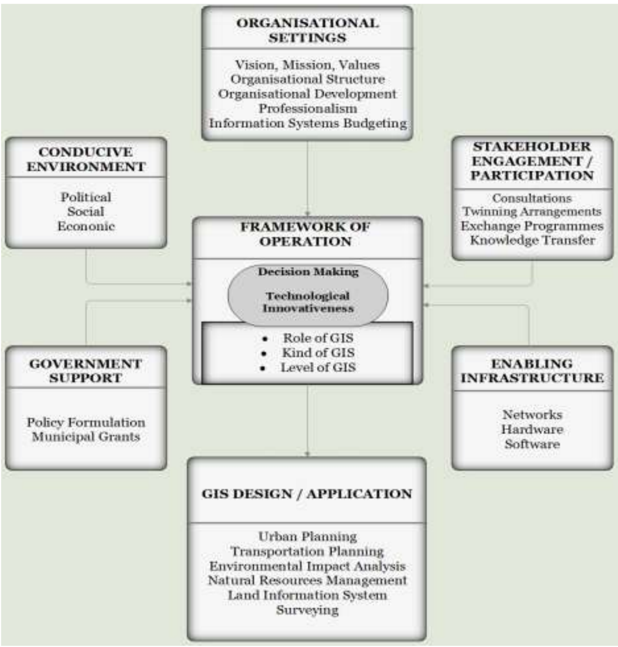

Figure 5: Proposed GIS Adoption Framework

7.2 Implications of the study

The research study contributed to the development of a GIS adoption framework that can be used by local authorities in developing countries to enhance service delivery. The study established that there was indeed a link between GIS technology and service delivery even though a number of factors determined its successful adoption. The study established that the success of GIS adoption or implementation is heavily dependent on top management support and availability of key resources like skills and finances within the local authorities.

Conflict of Interest Statement

The authors declare no conflict of interest in the conduct of this study.

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The effect of service guarantee on customer satisfaction: Evidence from elected companies in the Ghanaian courier industry

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Abstract:
This research examined how courier companies in Ghana use service assurances in their operations while serving consumers. It investigated how service reliability, responsiveness, certainty, and empathy impact customer satisfaction. In this study, a quantitative research technique was applied. Questionnaires were given to 120 customers from 10 Ghanaian local courier businesses to get first-hand information on internal procedures and consumer impressions of service guarantee. Correlation and regression analyses were used to investigate the impact of a variety of service quality parameters on customer satisfaction. All the traits, including reliability, responsiveness, certainty, and empathy, were found to be positively associated to customer satisfaction. Again, the study found that courier companies in Ghana lack a systematic way to track the efficiency of their service guarantee initiatives, relying instead on user feedback. Furthermore, these Ghanaian courier firms concentrated on breakdowns while ignoring time and human mistakes, which account for most reported failures. Customers' reluctance to complaining says companies should take the initiative and respond to complaints swiftly. To improve their service, guarantee efforts, and ensure customer satisfaction after a service failure, couriers should create an automatic invocation guarantee policy and ensure that they monitor and respond to customer complaints.

Keywords:
Service guarantee; Customer satisfaction; Service quality; Courier services.

Reference to this paper should be made as follows: Armah, I., Ansong, E., & Lartey, E.N. (2023). The effect of service guarantee on customer satisfaction: Evidence from selected companies in the Ghanaian courier industry. Wisconsin Journal of Arts and Sciences, 5(1). 53–76.

1. Introduction

Every firm or business aims to continue to be useful and successful in the fast-growing global market. In terms of generating profitable growth and standing out in the competition, firms must begin by strategically competing through service and new solutions for business clients. Quality service cuts across various industries and businesses, and this area cannot be highlighted enough without emphasizing the services the courier industry provides. Businesses engaging in this industry are meant to provide guaranteed speed, safety, and service, which are one of the core reasons they stand out of traditional postal companies (Hasni, 2015).

The growth of global ecosystems has necessitated the use of courier services and Ghana`s courier service is no different. Connectivity, speed to market, and simple digital product offerings are at the forefront of what enterprises across the supply chain are focusing on in terms of business strategy, thanks to increased mobile activity (Sullivan, 2021). Global competition is so ubiquitous – this is because firms are increasingly focusing on improving their marketing strategies to survive and remain competitive (Katsikeas et al. 2019). This is proven by the increasing number of courier organizations or enterprises in Ghana's courier services industry, as well as the popularity of online shopping (Alimo & Zhao, 2018). Some courier companies have realized the need to look for new strategies for gaining and maintaining a competitive edge over their competitors by using unique service features to provide superior value for the customers (Ilovi, 2008).

Considering the current global pandemic which calls for social distancing, the services of the courier industry have become very critical. This is evidenced in the Philippines where the demand for the services of the top five courier services peaked in the heat of the Covid- 19 pandemic (Dones & Young, 2020). As a reason, the courier industry has subsequently received considerable attention. Maintaining overall service quality in courier services might help establish a competitive edge. As a result, courier service is a key element that may influence customer happiness as well as the company's profitability. (Libo-on, 2021).

The literature on the subject reviewed showed a dominance of studies within the hospitality industry (Atsutsey & Tandoh-Offin, 2013; Chang & Cheng, 2021); the banking industry (Ahmed et al., 2020; Lubis et al., 2021). Arguably, several studies centered on the courier industry (e.g., Pei et al., 2021; Rajendran, 2020; Zhang et al., 2021). Rajendran (2020), for example, explored online evaluations submitted for package and delivery service firms on social networking sites and discovered that shipment mishandling, products being delivered late or lost in the system, unhelpful online customer support among others to be the primary causes for customer dissatisfaction.

These studies on the courier industry however, also focused on the United States (Rajendran, 2020), and Asia (Dones & Young, 2020; Pei et al., 2021; Zhang et al., 2021) with a handful arguably on Ghana (Ofori-Atta, 2015; Sarfo, 2018). The research in Ghana, on the other hand, focused on the approaches that courier firms have in position as service guarantee procedures when there is a service failure from the perspective of the managers or business owners. This leaves a gap for further research on the topic in Ghana where the focus will be on the frontline staff of the courier firms instead of only the managers, as the front-line employees are particularly important to the service experience of customers (Solomon et al., 1985).

Furthermore, few service businesses, according to Crisafulli and Singh (2016), have given much thought to service guarantee. The service guarantee as a recovery approach has a lot of advantages. In the Ghanaian courier business, however, there are presumably fewer studies that have investigated the impact of service guarantees on customer satisfaction. Despite the efforts of several academics to explore the topic of service assurances, the problem remains unsolved (McCollough, 2010; Meyer et al., 2014). This study is conducted based on the realization that research focusing on service guarantee as well as the impact it has on consumer satisfaction in the courier sector in African countries especially Ghana is limited. The goal of this study is to fill a current gap in information as well as add to knowledge.

The primary aim of this study is to investigate the effect of service guarantees on customer satisfaction within the Ghanaian courier industry. The specific objectives of the study are:

1. To identify the extent to which service reliability affects customer satisfaction in the Ghanaian courier industry.
2. To assess the effect of responsiveness on customer satisfaction in the Ghanaian courier industry.
3. To find out how assurance in service provision affects customer satisfaction in the Ghanaian courier service sector.
4. To identify the role of empathy on customer satisfaction.

The study focuses on the courier firms who operate predominantly within the capital city of Ghana.

2. Literature review

This chapter examines previous research work and information relating to the research questions of the study which are to examine the effect of implementing service guarantees for improved customer satisfaction in the Ghanaian courier industry.

2.1 Overview of the courier industry in Ghana

In 2006, the Ghanaian government established the Postal and Courier Services Regulatory Commission (PCSRC) (2019) to oversee the industry. Since then, the commission has been instrumental in bringing the sector to its current level. This is evident in the industry's current growth. Certainly, the increase in the number of players in the business from a few to over 1000, as well as the development in services and the fierce rivalry that exists, all point to growth in the courier industry.

Locally, Eagle Express and many other businesses are building a name for themselves by offering excellent customer service. On the international landscape, however, prominent firms like as DHL, EMS, and FedEx are also making significant contributions to the industry's growth. Even though the courier service business has a bright future, it must be fostered to remain consistent. It will also be vital to provide level playing fields for all participants for the industry's growth, since competition will play a significant role.

It will need a concerted effort by participants and the PCSRC to ensure full manifestation the industry's growth. The commission will be expected to keep its restrictions in place to ensure an equality of opportunity; participants will be compelled to provide quality services; and competition will ensure that consumers pay a fair price for the services they get.

2.2 A brief review of service delivery concept

The Kanban Method is founded on the premise that by viewing the workplace as an environment of interconnected activities and being able to control and organise in a service-centered way, firms will be equipped to deal with the plethora of complexities (Adaku et al., 2018). This simplifies things significantly by allowing an organization to be conceived as a range of providers, with each node representing a service that spans many roles across the corporate structure. This allows for business management to allow each service to grow individually, using fitness criterion measurements that reflect the desired quality of service each consumer require to satisfy their own demands. As a result, external consumer demands and expectations can spread throughout a company's interconnected services, resulting in large-scale and holistic improvements from localized changes at the service level (Jovčić et al., 2019).

2.2.1 Service delivery principles

Three service delivery concepts that apply to the whole network, and not just one service, are recognized by Kanban as discussed in the next subsection. Making policies plain allows these three concepts to be debated (Anderson, 2016). It allows them to be reviewed by many people, and it typically makes the policies purpose clear. The dangers associated with policy transactions are well acknowledged. Therefore, if risks alter the policy, it may be questioned and amended. The policy's propriety, as well as the effect it creates, might be questioned.

Service classes are a collection of policies. A collection of policies that specify how a piece of work should be handled is referred to as a class of service. Consumer expectations and the fitness criteria through which the customer evaluates performance should be clearly matched with service classes (Aguinis, 2019). Organizations that think in terms of policies are better positioned to serve their consumers.

Policy considerations can aid in aligning with change management concepts. When organisations think of a system as a framework of measures for making a decision on how work is handled instead of a methodology based on predetermined work process, positions, and obligations. They focus on the task rather than the workforce making it less possible to address behaviour resistance to change, when changing a strategy or an individual's responsibilities.

2.2.2 Focus on the customer

Recognize and concentrate on the requirements and expectations of your consumers. When it comes to establishing consumer loyalty and keeping them coming back for more, being fit for purpose is critical (Shafiee & Bazargan, 2018). Focusing on the consumer, necessitates an understanding of their requirements. The consumer base must be segmented depending on their requirements and expectations. Customers must also be evaluated based on the criteria they use to determine whether they are pleased with the service and whether they would suggest or speak highly of the company.

Fitness Criteria are these criteria and must be embraced as the criterion that drives improvement initiatives (Juran & De Feo, 2010). To do so, you must first have a clear grasp of who your consumers are, what they ask for, and what they want in terms of service. By focusing on the client, a system with appropriate capacity, capacity allocation, and service classes that can satisfy their demands may be developed to meet within the organization's limits and risk tolerance level.

2.3 Service quality and customer satisfaction

Customer satisfaction, according to Abd-El-Salam et al. (2013), is the consequence of a customer's assessment of perceived quality and actual service performance. Customer satisfaction or discontent may result from this comparison. According to Kaura and Datta (2012), customer satisfaction shows a consumer's belief that using or possessing a certain service would elicit favourable sensations. While Li-hua (2012) compared customer satisfaction to an expectancy/disconfirmation paradigm, most customer satisfaction research is based on this paradigm. Expectations, performance, disconfirmation, and satisfaction are the four constructs covered. The confirmation or incredulity that may emerge from a mismatch between expected and actual service quality during or after service consumption.

Client satisfaction may be characterized as contentment, joy, or ambivalence depending on the sort of service offered to the customer at a certain purchase occasion (Namkung & Jang, 2010). Price, service features, product perceptions, and service quality may all influence customer happiness. Customer perception, on the other hand, has a direct influence on how consumers rate the service (Ryu et al., 2012).

2.4 Service recovery

The process of regaining consumer confidence after a service breakdown is known as service recovery (Wang & Alexander, 2018). After a failure, service recovery is designed to compensate for the customer's dissatisfaction in not being pleased (Borah et al., 2020). After issues in the usual service, service recovery is a specific activity made to guarantee that clients receive the proper level of service (Hewagama et al., 2019).

There are three strategies to achieve service recovery: distributive justice, procedural justice, and interactional justice (Babin et al., 2021; Mujiyanti et al., 2020). Customers feel distributive justice because of the interaction process between customers and employees during the complaint handling procedure; procedural justice would be the value of fairness embedded in the trustworthiness of the complaint submission process; and interactional justice is the value of justice perceived by consumers because of the interaction process between customers and workers during the complaint handling method (Babin et al., 2021; Bacile et al., 2018). Furthermore, service recovery can be measured using the dimensions of online service recovery, which include responsiveness, compensation, and contact.

2.5 Characteristics of effective service guarantee

According to this study, the characteristics reliability, assurance, and empathy, as well as their individual effects on customer satisfaction, were utilized to quantify the amount of service guarantee.

2.5.1 Reliability

According to Izogo (2017), reliability demonstrates the service provider's capacity to deliver dependable and accurate services. Furthermore, it entails making the proper decision on the first attempt, and it is a critical customer service component (Shanka, 2012). To increase service guarantee, reliability must be improved. This is because when a company is unreliable, it communicates a lack of interest in what customers care about. Customers may create a poor impression of the company and will quickly move to a rival (Hays & Hill, 2006).

Many types of service firms find it difficult to maintain a greater degree of reliability daily. Customers see, feel, and assess service sector catastrophes as soon as they interact with the company (Parasuraman et al., 1991). When services are supplied in a sector like the courier business, there is a lot of heterogeneity.

2.5.2 Assurance

It means to instil trust and confidence in others. Assurance is described as workers' comprehension of civility and the firm's and its employees' capacity to maintain a high level (Ramya et al., 2019). This factor is likely to be especially significant for services that consumers consider to be high-risk and/or about which they are unsure of their capacity to appraise. Trust and confidence may be represented by the person who connects the client to the firm, such as the marketing department. As a result, staff are aware of the need of establishing customer trust and confidence in order to acquire a competitive edge and client loyalty.

2.5.3 Empathy

Understanding consumers' needs and offering them special attention is the foundation of empathy. Empathy is a factor that reflects employee and customer relationships (Raza et al., 2023). Customers have an expectation that the service provider would understand and care about their specific requirements and desires.

As a service provider, attempting to comprehend the issue from the perspective of the consumer provides a clearer picture of what is occurring (Stickdorn et al., 2018). In the service sector, it is critical to demonstrate awareness and knowledge to address clients' concerns.

Empathy requires staff to pay special attention to customers, to interact with them in a caring manner, and to understand their needs (Raza et al., 2023).

2.6 Customer satisfaction and the effect on service reliability

Providing service as promised

According to Meesala and Paul (2018), the reliability and reputation of a courier business are the primary reasons for clients to pick one over another. Customers are frequently assured of security and urgency by courier providers during transactions. Customers will have more faith and trust if the required service is provided by staff (Utami, 2015).

One of the main components of customer happiness, according to Selvakumar (2015), is providing services as promised. Delivering on promises and getting things right the first time is a great approach to impress consumers, this will lead to repeat business. According to research, delivery is the most crucial aspect for consumers, and if it is not met, it is one of the leading causes of desertion (Bell et al., 2020). As a result, delivering on promises is critical in every business. This will enhance a company's reputation, and a strong reputation increases the likelihood of repeat business. Furthermore, word of mouth will drive new revenue and will set a company apart from its competitors. The reason being that they may sell similar products, but their company could lack in delivering as promised.

2.6.1 Reliability in handling customer service problems

Complaints, according to Stauss et al. (2019), provide businesses with an opportunity to remedy current problems. Furthermore, they frequently offer helpful suggestions for refining products and services, changing marketing strategies, or adjusting material and service information. Customers should not be disregarded when they have problems. This should allow a company to listen to challenges that arise from time to time. Error recovery is a skill that businesses may master. Dissatisfied customers may become loyal customers if problems are handled appropriately. This is necessary for maintaining a good reputation.

According to Ilovi (2008), courier firms compete in every manner to keep existing customers and sign on new ones to demonstrate their reliability. We no longer have an industry where effective advertising and corporate social responsibility bring in customers in today's market. Customers must be persuaded to remain loyal to a company rather than switching to a competitor. Clients have a plethora of options to pick from because of the huge growth, and most businesses will want to have these customers on their side (Nimnada, 2022). Customers' expectations of courier services are frequently higher than their perceptions of those services. Customers are continuously on the lookout for any signs that could be used as indicators of trustworthiness.

2.6.2 Performing services right at the first time

The most efficient technique for minimizing mistakes in a service organization is to ensure that tasks are completed correctly the first time. This entails ensuring that all jobs are completed correctly the first time and every other time in a company (Wasshausen et al., 2016). The initial step in correctly running service processes the first time is to evaluate current performance. Employees might start by calculating and comparing the volume of transactions that meet this criterion to the total number of transactions. That is any internal procedure that allows input from a third party to be assessed. Employees can then address the problem logically and discover the reasons behind poor service performance (Paul et al., 2016).

Managers of courier services may be accustomed to judging their employees based on how long it takes to resolve a client issue. Customers may not always receive complete information from workers, which might lead to frequent complaints. As a result, it is critical to link an employee's performance to activities accomplished correctly the first time (Abualoush et al., 2018).

2.6.3 Maintaining error free records

A company's capacity to engender trust is based on its ability to capture and keep customers. This conveys trustworthiness since their representatives and agents are available to assist them when needed, and the fact that their clients' records are error-free (Odhiambo, 2019). According to Karanja (2014), keeping accurate records allows a company to run more efficiently. This, in turn, could lead to profit. Accurate records enable businesses to keep track of their income, expenses, assets, and liabilities in real time. Error-free records are a crucial necessity for service companies.

It can be difficult to keep track of business records initially. Breaking down activities and responsibilities into simple, achievable tasks is the key. This will allow an employee to keep their data up to date and readily access them in the future. When a company's records are questionable, it is impossible for a client to see how business operations have improved (Ukil, 2016).

2.7 Effect of assurance on customer satisfaction

2.7.1 Keeping customers informed as to when services will be performed

The methods adopted to keep customers informed when difficulties arise, according to Ukil (2016), can enhance or weaken the connection. Keeping clients up to date on what's going on can have long-term consequences for the connection. Firms squander an opportunity to improve customer connections by letting customers sort through their difficulties alone and not demonstrating proactiveness. The client will feel properly taken care of and that he is receiving his money's worth if the customer understands that the company is working hard to solve the situation (Ramya et al., 2019).

Employees should be given the opportunity to exercise discretion in notifying clients on the progress of their demand, as well as a platform for asking questions when they are unsure (El Saghier & Nathan, 2013). Employees should know their customers' needs and what they think of the firm. Firms may be able to develop relationships with customers that will benefit both parties by talking to them about their needs. Moreover, organizations can form a platform where customers can give their views about products or services to ensure that they meet their needs. Greater understanding of their requirements and informing them through feedback from customer communications increases customer satisfaction (Dadfar et al., 2013).

2.7.2 Prompt service to customers

Al Idrus et al. (2021) claimed that no matter how good one is at work, one should constantly deliver great service to customers. Responding immediately to consumer questions and inquiries, as well as contacting your clients, are examples of these. Customers' rapid comprehension of the firm is demonstrated by greeting them cheerfully, involving them in determining what they have come for, and answering swiftly and accurately to inquiries. Failure to do so might cost a company money and hurt its reputation (Sadgrove, 2015).

Prompt services encourages a feeling of connectedness. Customers will trust that the provider can provide the service. If the consumer believes that the services provided are frequently delayed, he or she will be dissatisfied. It casts doubt on the service provider's competency (Ramya et al., 2019). Customer happiness hinges on the level of service offered by employees and the ties they establish. Employees must comprehend, believe in, and be proud of the company in which they work. As a result, they will be able to serve their consumers more quickly (Tax et al., 2013).

2.7.3 Willingness to help customers

First impressions are important. Specifically, how businesses respond to and treat first-time clients influences whether they will return. If customers are well served, they may recommend the company to others (Parasuraman et al., 1991). Sincere appreciation, probing questions to determine what customers require, and swiftly and accurately responding to inquiries demonstrate commitment and eagerness to assist. Customers' willingness should always be enhanced to receive a tip of contentment. By freely asking direct questions and having knowledge of the customers' records and progress, the firm sends a message to the customers that it wants to help them, resulting in a sense of satisfaction. Employees who are creative problem solvers are essential for businesses.

They should constantly ensure that they fully comprehend the customer's situation and offer alternative solutions. Employees are frequently expected to come out with answers that meet the requirements of a specific consumer as they arise (Ramya et al., 2019). It is beneficial to aid an employee in obtaining more assistance if they are unable to find a solution that works for the customer. Customers' perceptions can be shifted by following up to ensure that problems are fixed. It is stated that the most significant parts of customer retention and happiness is demonstrating to customers that the provider is eager to help them in their time of need (Tax et al., 2013).

2.7.4 Preparedness to respond to customers

Customers anticipate prompt responses to queries, according to Al Idrus et al. (2021). As a result, they should not be ignored or deferred only because there are underlining difficulties. Some companies offer online support, allowing customers to get quick answers to their issues. Email inquiries and phone calls should be evaluated on a case-by-case basis and dealt with as needed (Dadfar et al., 2013). Customers are relationships that take time and effort to build and maintain. Losing customers results in the loss of a business opportunity. Most firms focus on obtaining or earning clients, but they are hesitant to follow up to keep them.

A business and its personnel should be prepared to answer customers' queries concerning products and services they provide (Shanka, 2012). Customers want to engage with entrepreneurs who are eager to answer quickly to questions regarding the good or service they are marketing or providing. It represents staff' preparedness and ability to service clients as quickly as possible. When courier service providers treat their customers professionally and competently, they can instil feelings of preparedness in them. Customers have faith in a company's ability to respond to their request based on previous experience. Customers can be reasonably certain that their next request will be responded to if a company routinely responds quickly to their enquiries.

2.8 Effect of empathy on customer satisfaction

2.8.1 Giving customers' individual attention

Customers are more satisfied, according to Ramya et al. (2019), if they believe they have been served in a way that considers their own specific requirements. When it comes to customer service, businesses frequently deal with many clients who appear to be the same, but it is crucial to realize that each one is unique. Anything that can be done to make each customer feel as if they have had the firm's undivided attention and have been treated with respect boosts their pleasure. Creating two-way communication between customers and businesses, tracking customer Behavior, and providing customers with personalized information all add to a sense of belonging to a particular brand or company.

Any beneficial improvement in today's competitive business climate is likely to create a competitive advantage. Employees that pay attention to their consumers leave a favourable impression in the minds of their clients (Ukil, 2016). Clients love a firm that provides them with options and alternatives, especially when company personnel make them feel as if they want their customers to have the finest experience possible by providing them with personalized service. Customers will feel valued and treated differently as a result of this approach. It is critical to comprehend not only what a customer says, but also how they feel, in order to offer them the attention they deserve. Recognizing and understanding the emotional condition of customers is a necessary ability for providing this service.

A consumer may be persuaded to choose one courier company over another, but without a strong relationship marketing plan based on market knowledge, the customer may simply choose another company that provides identical services. While courier companies use elements of both relationships and transactional marketing or paying attention to consumers, is becoming more important (Tax et al., 2013).

2.8.2 Employees who deal with customers in a caring fashion

Employees, as pointed out by Ukil (2016), are the company's frontline, interacting with customers and representing the brand on a regular basis. Customers who are abused or ignored by employees will not always complain about what they perceive to be impersonal treatment; instead, they will leave and never return, which no company wants. Instead, a company should begin by caring about its clients to adopt a competitive advantage and attract customers. A business that hires personnel who enjoy what they do attracts customers and makes a good impression. Customers will desire to engage in business with a particular organisation if the reps provide real and thoughtful service (Dadfar et al., 2013).

2.8.3 Employees that are informed of their customers' requirements

Every business needs a reason for their customers to choose them over their counterparts. Customers are quite satisfied with companies like Fidelity Bank and MTN. It is not surprising, given that these businesses place a premium on market research and marketing as techniques for determining what customers want and need (Al Idrus et al., 2021). Knowing what customers want and being able to direct actions to meet those needs can increase client loyalty.

When working with consumers, a true professional should always answer in a way that demonstrates that they are aware of their demands (Ukil, 2016). That principle is reciprocated in the operations of the most successful corporate relationships. Customers who are satisfied, according to Abualoush et al. (2018), inform others about their experiences. As a result, favourable word of mouth advertising will increase. Existing clients are frequently an underutilized source of income that may save organizations time and money through referrals. It is only natural that you would want to keep them around if possible. In today's competitive market, a firm must ensure that more of its consumers are loyal, emotionally involved clients who not only spend with the company, but also generate revenue by recommending it to others.

Workers at companies should be allowed to work in dynamic, stress-free environments that allow them to interact with consumers in a cost-effective manner while not jeopardizing the firm's reputation or driving away customers (Odhiambo, 2015). Overall staff productivity and mission performance will improve when the materials used for the service are compatible. This can be accomplished by utilizing modern technologies in the workplace to assist in meeting client requests. Consumers may rely on organizations to a considerable extent, so organizations' dedication to understanding their customers' needs is critical. Employees must truly grasp the demands of their clients and provide a comprehensive explanation of each product to customers while dealing with complex items like insurance, finances, and courier. When these clients are provided with the services they desire, they will feel a sense of connection, which may lead to their loyalty to a certain company.

Whenever customers are presented with a problem that necessitates the knowledge of the employees, they become upset when firms fail to provide them with what they require. Customers' needs will aid a company in defining and creating new market prospects. As a result of the constantly changing economy and dynamic technology, customers perceive a rapid shift in personal likes and preferences, and they want businesses to grasp these shifts (Timothy & Ron, 2013).

2.9 Conceptual Framework

The conceptual framework is based on research from Njeru et al. (2019) that suggest empathy, assurance, and reliability have the biggest impact on customer satisfaction. According to Kaura and Datta (2012), empathy, assurance, and reliability dimensions of service quality are also observed through the people component of service quality. According to previous studies (e.g., Chatterjee et al., 2022; Sharma et al., 2022), these Service Quality (SERVQUAL) criteria have the significant effect on customer satisfaction; therefore, the five service quality components have been reduced to empathy, assurance, and reliability and used in developing the conceptual framework for this study (see Fig. 1). Also, since these components can only be obtained through the people element of service quality, the elements of service quality (people, process, and physical evidence) have been limited to the people component.

Fig. 1. Conceptual Framework

Source: Authors' construct, 2022

3. Research methods

In order to investigate the impact of service guarantee on customer satisfaction, the study used a quantitative survey. Quantitative research, according to Creswell et al. (2007), is suitable for analysing and understanding a phenomenon by gathering numerical data and analysing it using statistical or mathematical methodologies borrowed from statistical areas.

3.1 Population and Sampling

This study focuses on the local courier industry in Ghana. The study covered ten (10) courier companies which included Aramex Ghana Limited, Bolt Food, Eagle Express, Emirad Express, Unique Express Courier Services, Ghana Post Company Limited, Glovo Ghana, Jumia Ghana, StreetXpress, and Swift Courier Services. Because the research is an industry inquiry, numerous cases were used instead of a single example. This method was chosen to provide an in-depth understanding of the courier industries' service guarantee.

As per Saunders et al. (2009), there are two types of sampling strategies. Non-probability or judgemental sampling and probability or representative sampling are the two types of sampling. According to Bell and Bryman (2007), probability sampling occurs when in a population, a unit has the same chance of being chosen. Because data would be obtained from respondents as they were available, the study used a simple random sampling technique.

Customers of ten local courier firms were included in the study. Customers are served by courier firms who deliver their items to various locations. For the study, a total of 120 questionnaires were issued.

3.2 Profiles of sampled firms

Aramex offers a wide range of innovative transportation and logistics technologies to support business needs. From warehousing to facility management and value-added services, they help make businesses more efficient and increase customer satisfaction. Services can be easily applied to a variety of business models across varying industries.

Eagle Express Limited is a logistics service provider experienced in the management of courier/dispatch operations. Incorporated in 2008, Eagle Express is licensed by the Postal and Courier Services Regulatory Commission (PCSRC) to provide delivery solutions within Ghana. Eagle Express consistently support firms by providing bespoke and complex delivery and value-added services including Cash on Delivery (COD) for leading e-commerce giants.

Emirad Express is a dependable delivery, transportation & logistics service registered in 2019 under the Registration of Business Names Act, 1962 (No.151) of the Republic of Ghana. Emirad Express is committed to deliver on time and ensure all goods and packages are handled with extreme care to enhance maximum safety and security.

Ghana Post was incorporated by an Act of Parliament, Act 505 in August 1995 thereby formally separating it from Ghana Telecom Company. By this Act of incorporation, the corporation was expected to operate on sound commercial lines, and to be self-supporting. As the nation’s designated operator, with a network of 360 post offices across the country, Ghana Post provides courier, financial services (remittances, post assurance and agency services) and traditional mail services.

Glovo is an online delivery platform (web and app) that connect customers with businesses that want to expand their offer beyond the doors of their establishment and sell online. Present in 30 countries and with more than 3.4 million active users, Glovo leads the food delivery market in both orders and the number of restaurants.

Bolt Food is a delivery platform that provides fast, high-quality food delivery services at affordable prices. The food team is responsible for the entire process, from ordering to the customers’ doorstep. Bolt Food also offers thousands of couriers the chance to earn extra money on their own schedule.

Jumia, Ghana's no. 1 online retailer was established in 2014 with the aim and vision to become the one-stop shop for retail in Ghana with implementation of best practices both online and offline. Jumia is the largest online retail store in Ghana.

StreetXpress Logistics is a limited liability company registered under the Companies Code of the Republic of Ghana, incorporated in 2017, licensed and in good standing with the Postal and Courier Service Regulatory Commission, Ghana. StreetXpress is also a proud member of the Invest in Africa (IIA) Partner Pool. StreetXpress is a wholly owned Ghanaian company.

Unique Express Courier Services is a domestic courier service established in 2007 which is also registered in Ghana with the Postal and Courier Service Regulatory Commission. Unique Express Courier Services offers services such as parcel delivery, special service, freight air and sea freight, imports, door to door services, proof of deliveries, online tracking, and mass mailing. The company operates across all Ghanaian regional capitals.

Swift Courier is a subsidiary of Swift Courier Services –U.S. A's largest parcel delivery network. Swift Courier Services was founded in 1990 and has more than 25 years of operating experience, with presence in over 10,000 locations. Swift Courier is a strategic partner of DPD Group, an International Parcel Delivery Services Company owned by Swift Courier.

3.3 Data Collection Instrument

Nurani (2009) delineates data collection instrument as a device utilized to elicit data for research. It comprises questionnaires, interviews, laboratory experiments and polls among others. Creswell et al. (2007) further assert that the choice of collecting data is dictated by the nature of the study, sample size, the objectives, period and available resources for the study. The questionnaire was the primary research tool used to gather information from the chosen respondents. The questionnaire was created based on a review of the literature on the impact of service quality on customer satisfaction. The questionnaire was divided into three sections The first section required the respondents to give their background characteristics (age, sex, level of education among others).

The subsequent sections required respondents to give responses in relation to the extent of their satisfaction with the four service quality dimensions (reliability, assurance, empathy and responsiveness). Table 1 presents the number of items for each construct and their sources. The last section of the questionnaire focused on overall satisfaction of customers. Questionnaires were administered to respondents mainly during the hours of 8am to 3pm. Considering the fact that these are the productive hours of the day, some respondents were hesitant to partake, and even those who made time to answer questionnaires were impatient.

Table 1. *Satisfaction Levels Regarding Various Services Quality Dimensions*

Construct	No. of Items	Source
Reliability of Service	5	Sullivan et al. (1996)
Responsiveness	5	Lee et al. (2000)
Assurance	4	Donthu and Yoo (1998)
Empathy	*5*	Shanka (2012)

Source: Authors' construct (2022)

Pilot research was carried out to detect faults in design and instruments, as well as to provide proxy data for sample selection (Ikart, 2019).

3.4 Data Processing and Analysis

The first step of data analysis in this study was to check for accuracy, consistency and completeness. Each questionnaire completed by the respondent was checked for accuracy and consistency of the responses to the items on the instrument. The questionnaire was also checked for comprehensiveness of the responses. After editing, a template was developed and used to create a data analysis matrix on the computer, as well as code responses to the items on the instrument. After coding, the data was then entered into the computer's analysis matrix developed with the computer software, SPSS version 21.

A frequency distribution table was used to illustrate the results on the respondents' socio-demographic variables. To determine the impact of service quality on customer satisfaction, a simple linear regression was performed for each of the service quality attributes and total customer satisfaction. Test for statistical significance was obtained at 95 percent confidence level (Marshall & Jonker, 2011).

4. Results and discussions

The demographic features of respondents were explored in Table 2. The gender distribution of the responses is represented graphically.

Table 2. *Demographic details of respondents*

Demographics	Categories	Frequencies	Percentages
Gender	Male	58	48
	Female	62	52
Age	18 – 25 years	27	22
	25 – 30 years	28	23
	31 – 40 years	57	48
	41 – 50 years	5	4
	51 – 60 years	3	3
Level of Education	No formal education	4	3
	Secondary	5	4
	Tertiary	92	77
	Postgraduate	19	16
Profession	Government employee	31	26
	Private employee	37	31
	Self employed	26	22
	Student	15	12
	Unemployed	11	9
Courier Companies	Aramex GH	4	3
	Bolt food	31	26
	Eagles Express	7	6
	Emirad Express	5	4
	Ghana Post Company Limited	15	13
	Glovo Ghana	13	11
	Unique Express Courier Services	4	3
	Jumia Ghana	33	28
	StreetXpress	3	2
	Swift Courier Services	5	4

Source: Field data, (2022)

4.1 Descriptive Statistics

The use of descriptive statistics to analyse the data is critical. To put it another way, descriptive statistics analysis is a prerequisite for understanding more advanced statistical analyses, such as inference drawing. When data is presented effectively, it is typically obvious whether the author collected and processed the data correctly and in accordance with accepted field practice (Spriestersbach et al., 2009). The descriptive statistics are used to determine the degree to which respondents agree or disagree with the questions in numerical terms. Table 3 shows the overall mean and standard deviation of all the variables.

Table 3. *Central Tendency Measure of Variables*

	Number	Mean	Stand. Dev.	Minimum	Maximum
Reliability	120	3.67	0.833	1.20	5.00
Responsiveness	120	3.56	0.900	1.20	5.00
Assurance	120	3.61	0.696	1.75	5.00
Empathy	120	3.77	0.790	1.25	5.00
Service Satisfaction	120	3.82.	0.710	2	5.00

Source: Field data (2022)

4.2 Data Validity and Reliability

The Kaiser-Meyer-Olkin (KMO) test found in Table 4 determines how well the data is suited for factor analysis. The test determines sampling adequacy for each variable in the model as well as for the entire model. The statistic is a measure of the proportion of variance that may be common variation among variables. The lesser the proportion, the better your data is suited for Factor Analysis. KMO values between 0.8 and 1 suggest acceptable sampling. KMO values less than 0.5 indicate that the sampling is insufficient, and that corrective action should be performed (Creswell et al., 2007).

Considering the above, all the variables in the table have KMO above 0.5 and are considered adequate. Bartlett's Test of Sphericity compares an observed correlation matrix to the identity matrix (Taherdoost et al., 2014). Essentially it checks to see if there is a certain redundancy between the variables that we can summarize with a few numbers of factors. The null hypothesis of the test is that the variables are orthogonal, i.e., not correlated. Bartlett's Test of Sphericity test show the data is not an identity matrix and that the construct correlate with each other (P < 0.05).

Table 4. *Validity Test (KMO and Bartlett's Test and Factor Loadings/CFA)*

		Reliability	Responsiveness	Assurance	Empathy
		0.707	0.784	0.539	0.755
Bartlett's Test of Sphericity	Approx. Chi-Square	560.394	838.142	214.433	342.658
	Df	10	10	6	6
	Sig.	0.000	0.000	0.000	0.000

Source: Field data, (2022)

4.3 Validity of Instrument

Factor analysis in Table 5 allows us to measure the ratio of an item's unique variance to its shared variance, known as communalities. It is advisable to remove any item with Communalities score of less than 0.2 (Wasshausen et al., 2016). Hence, from the Communalities table, the third item of Empathy construct was removed from the analysis. Reliability was analysed with five items, Responsiveness with five items, Assurance with four items, Empathy with five items.

Table 5. *Validity of Instrument*

Communalities				
Initials				
Construct	Reliability	Responsiveness	Assurance	Empathy
1	0.868	0.836	0.807	0.729
2	0.863	0.854	0.905	0.840
3	0.959	0.898	0.831	**0.350**
4	0.875	0.813	0.887	0.740
5	0.960	0.841		0.839
Extraction Method: Principal Axis Factoring.				

Source: Field data, (2022)

4.4 Reliability Test (Cronbach Alpha test)

From the Cronbach's Alpha interpretation, the Responsiveness has the highest internal consistency reliability with the value of 0.955 followed by Reliability with 0.889. From the result in Table 6, all variables have good internal consistency reliability because they passed the threshold of 0.6. Most professionals use a Cronbach's alpha value of 0.6 or higher as a requirement for combining several items into a new reliable variable. For this study, we also set the alpha at 0.6 as a minimum for creating new variables that represent a construct (Creswell et al., 2007). From the result, all variables have good internal consistency reliability.

Table 6. *Reliability of Instrument*

Reliability Statistics						
		Before adj.		After adj.		
No	Variable	Cronbach's Alpha	No of item	Cronbach's Alpha	N of Items	Number of respondents
1	Reliability	0.889	5	0.889	5	120
2	Responsiveness	0.955	5	0.955	5	120
3	Assurance	0.756	4	0.756	4	120
4	Empathy	0.876	5	0.908	4	120

Source: Field data, (2022)

4.5 Multiple Regression Analysis

The components were validated and assessed using multiple regression analysis. This was done after checking all the regression assumptions to make sure none of them had been broken. The multiple regression analysis approach was chosen because of its capacity to forecast the variables given as well as analyze the proportional impact of each variable (Pallant, 2011). Consequently, conventional multiple regression was performed, which is allowed when the study's goal is to learn more about the relationship between a dependent variable and independent variables (Pallant, 2011).

The relationship between service guarantee and customer satisfaction was studied using regression analysis. Customer satisfaction was the dependent variable, with reliability, responsiveness, empathy, and assurance as independent factors. From Table 7, the R square for the model is 0.564. This means that the four predicting variables (Reliability, Responsiveness, Assurance and Empathy) explains about 56.4 percent of the variance of the dependent variable (Service Satisfaction). The prediction of Service Satisfaction might be off by 0.477 points using the four predicting variables scores from the standard error estimates.

Table 7. *Regression analysis*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.751[a]	0.564	0.549	0.47667

ANOVA Table

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	33.837	4	8.459	37.229	0.000[b]
	Residual	26.130	115	.227		
	Total	59.967	119			

Multiple Regression Analysis

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.352	0.238		9.888	0.000
	Reliability	-0.739	0.146	-0.867	-5.042	0.000
	Responsiveness	-0.342	0.120	-0.434	-2.852	0.005
	Assurance	1.063	0.138	1.042	7.690	0.000
	Empathy	0.411	0.097	0.458	4.252	0.000

a. Predictors: (Constant), Reliability, Responsiveness, Assurance, Empathy.

b. Dependent Variable: Service Satisfaction

Source: Field data (2022)

5. Discussion of findings

This section of discusses the results of the research work and their relationship with the literature review. Using data from Ghana's courier business, the study's purpose was to look at the impact of service assurances on customer satisfaction. The discussions were therefore done in line with these specific objectives.

5.1 Effect of service reliability on customer satisfaction

The study's initial goal was to determine the extent to which service reliability influences customer satisfaction. The study's findings revealed that customer satisfaction was influenced by reliability. The findings on the impact of reliability on customer satisfaction are consistent with those of Chingang and Lukong (2010), who discovered that reliability had an impact on consumer satisfaction. Similarly, Bonsu and Mensah (2013) discovered that reliability and customer happiness are inextricably linked.

The results on the influence of reliability on customer satisfaction corroborate those of Khan and Fasih (2014), who found a positive and substantial association between reliability and customer satisfaction. Bharwana et al. (2013) did a study on the influence of Service Quality on Customers' Satisfaction and discovered that there was a positive and substantial association between reliability and customers' satisfaction, which supports the conclusions of the current study. The results, on the other hand, contradict the findings of Munusamy et al. (2010) who showed that reliability had no substantial influence on customer satisfaction at the 99 percent confidence level.

5.2 Effect of responsiveness on customer satisfaction

The second purpose of the study was to see how responsiveness affected customer satisfaction. Responsiveness has a statistically significant impact on customer satisfaction, according to the data. The findings in respect to the influence of responsiveness on customer satisfaction are comparable to those of Lau et al. (2013), who found that responsiveness had a statistically significant effect on customer satisfaction in similar research. Another study by Kant and Jaiswal (2017) discovered that responsiveness had a substantial influence on customer satisfaction.

As a result, high-quality service improves customer satisfaction and may even result in client loss, whereas low-quality service decreases customer satisfaction and may even result in client loss. According to Twum et al. (2023), responsiveness is one of the service quality factors that has the greatest impact on customer satisfaction. Amin and Isa (2008) discovered that there is a significant relationship between perceived service quality and customer happiness in banking in their study. In particular, responsiveness was shown to have the largest impact on customer satisfaction.

5.3 Influence of assurance and customer satisfaction

The study's third goal was to look into the impact of assurance on customer satisfaction. The study's findings revealed that assurance had a statistically significant impact on consumer satisfaction. As found in this study, Chingang and Lukong (2010) also found that assurance had an effect on customer satisfaction. Similarly, Twum et al. (2023) also found that one of the service quality dimensions with the highest effect on customer satisfaction was assurance. On the contrary, Munusamy et al. (2010) found that assurance does not have any significant impact on customer satisfaction.

5.4 Effect of empathy on customer satisfaction

The study's final goal was to see how empathy affected consumer satisfaction. According to the findings, empathy has a statistically significant impact on customer satisfaction. The conclusions of the study are backed up by the findings of a study by Fida et al. (2020), which found that empathy had the highest impact on customer satisfaction. Empathy, according to Chingang and Lukong (2010), has a positive influence on customer satisfaction. In the banking business, Bonsu and Mensah (2013) discovered a clear correlation between service quality factors and customer happiness. One of the key dimensions that affected customer satisfaction was empathy.

6. Summary, conclusion and recommendations

The study's goal was to see how service guarantees affected customer satisfaction, with a focus on the Ghanaian courier industry. Specifically, the study sought to identify the role of empathy on customer satisfaction, examine the extent to which service reliability affects customer satisfaction, find out how assurance in service provision affects customer satisfaction, and assess effect of responsiveness on customer satisfaction. Based on the stated objectives of the study, relevant literature was reviewed to know what existing studies had been done in line within the topic and therefore build on existing knowledge rather than perform a study that had earlier been conducted.

The methods of the study made use of the positivist philosophy of research, thus the use of quantitative primary data collected from the field. A closed-ended questionnaire was used in the collection of data which was distributed mainly through virtual platforms where the target population could be accessed. The gathered data was then coded and analyzed using SPSS. The SERVQUAL Model by Parassuraman was used to calculate service guarantee, which included variables like reliability, responsiveness, assurance, and empathy. Following the data analysis, the study's summary and conclusion were provided, along with the study's limitations and recommendations on how courier service providers in Ghana might raise the standard of their service to increase customer satisfaction.

6.1 Summary of Findings

Four objectives guided the conduct of this study. The results demonstrated that responsiveness has a direct beneficial influence on customer satisfaction with respect to the first objective. This is manifested from the findings as indicated in the earlier chapter. It was indicated by respondents that the speed with which service is delivered to them is a great way they are guaranteed of quality service. They also value such attributes as assistance provided by employees, and clarity of information provided by company employees, which explains they all influence customer satisfaction. After using the company's services, customers look for other things that can give them with satisfaction.

The second objective of the study demonstrated that reliability has a direct and positive impact on customer satisfaction. This is evident from the findings of the indicator research. Trustworthy information is valued as much as service accuracy and promised services that show that they all influence consumer satisfaction. This condition shows that if the ability to provide promised services is better, more accurate, and reliable, it will affect the psychological condition of consumers to give a positive appreciation of the company's products.

The findings of the study's third objective revealed that assurance has a direct positive impact on customer satisfaction. This is seen from results of research on the indicators. The ability of employees to have answers to all questions asked by customers, politeness and friendly staff, as well as willingness of employees to provide further assistance, and the availability of an experienced management team that can address customer concerns and effectively direct customers were all variables that respondents gave positive answers to. Customers therefore derive great satisfaction from these attributes. This shows that if assurance of quality service is guaranteed and fulfilled, it yields great satisfaction in customers.

The results of the last objective of the study showed that empathy has a direct positive effect on customer satisfaction. This can be seen from the results of that variable such as opening hours, safe transportation of goods and packages, waiting time, confidentiality of data of customers and privacy of customers were of great value to customers. They go a long way to provide great guarantee to the customer that the company is ready to meet and possibly exceed their expectations.

6.2 Recommendations

First, since courier industry is a service-oriented organization; management should provide continuous training to the employees on issues like courtesy, etiquette and communication skills while dealing with customers.

Secondly, to retain the existing customers and to improve service guarantee, the courier companies should continuously maintain error-free transactions, since they transport goods, packages and sometimes very sensitive documents from one destination to another. Maintaining an error-free transaction ensures that the privacy of customers as well as the security of goods transported are important to the company.

Thirdly, management needs to improve quality services to satisfy customer needs. The management of courier companies need to pay much attention to the customer complaints to satisfy customers' expectation. Customers should be provided individual attention to better understand and meet their demands.

Again, management should do research regularly to keep track of consumer satisfaction levels and develop strategies to fulfil them if they fall.

6.3 Suggestions for Future Studies

The effect of service guarantees on Ghana's courier firms was investigated in this study. It was restricted to Ghana's local courier sector, which was mostly located in Accra. It is recommended that research be conducted by researchers and industry players on courier service customers outside Accra to ascertain the degree to which they are certain of receiving high-quality service. This will help to discover the differences in client perceptions and expectations, allowing for better generalization and informed decision-making in the courier sector.

Conflict of Interest Statement

The authors declare no conflicting interest in the conduct of the study.

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Organizational change and its effect on employee performance. A study at the Ghana Broadcasting Corporation

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Abstract:
The competitive nature of the 21st century business world has made it necessary for organizations to reconsider their approach in business operations likewise the structures with which they render their services. Hence, it has become a must for them to be flexible and adapt to changes in all their operations to enhance the performances of their employees with the ultimate goal to stay competitive as an organization. Using the Ghana Broadcasting Corporation as a case study, this study evaluates organizational change and its effect on employee performances. With convenience sampling, structured questionnaires were used to collect data from 278 respondents. Descriptive statistics and linear regression were used to analyze the data. The study showed that organizational changes done by the Ghana Broadcasting Corporation were primarily characterized by the establishment of new divisions that are capable of producing whatever the market require, peer-examination of the culture and habits of workers, and changing technology to suit business needs and technological advancements. Results also showed that together, structural change, strategic change and technological change contribute significantly to change in employee performance. However, findings made from examining the degree of these effects showed technological change as having the highest effect. This was followed by strategic change and structural changes accordingly.

Keywords:
Employee performance; Organisational change; business strategy; media; public sector.

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1. Introduction

The dawn of the 21st century has seen organizations modifying and adapting their business processes and models so they can remain viable and compete in a fast-changing global economy. Organizational change is frequently a reaction to environmental changes (Hanelt et al., 2021). According to Burnes (2004), many companies are confronted with obstacles that push them to adapt or modify their operations regularly. Due to the fact that we live in a technology-driven world, firms, especially media houses, have to change procedures regularly, either in response to new development scenarios or as part of their expansion or reform activities (Ebrahimi et al., 2021). This is necessary to stay competitive, prevent the loss of employees to competitors, and achieve defined goals. Given this, the need for change in the management of a firm's human resources to support new drives and retain employees for better performance has become crucial. This has resulted in making the subject of organizational change a keen interest to a number of scholarly works, as highlighted by Hanelt et al. (2021) in a review of literature on the insights and implications for strategy and organizational change due to the advent of digital transformations.

Karanja (2015) conducted a study on the impact of organizational change on employee performance using the postal corporation of Kenya. The study found that organizational change had a positive influence on employee performance, with technology being the most significant factor. Karanja (2015) focused on four areas: structures, technology, roles and responsibilities of employees, and changes in management. In a similar study, Gurmeet (2016) explored the relationship between organizational change and employee productivity. The findings indicated a positive relationship between factors influencing organizational change and employee productivity. Gurmeet (2016) focused on changes in technology and management. More recently, Ansong (2022) examined how digital enterprises strategize to survive in the dynamic digital economy. These studies aimed to unravel the dynamics of change and how it has impacted organizations and their effectiveness, as well as the performance of their employees. However, despite these studies, there is still much knowledge to be uncovered in the area of organizational change and its effect on employee performance. This is because organizations are constantly changing, and literature needs to be updated regularly. Additionally, there is a dearth of knowledge concerning organizational change and its effect on performance, particularly within the Ghanaian state-owned media.

The study therefore seeks to complement literature by identifying the nature of organizational change at the Ghana Broadcasting Corporation and the extent to which they influence employee performance. Although the organization has offices throughout Ghana, the study only concentrates on the head office. Although this poses a limitation to the study, it is expected that the outcome will be beneficial to the organization and as well as increase the stock of knowledge on organizational change. The rest of the paper is organized into four main sections. Literature related to the topic is reviewed in the next section. This is followed by a discussion of the methodology of the study. The fourth section outlines the data analysis. The discussion of the findings is presented in the fifth section. The study concludes in the sixth section with recommendations and directions for further research.

2. Literature review

Literature related to organisational change and change management is discussed in this section. This discussion is intended to help outline all relevant concepts used in the study.

2.1 Concept of Organizational Change

The nature and environment of organizations give rise to the idea of organizational change, most especially in these times of environmental, political and economic uncertainties. Change is a term that refers to a series of events that help companies grow (Belyaeva, 2018). A change in an environment frequently necessitates a corresponding change in the organization that operates in that environment. Organizational change is therefore defined as rightsizing, new development and change in technologies, rescheduling operations and major partnerships amidst changing environment or situations; all geared towards making the organization robust, effective and efficient to deliver its mandate (McNamara, 2011). Organizational change is the transition of an organization from one condition of affairs to another state where it functions more effectively and efficiently (Faupel & Süß, 2019). It can be deduced from the definitions above that, organizational change is that adopted approach that keeps an organization resilient, responsive and adaptive to situational or environmental changes through effecting changes in areas deem necessary based on their strategic analysis. The general aim of organizational change is an adaptation to the environment or an improvement in performance (Stringer, 2010).

The forms or types of organizational change have been looked at by several people from various angles. Kotter (1996) divided change management into three categories: business process re-engineering, technical change, and incremental change. Business process re-engineering is a business management method that focuses on the study and design of workflows and business processes inside a company (Elapatha & Jehan, 2020). In the course of re-engineering business processes, the old methods of doing things are completely turned down for a more meaningful change implementation (Kotter, 1996). Incremental change unlike business process re-engineering does not actually change the current structures but makes minute changes with the ultimate focus on the end result (Kotter, 1996). The idea is that this form of change is carried out in a step-by-step manner. However, its prime purpose is to enhance the overall efficiency of the organization. Under the technological change, organizations embrace new inventions in an intuitive manner whiles diffusing their processes for operational efficiency (Kotter, 1996).

Weiss (2015) enumerated these changes into three types' namely developmental change, transitional change, and transformational change. Developmental changes are those you make to improve present company practices. The essence is to fine tune business practices to yield efficient outcomes. Weiss (2015) viewed this as a prime step required of an organization to make adjustments in its operations to help them meet their expectations in the market place. Transitional change is those that are implemented to replace old procedures with new ones (Weiss, 2015). This sometimes might cause pain as in most cases people find it difficult letting go used-ways of doing things to embrace a new way (Weiss, 2015). Transformational changes are changes that radically restructures an organization's business strategy and operations, frequently resulting in a shift in its work culture (Weiss, 2015).

2.2 Factors influencing organizational change

Empirical research has revealed three major influencers of organizational change: leadership, focus, and commitment (Lawler & Worley, 2011). Organizations that do not transition from a controlling to a more nurturing body that motivates employees to outperform their performance; tend to have challenges with successful change processes (McFarlin, 2011). Organizational change processes become a big challenge when business decisions are not adequately aligned with the organization's goals; and management fails to demonstrate commitment to future changes in the change process (Sadler, 2005).

Nyaguthii (2016) investigated factors that are affecting organization change at the Kenya Trade Network Agency and did find out that training and compensation, goal planning, and employee empowerment impacted on the performances of organizational change processes. When employees are adequately trained and rewarded for their efforts, they work as a team to achieve the organizational change processes. In the absence of this, management is not in a good position to harness employees' abilities to available resources, thereby impeding the change processes at the Kenya Trade Network Agency.

Rhodes et. al. (2008) examined the factors influencing organizational knowledge transfer and the study indicated that, the particular organizational factors considered as IT systems had the most significant impact on organizational knowledge transfer followed by a structured learning strategy, and an innovative organizational culture.

2.3 Effect of organizational change on employee performance

A number of research on organizational transformation and employee performance have been conducted. A study by Karanja (2015) on the impact of organizational change on employee performance at the Postal Corporation of Kenya found out that organizational change had a beneficial influence on employee performance with technology being the main influencer. This owed to the fact that it provided an internship programme for existing staff and motivated them to greater performance.

Khosa et. al. (2015) used descriptive statistics and correlation analysis methodologies in their study on the influence of organizational change on employee performance in Pakistan's banking industry. According to the findings of the study, organizational change has a favourable and significant influence on employee performance in Pakistan's banking industry. In addition, the strongest influential factor toward employee performance in banking industry is tolerance to change while the lowest influential factor affecting the employee performance in banking industry is procedural justice.

Khan and Jabbar (2013) did research on the factors that influence employee performance in the business sector in Pakistan. According to the study, working circumstances did not show a strong link with employee performance, however work-life conflict had a negative influence on employee performance. Leadership and remuneration, on the other hand, have a substantial and considerable impact on employee performance.

Tefera and Mutambara (2016) investigated the impact of organizational changes on employee engagement at a Kwazulu Natal country club. The study's major results revealed that management had not provided chances to engage employees as they were excluded from the decision-making process. This added to their dissatisfaction and aside the fact that communication was poorly handled in the organization. Despite employee perceptions that organizational change will aid in achieving organizational goals, they were unable to meet its financial aims.

Wanza and Nkuraru (2016) studied the impact of change management on employee performance in relation to technology developments, organizational leadership, structure, and culture. The study discovered that structural change and organizational leadership have a favourable impact on the performance of staff. The survey also indicated that technology changes have a significant influence on employee performance owing to the rapid technological developments occurring throughout the world, which serve to ease Labor and increase efficiency.

Kansal and Singh (2016) performed research at Maruti Suzuki on the influence of organizational transformation on employee performance. The study's findings demonstrated that organizational change had a significant impact on employee performance across gender, departments, and designations. The study indicated that cultivating a positive mindset and practice leads to enhanced organizational performance. According to the study, change has a higher impact on employee attitudes, which is supported by employee performance.

3. Methodology

This study adopts an approach to research that is quantitative, specifically descriptive and inferable in nature given the need to examine the relationship between the study variables. The study is also descriptive because it allows researchers to get opinions on a topic of interest or concern based on the study that will be conducted (Siedlecki, 2020). The research focuses on examining the effects of organizational change on employee performance using the Ghana Broadcasting Corporation as a case study. Given this, the adopted research approach will make it possible to analyze collected views and help develop an in-depth understanding of the research problem, even though there exist the dangers of prying into the private issues of study participants, high chances of biases in the research findings and inability to identify the cause behind the described phenomenon (Sileyew, 2019; Bloomfield and Fisher, 2019).

3.1 Population and Sample

Thacker (2020) defined the term "population" as a complete set of people with specified characteristics. To this end, the targeted population for this study will be all employees working at the headquarters of Ghana Broadcasting Corporation in Accra. The participants in the study comprised of directors, senior staff and junior staff situated in the headquarters of Ghana Broadcasting Corporation in Accra. The study's total population is 995.

A sample size of 278 employees was chosen from a population of 995. This was determined using the table supplied by Krejcie and Morgan (1970), which reveals that a sample size of 278 is adequate for a population of 995. The sample size was obtained using Krejcie and Morgan's sample size formula below (Krejcie and Morgan, 1970).

$$S = \frac{X^2NP(1-P)}{d^2(N-1)+X^2P(1-P)} \dots$$

Where:
S = required sample size.
X^2 = the value of chi square for 1 degree of freedom at the desired confidence level (3.841).
N = the population size.
P = the population proportion (assume to be 0.50 since this would provide the maximum sample size).
d = degree of accuracy expressed as a proportion (0.05).

$$S = \frac{3.841 * 995 * 0.50(1-0.50)}{0.05^2(995-1)+3.841 * 0.50(1-0.50)}$$

$$S = 277.52$$

$$S = 278$$

Hence, the sample size for the study is 278.

The sample constitute about 28% of the population. The population was then stratified into three categories and based on the sample proportion, the number of people to be selected from each category was determined. Convenience sampling technique was used to select the respondents for the study. This choice is motivated by the fact that the study aimed to collect data from respondents who were readily available to respond to the research instrument given the tight job schedule of staff. According to Bhardwaj (2019), convenience sampling technique allows for the selection of members of a sample on the basis of their convenient accessibility notwithstanding the fact that it could suffer high vulnerability to selection bias and influences beyond the control of the researcher.

Table 1: Population and Sample

Category	No. of Employees (Population)	Sample
Directors	9	3
Senior Staff	86	24
Junior Staff	900	251
Total	**995**	**278**

Source: Authors' Construct, (2022)

3.2 Data Collection

Questionnaire was the primary collection instrument administered to gather data from respondents. The most cost-effective method to gather quantitative data is the questionnaire (Kazi and Khalid, 2012). It's scalable, can be easily analyzed, and guarantees respondent's anonymity (Kazi and Khalid, 2012). However, it is susceptible to dishonesty, unanswered question, and lack personalization (Kazi and Khalid, 2012). The questionnaire had three parts. Section A was used to gather information regarding respondents. Sections B and C focused on getting relevant data on organizational and employee performance. Section B uses a three-point Likert scale (1 = Yes, 2 = No and 3 = Not Sure) while Section C used a five-point Likert scale (1 = Strongly Agree, 2 = Agree, 3 = Neutral, 4 = Disagree and 5 = Strongly Disagree).

The administration was done in proportion to the sample size as shown in Table 1. The researcher was readily available to all study participants, provided further information were requested and assured them of their anonymity.

3.3 Data Analysis

Following the retrieval and analysis of the questionnaire, each response was calculated using IBM SPSS 20, a statistical tool that can be used to execute a wide range of statistical procedures. But prior to that the collected questionnaires were checked for any omissions in terms of the responses. This was followed by data coding by assigning a unique code for each item of the questionnaire or the variables to be used when entering the data into IBM SPSS system. Subsequently, the prepared data was then entered into the system. The entered data were again checked for missing values using IBM SPSS. Upon proving this, the analysis was carried out in the following manner: the frequency and percentage distributions were used to determine the respondent profile. Descriptive statistics such as mean and standard deviations were used to establish the various organizational changes implemented in Ghana Broadcasting Corporation.

Regression analysis was used to determine the effect of organizational change on employee performance. Using IBM SPSS, the variable value for the independent and dependent variables was computed. Multiple regression analysis was used to identify the predictors of employee performance by organizational change variables such as structural, strategic, and technological change at a confidence level of 95%. At the 0.05 level of significance, the hypothesis was tested. The decision rule was $p = 0.05$, so if $p \leq 0.05$, the null hypothesis was rejected; otherwise, it was accepted.

4. Data analysis

4.1 Changes implemented by the Ghana Broadcasting Corporation

The various types of changes implemented by the management of Ghana Broadcasting Corporation are analyzed in the following subsections.

4.1.1 Structural Change

It was found that there had been some realignment of jobs to suit new business structures. This became necessary as there were changes in the environment which necessitated the adaptation of the structures. Some of these realignments necessitated the establishment of divisions (as mentioned by 78.1% of the respondents), development of new policies (supported by 80.6% of the respondents), and changes in business model to suit present needs (mentioned by 74.5% of the respondents). These changes made some positions obsolete and redundant and 78.8% indicated that such positions are mostly removed. However, the remaining respondents although attested to the fact that some redundant positions have been removed, they were of the view that there are a lot of redundant positions that need to be removed to enhance efficiency.

This affirms the work of Cahyani and Kriswibowo (2022) indicating the need for organizations to put in the greatest effort in changing the method of thinking and working processes of employees at all levels to enhance their performances.

4.1.2 Strategic Change (SC)

The study found that there have been some strategic changes at the Ghana Broadcasting Corporation. Prime among them is the changes in fundamental business approach, strategy and tactics. This position was supported by 80.2%. Although 19.8% of the respondents had another opinion, it was clear that there have been major strategic changes with respect to the approach, strategy and tactics the Corporation uses. Another strategic change mentioned (by 78.8% of the respondents) concerned the culture and habits of the employees. Authors such as Marlon, Prasanna & Starts-Hopko (2021) have underscored the importance of work culture and therefore it is important to initiate cultural and attitudinal changes to make strategic changes worthwhile. Another strategic change initiated by the Ghana Broadcasting Corporation was changes in corporate vision and objectives as revealed by 74.4% of the respondents. A major component of the corporation's strategic plan is the vision and so to make strategic changes, it is not out of place to modify the mission and objectives. Another strategic change (according to 71,2% of the respondents) was the improvement of corporate services available to the customers to be able to stay competitive. However, after such changes in the culture as well as the vision and objectives are affected, there is the need to train the employees to better respond to these changes. According to the 75.5% of respondents, this was another strategic change implemented by the Ghana Broadcasting Corporation. These changes were necessary because according to Appelbaum et al. (2018), in order to achieve excellence and stay competitive, organizations must strategic in stimulating and growing knowledge and capacities among employees.

4.1.3 Technological Change (TC)

The study found that the Ghana Broadcasting Corporation implemented some technological changes. Specifically, it was revealed that the organization made changes in its technology to suit business needs and also as a result of technological advancement. Over eighty percent (81.3%) asserted that in order for the Corporation to remain in business, there was the need to improve on the technology it uses. Also concerning the use of software in in production as well as other activities, 82.7% of the respondents indicated the GBC customized most of its software to improve efficiency as well as the speed and productivity of the employees. According to 79.9% of the respondents, Ghana Broadcasting Corporation has also initiated some technological changes aimed at optimizing workflow and internal processes. Also, to improve the quality of services, GHC introduced new enterprise technological advancement. This was supported by 78.4% of the respondents. However, concerning those did not agree to this some of them mentioned that there are far advanced technologies that the GBC can take advantage of and since the current technology has existed for some time, the expect management to change. Furthermore, about 69.8% of the respondents mentioned that the Corporation has also trained employees on these new technologies. However, a little over 30% also believe that the training they have had is inadequate of which most of them had to learn themselves while doing the job. They advocated for a more formal training for all the workers and not selected few. It is worth noting that Makridis and Han (2021) emphasized the indispensable nature of technology change in business operation as it is associated with positive effects on employee empowerment and life satisfaction. Therefore, every establishment that expects to remain competitive and stay in business need to make some modification in its technology with the passage of time.

Ultimately, the study found out that Ghana Broadcasting Corporation practices organizational changes structurally, strategically and technologically. This affirms that assertion by Nadim and Singh (2019) that organizations cannot exist; neither can it survive competition without practicing organizational change due to the positive outcomes it yields for all stakeholders.

4.2 Relationship between organizational change and employee performance

The second objective of this study was to examine the relationship between organizational change and employee performance in Ghana Broadcasting Corporation.

Table 2. Correlation between organizational change and employee performance

Correlations				
			OC	**EP**
Spearman's correlation	**OC**	Correlation Coefficient	1.000	.752
		Sig. (2-tailed)		.000
		N	278	278
	EP	Correlation Coefficient	.752	1.000
		Sig. (2-tailed)	.000	
		N	278	278

Correlation is significant at the 0.01 level (2-tailed)

Spearman's correlation was computed to assess the relationship between organizational change and employee performance. Table 2 shows that 278 respondents provided the data for organizational change and employee performance. The relationship is statistically significant at 0.000 given the fact that it is below 0.05 and with a correlation coefficient of 1 for both variables, it can be concluded that there is a perfect positive correlation. As organizational change increases, employee performance also rises and from the result in Table 4.5, this is quite strong at 75.2% (0.752). Hence, the relationship between organizational changes and employee performance is strong, significant and positive. This affirms the finding of relationship results of Tarekegn (2020) which showed the existence of a positive relationship between the organizational change dimension and employee performance at Dashen bank.

4.2.1 Structural Change and Employee Performance

Table 3. Structural Change Model Output

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.457a	.209	.206	3.94424

Model		**Sum of Squares**	**df**	**Mean Square**	**F**	Sig.
1	Regression	1133.850	1	1133.850	72.883	.000b
	Residual	4293.747	276	15.557		
	Total	5427.597	277			

Model		**Unstandardized Coefficients**		**Standardized Coefficients**		
		B	**Std. Error**	**Beta**	**t**	**Sig.**
1	(Constant)	9.685	1.183		8.185	.000
	STC	1.584	.186	.457	8.537	.000

a. Predictors: (Constant), STC

b. Dependent Variable: EP

The results presented on Table 3 revealed that structural change significantly affects employee's performance by causing a variance of 20.9% (R2=0.209, P=0.000). Furthermore, the study revealed that the regression model was the best fit for predicting the effect of structural change on employee performance (F=72.883, P=0.000). Similarly, the study revealed that every unit change in structural change will significantly affect the variance in employee performance by 45.7% (Beta = 0.457, P = 0.000). This shows that changes in structural change affect employee performance. It is therefore in line with Ahmed et. al. (2013) assertion that organizational structural change can inhibit or promote employee performance depending on how effective the supervisory relationships and workflow influences productivity.

4.2.2 Strategic Change and Employee Performance

Table 4. Strategic Change Model Output

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.546a	.298	.295	3.71652

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1615.343	1	1615.343	116.948	.000b
	Residual	3812.254	276	13.813		
	Total	5427.597	277			

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	8.173	1.078		7.579	.000
	SC	1.801	.167	.546	10.814	.000

a. Predictors: (Constant), SC

b. Dependent Variable: EP

The results in Table 4 show that strategic change has a 29.8 percent variance in employee performance (R2=0.298, P=0.000). Furthermore, the regression model (F=116.948, P=0.000) was found to be the best match for predicting the influence of strategic change on employee performance. Results in Table 4.7 also shows that for every unit change in strategic change, employee performance is affected by 54.6 percent (Beta = 0.546, P = 0.000). The results show that changes in strategic change affects employee performance. According to Thugi and Gathenya (2018), strategic change can either be harmful or helpful to employee performance. The successful implementation of it will improve the business while its failure will lead to catastrophic consequences including organizational decline (Thugi & Gathenya, 2018).

4.2.3 Technological Change and Employee Performance

Table 5. Technological Change Model Output

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.732[a]	.535	.533	3.02344

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2904.636	1	2904.636	317.753	.000[b]
	Residual	2522.961	276	9.141		
	Total	5427.597	277			

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	5.968	.785		7.602	.000
	TC	2.194	.123	.732	17.826	.000

a. Predictors: (Constant), TC

b. Dependent Variable: EP

The results presented on Table 5 revealed that technological change significantly affects employee's performance by causing a variance of 53.5% (R2=0.535, P=0.000). Furthermore, the study revealed that the regression model was the best fit for predicting the effect of technological change on employee performance (F=317.753, P=0.000). Similarly, the study revealed that every unit change in technological change will significantly cause a variance in employee performance by 73.2% (Beta = 0.732, P = 0.000). Hence, there is a correlation between technological change and employee performance. The state of technology in any organization has a significant influence on employee performance as reflected in the quality and quantity of production of its goods or services (Dauda & Akingbade, 2011).

4.3 Multiple Regression Output

The output of the multiple regression is shown in Table 6.

Table 6 Multiple Regression Output

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.774[a]	.598	.594	2.82078

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3247.435	3	1082.478	136.044	.000[b]
	Residual	2180.162	274	7.957		
	Total	5427.597	277			

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.631	1.027		1.589	.113
	STC	.323	.154	.093	2.097	.037
	SC	.843	.143	.255	5.881	.000
	TC	1.708	.141	.569	12.088	.000

a. Dependent Variable: EP

b. Predictors: (Constant), TC, SC, STC

The results in Table 6 show that together the three independent variables (Structural, Strategic and Technological Change) have a 59.8% variance in employee performance (R2=0.598, P=0.000). This implies that a combination of structural change, strategic change and technological change contribute significantly to the improvement of employee performance. Furthermore, the study revealed that every change in organizational change factors would significantly cause a variance of 77.4% on employee performance (Beta = 0.774, p=0.000).

In addition, the results revealed that technological change is the highest predictor of employee performance, causing a variance of 56.9% (Beta =0.569, p=0.000), followed by strategic change which causes a variance of 25.5% in employee performance (Beta = 0.255, p=0.000), and lastly, structural change which causes a variance of 9.3% in employee performance (Beta = 0.093, p=0.037). This implies that for a single unit change in technological change, there will be a significant variance of 56.9% in employee performance. This affirms the study results of Karanja (2015) which revealed that employee performance has been positively influenced by organizational change; and that technology as a considered variable affected this change the most and influenced employee performance positively. Wanza and Nkuraru (2016) also indicated that technology changes have a significant influence on employee performance owing to the rapid technological developments occurring throughout the world, which serve to ease Labor and increase efficiency. In addition, this study also shows that for every unit change in strategic change, there will be a significant variance of 25.5% variance in employee performance. Likewise, for every unit change in structural change, there will be a significant variance of 9.3% variance in employee performance. Although, the findings show structural change to be the least the change influencing employee performance, it reinforces the work of Wanza and Nkuraru (2016) on the place and contribution of structural change as a component of organizational change on employee performance.

5. Discussion

The study has revealed that there is positive correlation between organizational change and employee performance. It has also been shown the different forms of change correlated with, and affected performance differently. There have been studies that seek to affirm or refute some of the findings identified in the study.

Concerning the studies that affirm the findings, a study by Tarekegn (2020) for instance showed the existence of a positive relationship between the organizational change dimension and employee performance at Dashen bank. Also, a study by Halkos and Bousinakis (2012) found after interviewing 355 employees in both public and private sectors that there is a relation between change and productivity (performance). They found that although initially change may lead to increased stress, which may impact negatively on productivity, when it's (change's) necessity and utility is understood, it leads increased productivity. The study further reported that successfully navigated organizational change will have a greater impact on productivity. This finding is thus in line with the findings of this study that strategic change and organizational change are positively related to performance.

Another study by Ozecelik (2010) also supported the findings of the current study that change results in increased performance. The study which identified 93 organizations that underwent Business Process Reengineering (BPR) projects and found that successfully implemented BPR led to improvement in the performance of the firms in terms of return on assets, return on equity and labour productivity.

Nevertheless, there are empirical research findings which do not corroborate the current research findings. There have been studies that have found a negative correlation between organizational change and performance. Mockus (2009) which sought to examine the effect of organizational change on productivity in more than 2000 software developers found that organizational change negatively affected productivity. Using the same sample, Mockus (2010) again found increasing coding defects among persons who are closer to the source of change. However, in concluding Mockus (2010) indicated that the time period after the change was relevant since shorter time periods after the change experience increasing defects. This shows that when change is properly understood and implemented, its negative impact is minimized. Also, a 1999 study by Mabile & Conti (1999) using data from 754 employees identified a decline in creativity after a downsizing initiative. They also found a decline in the number of invention disclosure submissions (an indicator of technological innovation rate) by 24 percent over the study period. They also found a partial decline in productivity.

It is therefore evident that the current research findings and existing literature show that organizational change may influence performance negatively or positively. However, it has been made evident that the direction of the effect depends much on the employees understanding and acceptance of the change, as well as the time lapse after the change has been implemented. A well understood and accepted change is more likely to an increase in performance while the opposite may affect performance negatively. Furthermore, the intensity of the impact of change on performance also depends on the type of change as is evidence in the current study where structural, strategic and technological changes have impacted performance differently. Literature sources such as Mabile & Conti (1999) and Ozecelik (2010) also corroborate this.

The study therefore shows that to obtain the maximum benefits from organizational change, there is the need to ensure that change is well understood and accepted by those affected. Furthermore, the more comfortable persons are with organizational change, the greater will be the positive effect of such change (see Halkos and Bousinakis (2012).

6. Conclusions and recommendations

The study aimed at examining organizational changes and how it impacts the performances of employees. Key concentration was on how structural, strategic and technological change is influencing the job performances of employees. The findings revealed are consistent and adds to the results of numerous studies that have demonstrated that organizational change impacts employee performance. Given this, organizational change in terms of structural change, strategic change, and technological change have a significant impact on employee performance and should be prioritized.

6.1 Recommendations

Based on the study's findings that structural, strategic, and technological change have a significant impact on employee performance, the study recommends that Ghana Broadcasting Corporation's management should:

- Periodically change the way business is done in a way that timely responds to the ever-changing customer demands.
- Practice appropriate strategic changes that enable them to offer services that meet their customers' expectations.
- Continue to embrace technology alongside providing the necessary training for its employees to fully take advantage and exploit the opportunities it offers.

Conflict of Interest Statement

The authors declare no conflicting interest in the conduct of the study.

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