



# 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.

### 2.1 Digitalization 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 (Hollington, 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 (Hollington, 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 of 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

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

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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            | <ul style="list-style-type: none"> <li>Employed to centralize operations on importation and exportation.</li> </ul>  |
| TradeNet  | CEPS       | 2000            | <ul style="list-style-type: none"> <li>Used for electronic issuance and management of permits.</li> <li>Used concurrently with GCMS.</li> <li>Helped to curb fraudulent activities in permit acquisition.</li> </ul> |
| VAT Information Processing System (VIPS)                    | VATS       | 2000            | <ul style="list-style-type: none"> <li>Adopted to support electronic records of VAT transactions.</li> </ul>   |
| Ghana Integrated Tax Management Information System (GITMIS) | IRS        | 2001            | <ul style="list-style-type: none"> <li>Used as an electronic payment and collection system.</li> </ul>   |
| Large Taxpayers Information Processing System (LTIPS)       | LTU        | 2001            | <ul style="list-style-type: none"> <li>Used for the processing and assessing of direct and indirect taxes.</li> </ul>  |
| Tax Identification Number (TIN) System                      | LTU & CEPS | 2002            | <ul style="list-style-type: none"> <li>Registration and issuance of TIN.</li> <li>Used concurrently with LTIPS.</li> </ul>   |

**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

| <b>Infrastructure</b>     | <b>Objective</b>  |
|---------------------------|---|
| 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.

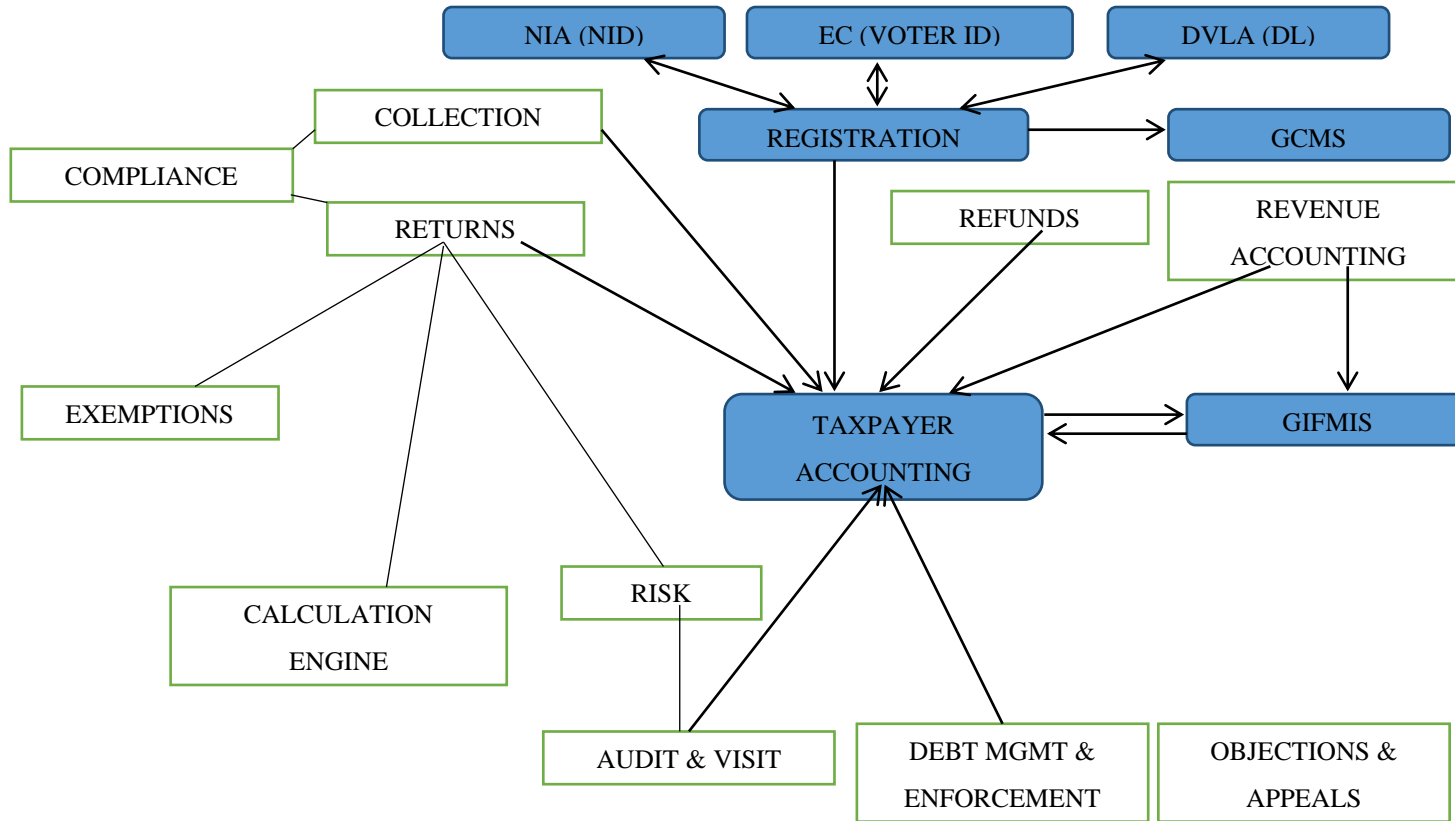


Figure 1: The workflow of the TRIPS modules

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*

| <b>Implementation Section</b> | <b>Required Resources</b>  |
|-------------------------------|--|
| Infrastructure                | -Appropriate location of Offices to accommodate system installation.<br>-Networks for connectivity<br>-Power stability<br>-Help desk<br>-IT infrastructure |
| Applications                  | -System testing<br>-Configuration procedures<br>-Deployment process<br>-System Maintenance   |
| Facilities                    | -Civil works e.g., server rooms<br>-Logistics, procurement, and fleet management<br>-Power support systems   |
| Change Management             | -Preparation for change<br>-Re-enforcing change<br>-Managing change  |
| Tax Expert                    | -Evaluation of business and system requirement specifications<br>-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.<br>-Used concurrently with GCMS.<br>-Helped to curb fraudulent activities in permit acquisition. | 2000            | Replaced (Integrated with TRIPS) | -Limited functionality in the processing of documents.<br>-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.<br>-Data inconsistency<br>-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.<br>-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.<br>-No integrated TIN  |
| TIN System  | -Registration and issuance of TIN.<br>-Used concurrently with LTIPS.  | 2002            | Not in use                       | -Lack of automatic updates to the systems.<br>-Data inconsistency.  |

|       |   |      |                  |   |
|-------|---|------|------------------|---|
| TRIPS | -Integrated system to support all operations of GRA as a holistic body. | 2010 | Currently in use | -Cultural challenges.<br>-Change management.<br>-Computer illiteracy.<br>-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 furth Wisconsin Journal of Arts and Sciences, Vol. 5, No. 1, 2023,14 – 38 (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), an 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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