

THE EFFECT OF IFMIS ADOPTION ON FINANCIAL REPORTING QUALITY IN TANZANIAN LOCAL GOVERNMENTS

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ABSTRACT

This study investigated the influence of Integrated Financial Management System (IFMIS) adoption in financial reporting quality (FRQ) in the Local Government Authorities (LGAs) in Tanzania. The FRQ in this study was addressed using qualitative characteristics (QCs) of accounting information which are understandability, relevance and reliability. This study used theoretical pluralism, whereby three theories and one model were applied, namely, innovation diffusion theory (IDT), technology, organization and environment (TOE), task technology fit (TTF) as well as the DeLone and McLean (D&M) model. Based on a theoretical framework, the study added six control variables: LGA type, LGA size, utilization capacity, IT control environment, internal audit function, as well as audit committee. The study used secondary data from Controller and Auditor General (CAG) reports for the period of 11 years from 2003/2004 to 2013/2014, covering 163 LGAs. To test for the difference between the Pre-IFMIS period and the Post-IFMIS period, a paired t-test and a generalized linear model (GLM) were applied and the results show that IFMIS adoption only has influence on the quality of the understandability. No significant influence was found for the quality of the relevance or the reliability. Further analysis was conducted using ordinary least square (OLS) while controlling for six control variables. The results from OLS show that IFMIS adoption has significant influence on the quality of both the understandability and reliability, while the quality of the relevance remained as not significant. Hence, this study reveals that the adoption of IFMIS has improved the quality of both the understandability and reliability of FRQ, while the quality of the relevance has not changed significantly. In addition, the study results show that for IFMIS adoption to influence reliability, utilization capacity and internal audit effectiveness have to be taken into consideration.

Key words: *IFMIS; Qualitative characteristics of accounting information (QCs); Financial Reporting Quality (FRQ); Audit opinion, audit report lag.*

INTRODUCTION

Scholars interested in the relationship between information technology (IT) and financial reporting have focused on business organizations and the role IT plays, based on its rapid development, the availability of friendly accounting software (Rajeshwaran & Gunawardana, 2013) and its potentiality to transform those organizations (Azzali & Mazza, 2013; Ianniello, et al., 2013; Robey & Boudreau, 1999; Vaassen, 2002; Vaassen, Meuwissen & Schelleman, 2009).

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These studies consider that IT has helped to automate accounting processes from manual to computerized, including implementation of an integrated approach. Integrated solutions, such as Enterprise Resource Planning (ERP), are considered crucial because they are perceived to help modernise accounting processes and improve the quality of accounting information (Corsi, Rizzo & Trucco, 2013).

However, while there is a volume of literature on this relationship, there are limited studies which have been conducted to assess the relationship between IT and financial reporting quality, hereafter referred as FRQ, in public sector organizations (Dwyer & Wilson, 1989; Edmonds, et al., 2017; McLelland & Giroux, 2000; Pinnuck & Potter, 2009; Sohl, Waymire & Webb, 2018). Even though these studies addressed FRQ in Local Governments (in Tanzania called Local Government Authorities hereafter LGAs), it is only McLelland and Giroux (2000) as well as Sohl, et al., (2018) which investigated the relationship between IT and FRQ. In addition, these studies have not considered FRQ as a multidimensional concept by using only one aspect of measures. For example, while Pinnuck and Potter (2009) used accrual models other studies used relevance in terms of timeliness. Outside public sector, studies which have investigated the influence of IT on FRQ include Dorantes, et al. (2013), Heninger, Johnson and Kuhn (2018) as well as Paredes and Wheatley (2018). For example, the study conducted by Heninger, Johnson and Kuhn (2018), while interested in the relationship between IT and FRQ, examined the relationship between IT related internal control weaknesses and earnings management using an accrual model approach. Paredes and Wheatley (2018) also conducted a study to examine the impact of IT on earnings management using accrual management. Using ERP, Paredes and Wheatley (2018) went beyond Heninger et al. (2018) by taking into consideration not only the IT but also the integration of the information systems. This is consistent with the earlier study conducted by Dorantes, et al. (2013), who examined the relationship between the implementation of an enterprise system and improvement of the information environment in terms of FRQ by accommodating the integration and support of various business. According to Dandago and Rufai (2014), it is recognised that the presence of integrated systems will improve the quality of accounting information. This aspect has also triggered public sector organizations, such as Local Government Authorities (LGAs), to spend enormous resources to apply IT to their accounting systems in the expectation of improving their FRQ. As argued by Barata and Cain (2001), IT is considered crucial for providing financial accountability in public sector organizations; hence, its use has been promoted in most government organizations. It is that perspective that has triggered most countries to adopt integrated financial management information systems (IFMIS) in different public sector, such as LGAs.

From a practical perspective, IFMIS is considered to be an information system which tracks financial events and provides financial information through an automated accounting system (Combaz, 2015; Dorontisky, 2003; Laizer & Suomi, 2016; Hendriks, 2012; Rodin-Brow, 2008). IFMIS is built based on ERP solutions, which include examples of EPICOR, SAP, Free Balance, ORACLE, Microsoft Navision and so on. The use of integration was necessary since most ERP solutions were considered not to have all the required modules for public sector financial management because they were designed for business organizations (Laizer & Suomi, 2016). According to Qwabe (2014), IFMIS is an ICT application which advances good governance principles, including transparency and accountability. While Qwabe (2014) limits the explanation of IFMIS to ICT application, other authors, such as Hendriks (2001), Diamond and

Khemani (2005), Dorotinsky (2003) as well as Rodin-Brown (2008), consider IFMIS to go beyond IT application even though it is based on an IT platform. To Hendriks (2012) and Qwabe (2014), IFMIS can improve the quality of accounting information because it has the capacity to provide comprehensive financial reporting.

Hendriks (2012) and Qwabe considerations are based on a technology adoption perspective. This perspective considers that the use of IT will eliminate time consuming procedures, reduce error practices, as well as bringing simplification through a central accounting database, parallel data flow and increased throughput (Bergeron, 2003; Doolin & Troshani, 2007). These advantages are consistent with three theories. The first theory is innovation diffusion theory (IDT), as developed by Rogers (1983), which considers five main attributes of innovations that influence adoption, namely, relative advantage, compatibility, complexity, trialability and observability. The second theory, which is technology-organization-environment (TOE) as developed by Tornatzky and Fleischer (1990), considers three contexts influencing the propensity to adopt, namely, technological context, organizational context and environmental context (Baker, 2012; Lin & Lin, 2008; Oliveira & Martins, 2011; Pan & Jang, 2008; Thong, 1999). The third theory is task-technology fit (TTF), which was developed by Goodhue and Thompson (1995). TTF considers that IT will have positive impact on the task performed if there is a match between the task characteristics and the technology characteristics. TTF is also considered because it is concerned with the utilization and performance impacts of the system at an organizational level. These theories of adoption are useful in studying IFMIS adoption because they consider organizational variables associated with IT adoption. However, since these theories are associated with the factors which can lead to adoption, they do not address the dependent variables of IT adoption. The dependent variable which is FRQ is addressed by using DeLone and McLean (D&M) model which was developed by DeLone and McLean in 1992 and revised in 2003. The D & M model has been extended and critically reviewed by a number of studies which include Seddon (1997) and Seddon et al. (1999). According to the D&M model, one of the dependent variables is information quality, which measures the output of the information system in the form of reports. The indicators of information quality, as identified by the D&M model, are consistent with qualitative characteristics (QCs) of FRQ, as identified by van Beest, Braam and Boelens (2009). However, these studies did not focus on IFMIS as well as public sector organizations, such as LGAs. Hence, this study aimed at addressing this gap by examining the relationship between IFMIS adoption and FRQ in LGAs. It addresses the question: What is the influence of IFMIS adoption on the FRQ of LGAs in Tanzania?

By doing so, this paper enhances the understanding of the influence of IFMIS adoption on FRQ in LGAs. The Tanzanian scenario is interesting for four reasons. Firstly, Tanzania has implemented IFMIS as a customized EPICOR system since 1998 and it is considered one of the successful countries in implementing IFMIS. Secondly, IFMIS has been upgraded a number of times since 2000, hence, complicating its implementation because different LGAs were operating different versions of IFMIS. Thirdly, the number of LGAs using IFMIS has increased from the original 32 to all 163 LGA in Tanzania and this is implemented through the Ministry responsible for LGAs, while LGAs only receive and use the system. Fourthly, according to the Controller and Auditor General (CAG), the IFMIS implementation has been marred by issues such as requiring upgrades to accommodate IPSAS adoption. In these circumstances, the question remains as to whether the adoption of IFMIS can help LGAs process and produce

accounting information of the required quality. Despite the above-mentioned status, limited studies have been conducted to explore that relationship. For example, Laizer and Suomi (2016) investigated the challenges hindering IFMIS from providing timely and accurate reports in Tanzanian LGAs and found that inter-operability issues (no integration), systems proliferation (no coordination and systems duplication), a limited IT infrastructure and personnel, decentralized and centralized design, as well as running parallel systems (both manual and automated) were the main challenges. Likewise, Wynne (2005) as well as Hove and Wynne (2010), while both interested in IFMIS practices in Tanzania, focused on experience of public sector financial reforms and IFMIS was considered to be part of it. Peterson (2007) reviewed implementation of IFMIS in African countries by comparing the Ethiopian and Tanzanian experiences, but did not consider the effect of IFMIS adoption on information quality. These studies are consistent with Hendriks (2012), who argues that the introduction of IFMIS has been aimed at improving efficiency, effectiveness, accountability, transparency, security of data and comprehensive financial reporting, but did not test to see whether that has been achieved.

Outside Tanzania, there have been a number of studies conducted on the effect of IFMIS. For example, in Kenya the study conducted by Njonde and Kimanzi (2014) investigated the effect of IFMIS on public sector performance and used financial reporting as one of the factors for IFMIS performance. On the other hand, Lundu and Shale (2015) investigated the effect of IFMIS on the supply chain, while Selfano, Peninah and Sarah (2014) investigated the effect of IFMIS on cash management, based on the reliability and security of IFMIS. In Uganda, Kasumba (2009) investigated the adoption of IFMIS in Ugandan LGAs and focused on socio-economic factors affecting successful adoption of IFMIS, while Mugaga (2017) investigated the influence of IFMIS on the quality of financial statements, also in Uganda. Mugaga's (2017) study may be consistent with the objective of our study, but did not investigate each qualitative characteristic (QCs) separately and did not make comparison between the pre-adoption and post-adoption periods. Hendriks (2012) conducted a study in South Africa aimed at identifying the challenges and risks involved in the implementation of IFMIS, and found that there are a number of challenges, hence not always enabling IFMIS to achieve the desired objectives. Hence, our current study will extend the extant literature by specifically assessing the effect of IFMIS on three measurements of FRQ (understandability, relevance and reliability) as well as utilizing the D&M model, Rogers's IDT, TOE as well as TTF.

In order to achieve the objective of this study, the current study was conducted using audit reports from the Controller and Auditor General (CAG) for LGAs for the period of eleven years, from the financial year 2003/2004 to the financial year 2013/2014. The selection of eleven years was considered because it included both pre-adoption and post-adoption periods of IFMIS for all LGAs. Our tests include tests for the difference between pre- and post-IFMIS adoption, using a paired t-test as well as a Generalized Linear Model (GLM). The study found no difference between pre-IFMIS and post-IFMIS for relevance and reliability, while for understandability the results suggest that adoption of IFMIS increases the understandability of financial reporting. In addition, when IFMIS adoption interacted with the type of LGA, the results indicate that there is no significant influence on all types of FRQ. We further extended the analysis by testing the association between IFMIS adoption and FRQ, including other six variables (LGA type, LGA size, Utilization capacity, IT control environment, internal audit efficiency and Audit Committee effectiveness). The results from this extended analysis, using

Ordinary Least Square (OLS) after controlling for those six determinants, show that IFMIS adoption has the significant capacity of increasing 0.047 to the understandability, and 0.467 to the reliability, while the increase of 0.062 to the relevance was found to be not significant.

This paper contributes to an ongoing literature in accounting information systems, auditing and financial reporting that addresses the effect of computerisation of accounting systems on the quality of financial reporting. For example, studies such as Dorantes et al (2013), Paredes and Wheatley (2018), while they were concerned with effect of IT implementation on FRQ, they focused on earnings management. In contrast, our study focuses on the effect of IT on FRQ, using reports from the auditors, hence providing new archival evidence that IFMIS adoption has an effect on FRQ in public sector organizations. In addition, the findings of this study add to recent studies, such as those by Du and Wu (2018), Johnston and Zhang (2018) as well as Sohl, Waymire and Webb (2018) on the effect of IT (XBRL) on the timeliness of financial reporting. Of those three previous studies only Sohl, et al (2018) was undertaken in LGAs. Secondly, this study uses a multiple theoretical approach, comprising IDT, TOE, TTF as well as D&M model, to generate both independent and dependent variables. According to van der Meer-Kooistra and Voss Elman (2012), theoretical pluralism (heterogeneity) helps to expand understanding, provide complete knowledge as well as allowing the articulation of other voices to be revealed.

This theoretical approach is consistent with arguments provided by Thong (1999), that theoretical pluralism provides a richer, and potentially more explanatory, model. The use of theoretical pluralism has helped this study to expand the measurement of FRQ, as well as generate other determinants which need to be controlled when assessing the effect of IFMIS. The use of organizational-oriented theories is important in this study because the adoption of IFMIS in LGAs was top-down; hence LGAs' managers had little say in the situation and an individually based model may not be appropriate at the LGA level. Finally, this study also has managerial implications for LGAs in the developing countries context. While previous studies have indicated the influence of IT adoption on financial reporting, very limited studies have been conducted at the LGA level (see for example Mugaga, 2017) and on the adoption of IFMIS (Kasumba, 2009). These previous studies indicate that IFMIS adoption at the LGA level is imposed by the Central government and donors without considering the requirements of the LGAs. Hence, this study provides inputs to LGAs managers and policy makers to consider the information quality angle when they make decisions about adopting or evaluating IFMIS. This is consistent with Edmonds, et al's (2017) study, which shows that poor quality of accounting information in terms of timeliness is associated with high costs to the LGAs.

The rest of the paper is structured into four sections. The next section covers the review of theoretical perspective of the study, as well as measurements of FRQ. Then section three provides the hypotheses of the study, followed by the section covering the research methods whereby the sample, data collection as well as data analysis plus measurements of the variables are discussed. In section four, we present and discuss the results of the study. The final section is a summary and conclusion of the study, whereby we summarize the findings, outline the limitations of the study, as well as provide areas for potential research in the future.

THEORETICAL PERSPECTIVE THE STUDY

Adoption of information technology in accounting systems has been going on for quite a long time, based on the objective of organizations that they improve the quality of the information needed to enhance decision making. Various theories have been put in place to explain and predict the impact of adopting certain kinds of information technology on accounting system products i.e. accounting information. These theories and models have been adopted, modified, developed and validated by researchers to gain understanding and prediction of technology adoption (Benbasat & Zmud, 1999; Venkatesh et al., 2003). Based on a number of theories which have been put forward, it is very difficult to utilize all of them. As such, this study adopted three theories, namely, IDT, TOE and TTF as well as D&M model for measuring information systems success. IDT was developed by Rogers (1983) and it attempts to provide factors for the adoption of IT-related innovations by organizations. In this theory, factors for adoption are classified into three characteristics: individual characteristics, internal characteristics of the organization and external characteristics of the organizational structure. As such, IDT takes into consideration both the micro- and macro-perspective of adoption in the organization.

As put by Straub (2009), IDT is a micro-perspective when it focuses on the individual characteristics and internal organizational structure, while it is a macro-perspective when it considers adoption across time and includes external organizational characteristics. IDT considers innovation and adoption as a process which describes the decision to adopt, or reject, a given technology and this process includes innovation itself, communication channels, social systems and time (Oliveira & Martins, 2011; Straub, 2009). This process comprises five stages, namely, knowledge, persuasion, decision, implementation and confirmation (Rogers, 2003). While IDT is relevant to understanding IFMIS, it cannot be applied as a single theory in this study because IFMIS adoption in Tanzanian LGAs followed a top-down approach (*see*, Laizer & Suomi, 2016). In this approach, stages of persuasion and decision to adopt or reject IFMIS were not at the LGA level but at the Central Government level. The LGAs only were involved at the implementation and confirmation stages. As such, IDT may not be a comprehensive theory to explain the consequences of IFMIS adoption in the LGAs, but it is still a useful tool to analyse the consequences of implementation, as well as to confirm the expected results of IFMIS adoption on FRQ.

IDT can help to understand factors associated with internal and external organizational characteristics which will influence the relationship between IFMIS adoption and FRQ. However, another limitation is that IDT focuses on the decision-making unit context and not on technological contexts; hence, there was a need to consider another theory which takes into consideration the technological context. As such, TOE, which explains three elements of the organizational context influencing adoption of technology, was considered appropriate. According to Ilin, Ivetić and Simić (2017), the TOE framework has been directly derived from IDT but it does not assign the involvement of individual characteristics and does take into consideration the environment in which the organization is operating. The three elements are technological context, organizational context and environmental context. Technological context is concerned with both the internal and external technologies that are relevant to the organization (Oliveira & Martins, 2011). According to Baker (2012), technological context includes technologies that are already in use by the organization and those that are available in the market because they both influence the decision about adoption. Organizational context is concerned

with the characteristics and resources of the organization, including items such as size, scope, structure and so on (Baker, 2012; Oliveira & Martins, 2011). For the environmental context, TOE is concerned with the structure of the industry, presence and absence of technology, service providers, regulatory environment and competition. The latter two contexts (i.e. organizational and environmental) are consistent with IDT, while the technological context is consistent with TTF.

TTF theory is one of the information system theories dealing with the impact of information technology on performance. It argues that, for information technology to improve performance there is a need to match information technology capabilities to the tasks to be performed (Goodhue & Thompson, 1995). This theory is relevant in the current study because it helps to explain whether successful adoption of IFMIS is based on the match between IFMIS and LGAs' operations. In other words, the TTF helps to understand the compatibility between technology characteristics of IFMIS and tasks characteristics in the LGAs including accounting tasks characteristics (Glowalla & Sunyaev, 2014; Goodhue & Thompson, 1995). As found by Laizer and Suomi (2016), IFMIS implementation in LGAs in Tanzania was faced with three main challenges which are consistent with the TTF perspective. These challenges are interoperability caused by having different systems which are not integrated, systems proliferation which is concerned with lack of coordination, hence duplicating efforts, and the limited IFMIS support structure.

Glowalla and Sunyaev (2014) argued that using TTF helps to explore whether the fit between tasks characteristics and technology characteristics can influence systems performance and use. Consistent with our study, we consider that FRQ can be used to express the systems performance in terms of IFMIS. The use of FRQ as an indicator of system performance is consistent with Goodhue and Thompson's (1995) dimension of quality in information systems, which helps us to explain whether IFMIS is compatible with government accounting systems. However, the main difference with those studies is that they focused on data quality and ERP in general, and not specifically IFMIS and FRQ. This perspective is also supported by the D&M Model, which is concerned with the six dimensions of information system success, developed by DeLone and McLean in 1992 and revisited in 2003. The model explains the relationship amongst six dimensions: information quality, system quality, service quality, system use/usage intentions, user satisfaction and net system benefits.

While all the dimensions are critical, in our study we are interested in one dimension, information quality, due to the importance of accounting information in the decision-making process. This is consistent with the IASB (2010) framework as well as Positive Accounting Theory (PAT), which argues that the primary objective of financial reporting is to provide accounting information for decision making. However, PAT has focused more on items believed to influence the quality of financial statements and not the quality considered by the users of accounting information. In the case of the IASB conceptual framework, this seems to be confusing and inconsistent because it mixes hierarchical aspects of accounting information and the usefulness of information for the decision process (Gerber, Gerber & van der Merwe, 2015), as well as lacking clear characteristics of the conceptual frameworks and failing to consider admissible accounting standards (AAA-FASC, Ohlson, et al., 2010). As such, the D&M Model is considered appropriate because it provides information quality attributes which are concerned

with decision usefulness. D & M model identifies various attributes which are considered in terms of content and characteristics of the information which the system can store, deliver and produce that is to say the quality of the information that the system produces (DeLone & McLean, 1992). The measures for the quality which are numerous as identified by the model and validated by various studies include accuracy, precision, reliability, relevance, understandability, comparability, completeness and so on (Eppler, 2006; Ojo, 2017; Vassen, 2002; Xu, 2003). The identified measures are consistent with qualitative characteristics (QCs) of accounting information as provided by the financial accounting conceptual framework (de Koning, 2013; Bovee, Roberts & Srivastava, 2009; Ritchi, Wahyudi & Susanto, 2015), also takes into consideration measures used by both managers and accounting practitioners (Eppler, 2006).

Measuring financial reporting quality

There are different measurements of FRQ in the accounting literature because different user groups have different interests and objectives. As put in the IASB (2010) conceptual framework, users have different, and possibly conflicting, information needs and desires. This creates problems of context-specificity and user-specificity (van Beest et al., 2009). As result, researchers use many different measures as indicators of FRQ. These measures are grouped into four categories: accrual models, value-relevance models, specific elements in annual reports, and qualitative characteristics (QCs) of accounting information (van Beest et al., 2009). Accrual models and value relevance measures, while they are easy to collect data and compute, they tend to focus more on earnings quality and they are considered as indirect measures of FRQ. These indirect measures may ignore the importance of accounting information in the decision- and policy-making process, even though it has been clearly acknowledged by renowned economists, such as Joseph Stiglitz, that accounting measures are useful for policy- and decision-making (Stiglitz et al., 2006). In addition, accrual models and value-relevance models are oriented towards the stock market and are output-oriented, that is, they focus on information disclosed on financial statements of FRQ for listed companies and not privately held companies and public sector organizations, such as LGAs. It is difficult to generate measures from these types of organizations because their information is not readily available in the market and public sector organizations do not operate from a market perspective. As such, it is difficult to use market-based measurements because they may not adequately reflect the nature and conditions of the LGAs. In the case of specific elements in annual reports, while they are considered to measure directly FRQ, it is difficult and may focus only on selected items in the financial report.

As such, in this study we used QCs as a measurement of FRQ. QCs, while they are difficult to operationalize as per van Beest et al. (2009), they are a direct measure of FRQ and focus on the decision-usefulness of accounting information. The use of QCs is also considered important by Garnsey and Fisher (2008), who argue that financial statements provide guidance and information for decision makers to make financial decisions. Similarly, Robu, Istrate and Jaba (2015) found that QCs of accounting information have a positive influence on investor's decisions and can lead to growth in prices. Duréndez & Gómez-Guillamón (2003) used a questionnaire to assess the usefulness of the audit report to investors and found that audit reports are useful for investment and financial decisions. However, an earlier study conducted by Lin, Tang and Xiao (2003) on users' response to the qualification of audit reports in China found mixed results about the usefulness of accounting information to the decision makers. Those previous studies show that QCs still needed to be investigated. Following a hierarchy of

desirable characteristics of accounting information, we selected, as measures for the user-specific quality, understandability and the primary qualities of relevance and reliability. These measurements are based on the three objectives of accounting information provided by Seddon (1991), who stated that accounting has the objectives to provide management with information useful for planning and control, to provide external users with information useful for predicting the future and to provide information for accountability purposes. According to the standard setters (IASB and FASB for U.S.), understandability is concerned with making users understand the accounting information within the context of the decisions being made. This explanation is consistent with Smith and Taffler (1992), who argue that understandability is concerned with the capability of users in generating appropriate meaning from financial reports. In addition, our selection of FRQ measures is consistent with Epler's (2006) information quality criteria.

While the explanation looks similar, the challenge has been about how to measure understandability, due to lack of consensus on the part of academia (Smith & Taffler, 1992; Jones & Smith, 2014). The studies, which have attempted to measure understandability, have used the readability of the narratives of disclosures. However, readability measures have limitations. The limitations include ignoring the influence of accounting standards, and focusing more on assessing the difficulty of passages (Smith & Taffler, 1992) and not the usefulness of the accounting information for decision-making. Garnsey and Fisher (2008) argued that studies dealing with the readability of financial statements concluded that the readability of financial statements is difficult, hence making understandability problematic. Similarly, Boritz, Hayes and Timoshenko (2016) argue that readability is not a well-defined construct and its measures depend on the context of application. As such, it is difficult to use readability as a measure of understandability. Hence, in this study, the measurements are focused on the theoretical perspective of the standard-setters, who consider that accounting standards have been set so that once the financial reports are produced based on those standards, general users can understand and use the information for decision-making. As per IASB (2010), the general users are assumed those who are diligent with reasonable business knowledge. It is our perspective that financial reports that comply with accounting standards will be more understandable than those which do not comply with those standards.

The measurement of relevance is based on the argument provided by Chêne (2009) and Stoner et al. (1995) that information is relevant when it reaches the desired person at the right time to enable proper action to be taken. Robu et al. (2015) argue that accounting information is relevant if it has a predictive and informative value, to ensure that investors estimate the market value of the organization. van Beest et al (2009) argue that a better measurement of relevance are predictive values because they provide input to predict the processes used by capital providers, as well as disclosure of business opportunities and risks, which complements financial information with non-financial information, as well as providing the use of fair value. While these measurements reflect relevance, they ignore the timeliness aspect in terms of when the accounting information is provided. In other words, they are only concerned with the aspect of making a difference in the decision making, and not the right time for the information to reach the general user. Obaidat (2007) asserted that information must be available to the users before it loses its capacity to influence decisions. Based on that perspective, this study used timeliness to operationalize the relevance quality. The use of timeliness is consistent with the studies which

have applied the audit report lag, such as Jaggi and Tsui (1999), Khlif and Samaha (2014), as well as Naimi, et al. (2010).

Reliability is concerned with the confidence users have in the information presented, as well as the confidence that it is free from material error and bias. Maines and Wahlen, (2006) define reliability as the degree to which a piece of accounting information: (1) uses an accounting construct that objectively represents the underlying economic construct it purports to represent, and (2) measures that construct without bias or error using the measurement attribute it purports to use. These two conditions need to be verified by the external auditors to give confidence to the users that the information presented is reliable. As put by van Beest et al (2009), the auditors' report adds value to the financial reporting by providing reasonable assurance about the degree to which financial information represents economic phenomena faithfully. According to the conceptual framework issued by IASB (2010), the term 'reliability' was replaced by 'faithful representation', hence removing the aspect of prudence and verifiability. The removal of the term may be attributed to the difficulty involved in observing it directly and measuring it (Maines & Wahlen, 2006). In our view, replacing reliability by faithful representation tends to focus more on an aspect which is free from bias. This ignores the aspect of free from material error, as well as considering verifiability as a component of reliability, rather than a mechanism to assess reliability (Maines & Wahlen, 2006). We consider that verification carried out by the external auditors will help the users to assess the extent of reliability they assign to the given financial statements.

Hypotheses Development

IFMIS and the Quality of the Understandability

Rodin-Brown (2008) points out that IFMIS enables data grouping of financial data for recording financial events and enhancing internal controls during data entry and transaction processing and reporting by eliminating redundant and duplication of data. Rupanagunta (2006) asserts that data entered in the specified formats needs to be presented in an easy way for the user to understand and use to make valuable economic decisions. This is consistent with Königer and Reithmayer (1998) quality dimensions which categorise understandability in the group of quality of presentation together with interpretability, conciseness and consistency (Eppler, 2006). The IASB (2008) insist that information should not be omitted because it may be complicated or difficult for stakeholders to understand and comprehend the meaning of. Wongsim and Gao (2011), in their exploration of information quality (IQ) in AIS adoption within manufacturing firms in Thailand, developed a framework which measured information quality (IQ) dimensions from 16 dimensions, including understandability, found that understandability had a positive relationship with AIS adoption processes.

Based on the preceding argument, our first hypothesis is concerned with the influence of IFMIS adoption on the quality of understandability. Understandability considers whether the information in the financial report is well-organized and easily understandable by potential users with reasonable business knowledge and a willingness to study and understand (IASB, 2010; van Beest et al 2009). It is considered here that automation of accounting systems will enhance compliance with accounting standards, which in this case is IPSAS (Imeokparia, 2013), hence making accounting information more understandable to general users. Hence, the following

hypothesis was developed to assess the influence of IFMIS adoption on the understandability of the financial reporting in the LGAs in Tanzania:

H₁: The quality of understandability of FRQ for post-IFMIS is higher than the quality of understandability of FRQ for pre-IFMIS in the LGAs in Tanzania.

IFMIS and the Quality of the Relevance

Dorotinsky (2011) holds the view that IFMIS can improve public financial management by increasing confidence and trust in the budget. This is due to recognition that an increase in the relevance of the information provided by the management will be due to timely-generated and accurate reports, following a quick and an efficient processing of the accounting data. Timeliness is a crucial element for FRQ because accounting information has aspects of perishability and, like any other information, it can expire and lose value. To be useful, therefore, the accounting information needs to be published at the appropriate time or it would not be relevant. Relevance is crucial because it helps users in making and evaluating economic decisions regarding the allocation of meagre resources. The IASB (2008: 35) defined relevance as the ability “of making a difference in the decisions made by users.” The information provided by any information system must be presented to the users in time for proper action to be taken (Stoner et al 1995). Chêne (2009) pointed out that IFMIS increase the quality of financial reporting, due to timely and accurate generation of transactional and financial information.

Studies conducted by Khan (2002), Brazel and Dang (2005), as well as Salehi and Torabi (2012), investigated the effect of IT on the QCs of financial reports, the effect of web-based financial reporting on the QCs, internet financial reporting, future prospects and the impact of implementing ERP on the usefulness of financial information. All these studies concluded that IT increased the relevance of financial information. Wongsim and GAO (2011), who studied information quality in accounting information systems adoption within manufacturing firms in Thailand, found that IT led to increased speed, and timely preparation and submission of financial returns. However, these studies focused on the commercial sector.

Studies conducted in public sector concluded that IT adoption increased speed, timeliness, accuracy and possibility of producing quality data hence improving the quality of financial reports in terms of timeliness (Murungi & Kayigamba, 2015; Patrick, et al., 2013; Selfano, et al., 2014; Sugut, 2012). Based on this argument, our second hypothesis considers that IFMIS adoption has an influence on the quality of the relevance. As such, relevance quality in this case is when the information provided reaches the desired person at the right time to enable proper action to be taken (Chêne, 2009; Stoner et al 1995). Hence, the following second hypothesis was developed to assess the influence of IFMIS adoption on the relevance of the financial reporting in the LGAs in Tanzania:

H₂: The quality of the relevance of FRQ for post-IFMIS is higher than the quality of the relevance of FRQ for pre-IFMIS in the LGAs in Tanzania.

IFMIS and the Quality of the Reliability

The influence of IFMIS on FRQ has been connected to the merit of using IT in preparing and generating reliable financial statements. For example, Chêne (2009) argues that IFMIS may lead to generation of reliable financial information. As already argued, to make financial reports

authentic they should be certified by an independent and qualified person, known as an auditor. Auditors' reports are considered to add credibility to financial reports, since they provide reasonable assurance to the users about the degree to which they represent economic phenomena faithfully and are free from material error. According to Diamond and Khemani (2005), IFMIS facilitate the availability of detailed and reliable reports in an efficient manner by enhancing the control of information, which improves FRQ through the provision of accurate financial data.

McKinney (2004) considers that the utilization of IT in financial reporting and the processing of government financial transactions is expected to generate reliable accounting information. This is consistent with Imeokparia (2013)'s, study which found that IT enhances the accuracy, reliability, relevance and completeness of financial reports to a sufficient and ample level. However, studies conducted by Yazdanpanah (2014), as well as Salehi and Torabi (2012), on the effect of IT on the reliability of financial information found that the application of IT has a negative effect on the reliability of financial information. A major limitation of these studies is that they were conducted in the commercial sector, hence becoming difficult to generalize in the public sector with different conditions. Other studies, conducted in Kenya by Selfano (2014) based on IFMIS and its effect on cash management, as well as Njonde and Kimanzi (2014), who studied the effect of IFMIS on performance of the public sector, found that the quality of the reliability was evidenced by provision of adequate management reporting to support government decisions and budget preparation. Since our study was conducted in LGAs, which are public sector organizations, and because the literature on IFMIS argues that it will enhance reliability (Diamond & Khemani, 2005), our third hypothesis was developed as follows:

H₃: The quality of the reliability of FRQ for post-IFMIS is higher than the quality of the reliability of FRQ for pre-IFMIS in the LGAs in Tanzania.

RESEARCH METHODS

Description of variables

There are different measurements of FRQ in the accounting literature, as has been illustrated in section 3. In this study, to capture FRQ, three QCs, namely, understandability, relevance and reliability are used. In the case of the quality of the understandability (UnderQUAL), this was described by a compliance level with IPSAS. As per IASB (2010), it is considered that accounting standards are developed in order to enable general users of accounting information to understand financial statements. As such, this study considers that the more the financial statements comply with accounting standards, the greater the understandability. This is based on the assumption that financial statements with high compliance will disclose all required information and will be interpretable (Eppler, 2006). In this study, therefore, understandability was generated by computing the percentage of those not complying with 38 IPSAS (there were 38 IPSAS at the time) and then deducting the percentage obtained from 100% to generate a percentage for compliance. This was done because CAG reports identified queried issues with corresponding IPSAS which have not been complied. CAG reports do not identify IPSAS which have been complied. In this study, it is assumed that if, for example, the CAG report identified that three (3) IPSAS were not complied with by the LGA in a particular year, that means that during that particular year the LGA complied with 35 IPSAS (that is about a 92.1% compliance level).

For the quality of the relevance (RelevQUAL), this study used timeliness to describe this quality. The timeliness was captured based on the number of days which the LGA had delayed submitting its report to CAG for auditing purposes. The delay was considered as the number of days after the end of the 90 days (three months' period) granted to LGAs after the end of the financial year to complete the preparation of annual reports. According to the Public Audit Act of 2008, Section 38, the Local Government Finance Act of 1982 (as amended in 2000) section 45 (4), as well as Local Government Financial Memorandum (LGFM) of 2009, order 31 (1), LGAs are given 90-day deadline to submit their financial statement for auditing purposes after the end of the financial year. It was considered that if the LGA submitted its financial statement on time, the number of days in delays would be zero (0). The perspective of this study is that if LGAs submit their financial reports for auditing purposes, it means that the management considers that those reports are ready for usage, pending verifiability by the auditors. Therefore, those LGAs which do not delay production of financial reports are considered to do a timely production of the financial reports. The use of timeliness is consistent with other studies which have applied it in an audit lag, such as Jaggi and Tsui (1999), Khelif and Samaha (2014), Naime, et al. (2010), as well as Johnston and Zang (2018).

The last QC used was the quality of the reliability (ReliaQUAL), which was described using audit opinion. These audit opinions were categorised into four points, ranging from 1 to 4, whereby unqualified opinion was given point 4, qualified opinion was given point 3, adverse opinion was given point 2, and disclaimer opinion was given point 1. For each year, the LGA was given a score based on the type of audit opinion the LGA has received from the CAG. The use of audit opinion as an indicator of reliability is consistent with other studies (see Alrshah, 2015; Duréndez & Gómez-Guillamón, (2003); ICAEW, 2013; Maines & Wahlen 2006; Schneider & Church (2008). The independent variable, the adoption of IFMIS, was described by two categories. The first category comprised the period before adoption of IFMIS, which was termed Pre-IFMIS and was granted a score of "1." The second category comprised the period after adoption of IFMIS and was termed the Post-IFMIS period; this was connoted by "2."

Study data

The sample of data utilised in this study was secondary data, based on external auditors' reports to LGAs as generated by the CAG under the National Audit Office in Tanzania (NAOT). These reports were generated from the NAOT library and its website. The use of secondary data is considered to offer advantages in terms of costs, efforts and overcoming difficulties associated with data collection and replication, as well as being relatively more objective than primary data (Cowton, 1998; Hubbard & Vetter, 1996). Cowton (1998), for example, argues that secondary data coming from the government and regulatory bodies is robust because it can stretch back a considerable distance into the past, as well as being rich in the main issues surrounding the decisions made. The use of auditors' reports helped this study to generate the understanding from the experts consistent with the views provided by Boritz, et al. (2016), that understandability is determined by the expertise of the reader, familiarity with terminology, as well as the effort expended.

The secondary data used was extracted from the CAG reports for the period of eleven years, from the financial years 2003/2004 to 2013/2014. This period was selected because it was the peak of the Local Government Reform Programme (LGRP) which led to significant devolution

of authority and resources to make them more efficient, effective, transparent and accountable (Kessy & McCourt, 2010; Tidemand & Msami 2010). In addition, the selection of the period took into consideration the adoption of IPSAS by the country in 2005. To determine differences between the two periods (Pre-Adoption vs. Post-Adoption of IFMIS), the average score for each dependent variable was computed for each period. These averages were considered appropriate for two reasons. Firstly, the LGAs were not all established at the same time, that is, each LGA has its own year of establishment. Secondly, the LGAs have adopted IFMIS at different times, meaning that the Pre-IFMIS periods and Post-IFMIS periods are not uniform for all LGAs. Since the averages were used, all LGAs were included in both periods. The number of LGAs has been increasing from 133 in the year 2003/2004 to 163 during the financial year 2013/2014. As such, the sample for this study contained all 163 LGAs. as audited by the CAG in 2014. Since these were repeated in two periods, for further analysis the study had 326 observations. Table 1, below, shows the distribution of the data by indicating that, in terms of LGA type, 129 (258 observations) were generated from District LGAs while 34 (68 observations) were obtained from Urban LGAs. In the case of IFMIS adoption, the data was spread evenly between the two periods, Pre-IFMIS and Post-IFMIS periods, each having 163 LGAs.

Table 1: Profile of sample (observations)

Item	Number of LGAs	Observation	Percentage
LGA Type - District	129	258	79.1
LGA Type - Urban	34	68	20.9
IFMIS Adoption – Not Adopted		163	50.0
IFMIS Adoption – Not Adopted		163	50.0
	163	326	

Data analysis

As already alluded, the average score for each period for each LGA was computed and these scores were analysed using both descriptive statistics and inferential statistics (hypotheses testing). Descriptive statistics comprised frequency, percentage, mean and standard deviation (SD), which were used to assess consistency (variation) of each FRQ measure. For hypotheses testing, a paired t-test and a General Liner Model (GLM) were applied. The paired t-test was used to compare the performance of two periods of Pre-IFMIS and Post-IFMIS, because it helps to compare the means of two groups within a single sample, as well as helping to detect the difference in the means of the two measurement groups (Agin, 2008; Field, 2013; Hsu & Lachenbruch, 2008; Kim, 2015). As put by Field (2013), a paired t-test is used when there are two experimental conditions and the same participants took part in both conditions of the experiment. On the other hand, the GLM multivariate analysis of variance was used as an extension of the paired t-test because of the single independent variable, which was adoption of IFMIS (Adopt IFMIS), and the multiple dependent variables, which were the measurement of the FRQ (i.e. UnderQUAL, RelevQUAL and ReliaQUAL). As put by Ho (2006), as well as Leech, Barrett and Morgan (2005), GLM multivariate analysis is appropriate for multiple dependent variables and a single independent variable because it also takes into consideration the interaction amongst the dependent variables. In addition, application of the GLM in this study allowed for assessment of the interactive effect of LGA type and the adoption of IFMIS on FRQ.

Model specifications

Furthermore, the statistical analysis was extended to test the association between IFMIS adoption and FRQ using three measurements of FRQ as dependent variables, UnderQUAL, RelevQUAL and ReliaQUAL, together with control variables. These control variables were added to take into consideration factors associated with LGAs' characteristics that may have an effect on FRQ. This approach is consistent with the studies conducted by Sohl, et al. (2018), McClelland and Giroux (2000), as well as Dwyer and Wilson (1989), which found a number of factors that influence FRQ. The identified factors include external characteristics, size, complexity, regulatory constraints, capacity, financial viability (funds) and managerial competence. However, most of these studies were concerned with only one aspect of FRQ, which was relevance in terms of timeliness. In this study, therefore, we considered three categories of QCS and constructed three ordinary least square (OLS) regression models to test the hypotheses about whether IFMIS adoption has a positive influence on FRQ, as follows:

$$\text{UnderQUAL} = \beta_0 + \beta_1\text{IFMIS} + \beta_2\text{LGTYPE} + \beta_3\text{LNSIZE} + \beta_4\text{UTILIZCAPAC} + \beta_5\text{ITCONTROENV} + \beta_6\text{INTERNALAUDIT} + \beta_7\text{AUDITCOMM} + \varepsilon \dots \dots \dots (1)$$

$$\text{RelevQUAL} = \beta_0 + \beta_1\text{IFMIS} + \beta_2\text{LGTYPE} + \beta_3\text{LNSIZE} + \beta_4\text{UTILIZCAPAC} + \beta_5\text{ITCONTROENV} + \beta_6\text{INTERNALAUDIT} + \beta_7\text{AUDITCOMM} + \varepsilon \dots \dots \dots (2)$$

$$\text{ReliaQUAL} = \beta_0 + \beta_1\text{IFMIS} + \beta_2\text{LGTYPE} + \beta_3\text{LNSIZE} + \beta_4\text{UTILIZCAPAC} + \beta_5\text{ITCONTROENV} + \beta_6\text{INTERNALAUDIT} + \beta_7\text{AUDITCOMM} + \varepsilon \dots \dots \dots (3)$$

The dependent variables were defined as follows: For UnderQUAL = percentage of the compliance level with 38 IPSAS. RelevQUAL = number of days the LGAs had delayed submitting financial statements for audit purposes to the CAG after the end of 90-days period after the end of financial year. ReliaQUAL= the score for the audit opinion the LGA had received.

The primary variable, which was IFMIS adoption, was specified by 1 for the period the LGA had not adopted IFMIS and 2 for the period LGA had adopted IFMIS. Based on previous studies (Boritz, et al., 2016; DeZoort, Hermanson & Houston, 2003; Dwyer & Wilson, 1989; Ilin, et al., 2017; Krishnamoorthy, Wright & Cohen, 2002; Laizer & Suomi, 2016; Mabert, Soni, & Venkataramanan, 2003; McLelland & Giroux, 2000; Oussii & BoulilaTaktak, 2018; Sohl, et al., 2018), this study included additional independent variables to control for other possible determinants of FRQ in the LGAs.

These variables included LGA type (LGTYPE), which was expected to be positively associated with FRQ since, as LGAs operate in Urban areas, they were expected to attract knowledgeable staff as well as sophisticated users of financial statements. The LGTYPE was captured by 1 for Rural LGAs and 2 for Urban LGAs. Another variable was LGA size (LNSIZE); this was captured by the natural logarithm of the sum of availability of funds in terms of actual revenue collected by LGAs, the actual recurrent grants and development grants received from the central government. It was expected that the availability of financial resources would have a positive association with FRQ, since the implementation of systems requires adequate funding. In other

words, those LGAs with more funds would be able to address problems associated with IFMIS implementation and train their employees better than those with less funds.

The third variable was utilization capacity (UTILIZCAPAC), which was taken as an average percentage of LGA use of the development and recurrent grants provided. It was considered that LGAs with greater utilization capacity would be motivated to produce high FRQ to be able to attract more financial resources for the attainment of LGA goals. In addition, this study included three variables that are related to auditing practices in the LGAs which were expected to have a positive association with FRQ. These variables include the effectiveness of the IT controlled environment (ITCONTROENV), the internal audit function (INTERNALAUDIT) and the effectiveness of the audit committee (AUDITCOMM). These variables were measured by the compliance level of effectiveness items, as identified by auditors.

EMPIRICAL RESULTS

Descriptive statistics

The descriptive statistics of this study are presented in Table 2, below, which includes the frequency, percentage, mean and standard deviation (SD). These statistics are provided for three measurements: UnderQUAL, RelevQUAL and ReliaQUAL. In the case of UnderQUAL, which was measured by a compliance level with 38 IPSAS, the results indicate that for the Pre-IFMIS period, the compliance level for the majority of the LGAs was between 85 percent and 90 percent (about 53.4% of LGAs which is 87 LGAs). On the other hand, for the Post-IFMIS period, the majority of the LGAs were at a compliance level between 90 percent and 95 percent (about 89 LGAs, which is equivalent to 54.6%). Improvement was also observed for those complying below 85 percent, whereby for the Pre-IFMIS period there were six LGAs but there were none for the Post-IFMIS period. Similarly, for those complying 95 percent to full compliance, the number increased from 31 LGAs (about 20%) during the Pre-IFMIS period to 71 LGAs (about 43.6%) during the Post-IFMIS. On average, the results indicate that Post-IFMIS had greater compliance ($\bar{x} = 0.943$ or 94.3%, $SD = 0.022$ or 2.2% than Pre-IFMIS ($\bar{x} = 0.907$ or 90.7%, $SD = 0.038$ or 3.8%).

Table 2, below, also presents the results which indicate that, in case of RelevQUAL, for both periods before IFMIS and after IFMIS, the majority of LGAs (80% for Pre-IFMIS and 67.5% for Post IFMIS) submitted their reports on time. In this case, the results indicate that if we take days between 1 and 20 days, Pre-IFMIS has 23 LGAs, while Post IFMIS has 28 LGAs. For more than 21 days, Pre-IFMIS has 4 LGAs while Post IFMIS has 2 LGAs. These details are supported by calculated mean (\bar{x}) whereby during Pre-IFMIS, the mean is 2.439 days and Post IFMIS the mean is 2.64. This indicates that on average, the Post IFMIS period takes more days than the Pre-IFMIS. However, the variations of days for submission is higher for Pre-IFMIS period than for the Post-IFMIS period, as presented by SD (for Pre-IFMIS=5.92 and Post IFMIS=5.68).

For ReliaQUAL, in this study the consideration was that accounting information would be reliable if it had been rated high by the external auditor. The results, as presented in Table 2, below, indicate that adoption of IFMIS increased the number of LGAs getting an unqualified opinion (High reliability) from 96 LGAs (about 59%) during the Pre-IFMIS to 117 LGAs (about 77.8%) during the Post IFMIS. However, those getting a qualified opinion (Medium reliability) decreased from 56 LGAs (about 34%) during Pre-IFMIS to 23 (14%) during the Post IFMIS. On

contrast, in the case of low reliability, the adoption of IFMIS seemed to increase from 11 LGAs (about 12%) during the Pre-IFMIS to 23 LGAs (about 14%) during the Post IFMIS. Overall, descriptive statistics indicate that the Pre-IFMIS period had higher reliability ($\bar{x} = 3.367$, $SD = 0.816$) than the Post-IFMIS period ($\bar{x} = 3.190$, $SD = 1.317$). With control variables for OLS, the descriptive statistics show that IFMIS had $\bar{x} = 1.5$ and $SD = 0.501$, while for the control variables the mean ranged from $\bar{x} = 0.552$ (for INTERNALAUDIT) to $\bar{x} = 23.216$ (for LNSIZE), while SD ranged from 0.111 (for UTILIZCAPAC) to 0.955 (for LNSIZE. In the case of the FRQ measures, the mean ranged from $\bar{x} = 0.901$ (for UnderQUAL) to $\bar{x} = 3.336$ (for ReliaQUAL) and SD ranged from 0.048 (for UnderQUAL) to 5.588 (for RelevQUAL).

Table 2: Descriptive Statistics

	F	%	\bar{x}	SD	Min	Max
Pre-IFMIS						
UnderQUAL (Compliance with IPSAS)						
<85%	10	6.14				
85 - 90%	87	53.37				
90 - 95%	35	21.47				
95% <	31	19.02	0.907	0.038		
RelevQUAL (submission delays in days)						
< 1 day	132	80.98				
1 - 10 days	5	3.07				
11 - 20 days	18	11.04				
21 days <	4	2.45				
Not identified	4	2.45	2.439	5.920		
ReliaQUAL (scores based on audit opinion)						
High (unqualified)	96	58.9				
Medium (qualified)	56	34.36				
Low (adverse)	11	11.66				
Very Low (disclaimer)	0	0	3.367	0.816		
Post-IFMIS						
UnderQUAL (Compliance with IPSAS)						
<85%	0					
85 - 90%	3					
90 - 95%	89					
95% <	71		0.943	0.022		
RelevQUAL (submission delays in days)						
< 1 day	110					
1 - 10 days	9					
11 - 20 days	19					
21 days <	2					
Not identified	23		2.640	5.680		
ReliaQUAL (scores based on audit opinion)						
High (unqualified)	117					
Medium (qualified)	23					
Low (adverse)	23					
Very Low (disclaimer)	0		3.190	1.317		
With control variables						
IFMIS			1.500	0.501	1.000	2.000
LGTYPE			1.209	0.407	1.000	2.000
LNSIZE			23.216	0.955	19.741	25.410
UTILIZCAPAC			0.805	0.111	0.484	0.995
ITCONTROENV			0.709	0.282	0.000	1.000
INTERNALAUDIT			0.552	0.313	0.000	1.000

AUDITCOMM	0.763	0.283	0.000	1.000
UnderQUAL	0.091	0.048	0.000	0.226
RelevQUAL	2.319	5.588	0.000	30.000
ReliaQUAL	3.336	1.135	0.000	4.000

Univariate results

As it has been alluded in the methodology section, the hypotheses of this study were tested using a paired t-test and a GLM multivariate analysis. The paired t-test was used to test H_1 , H_2 , and H_3 . H_1 proposes a competing hypothesis to test whether LGAs' Post-IFMIS accounting reports are more understandable than Pre-IFMIS accounting reports. To test H_1 , the compliance level with IPSAS during Post-IFMIS was analysed and compared to the compliance level with IPSAS during Pre-IFMIS. The paired t-test results for H_1 showed that, on average, Post-IFMIS accounting reports of LGAs complied more (hence, greater UnderQUAL) [$M = 0.934$, $SE = 0.003$] than Pre-IFMIS accounting reports [$M = 0.883$, $SE = 0.004$]. The difference of 0.052, BCa95% CI [0.044, 0.058], was significant $t(162) = 14.695$, $p = 0.000$ and had a very large sized (Cohen's d) effect, $d = 1.26$. As such, H_1 was supported by the results indicated in Table 3, below.

Hypothesis two (H_2), which predicts that LGAs' Post-IFMIS accounting reports provide more relevant information than Pre-IFMIS accounting reports was also tested using a paired t-test. To test this H_2 , the number of days for delaying submission of annual reports to CAG for auditing purposes during Post-IFMIS was analysed and compared to those days delayed for Pre-IFMIS period. The results, presented in Table 3, below, indicate that, on average, LGAs with adopted IFMIS submitted their accounting reports for auditing purposes much earlier ($M = 2.267$, $SE = 0.418$), than those not with IFMIS ($M = 2.379$, $SE = 0.459$). The difference -0.112, BCa 95% CI [-1.511, 1.282], was not significant $t(162) = -0.179$, $p = 0.858$ and there was a very small sized (Cohen's d) effect, $d = 0.02$. Hence, these results did not support H_2 . Since the results failed to reject the null hypothesis, statistical power was computed (with parameters: $\alpha = 0.05$, assumed small sized effect = 0.02, total sample size = 163). The statistical power generated was 0.08, which was far less than the desired standard of 0.80. Therefore, β error is considered to be one explanation for the failure to reject the null hypothesis.

In addition, the test was carried for H_3 which predicts that LGAs' Post-IFMIS accounting reports are expected to be more reliable than Pre-IFMIS accounting reports. To determine the extent of influence of IFMIS adoption, a planned contrast of average auditors' opinion between the Post-IFMIS period and the Pre-IFMIS period was conducted. Overall, the results indicate that Post-IFMIS accounting reports received a more qualified audit opinion (i.e. less unqualified opinion) ($M = 3.190$, $SE = 0.100$) than in the Pre-IFMIS period ($M = 3.373$, $SE = 0.065$) and that the difference of -0.183, BCa 95% CI (-0.431, 0.059) was not significant, with $t(162) = -1.374$, $p = 0.171$ and a small sized (Cohen's d) effect, $d = 0.17$. These results indicate that Post-IFMIS accounting reports have the same reliability quality (ReliaQUAL) as Pre-IFMIS accounting reports, hence failing to reject the null hypothesis. Since these results did not support H_3 , statistical power was computed (with parameters: $\alpha = 0.05$, assumed small sized effect = 0.17, total sample size = 163) and found to be approximately 0.70. Even though a statistical power of 0.70 was found to be less than the commonly desired standard of 0.80, it was considered that the magnitude of the difference between the computed statistical power and the desired standard was

not large enough to make β error a competing explanation for the failure to reject the null hypothesis.

Table 3: Results of paired t-tests and Descriptive Statistics underQUAL, RelevQUAL and ReliaQUAL by IFMIS period

Outcome	IFMIS Period						Bootstrap ^a 95% CI for Mean Difference	t	(Cohen's d) effect
	Pre-IFMIS (n=163)			Post-IFMIS (n=163)					
	M	SD	SE	M	SD	SE			
UnderQUAL	0.883	0.047	0.003	0.934	0.033	0.004	0.044, 0.058	14.695*	1.26
RelevQUAL	2.379	5.859	0.459	2.267	5.341	0.418	-1.511, 1.282	-0.179	0.02
ReliaQUAL	3.373	0.825	0.065	3.190	1.317	0.103	-0.431, 0.059	-1.374	0.17

^a. Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples

* $p < .05$.

Multivariate statistics

GLM results

Furthermore, a test was conducted to test whether LGA type had an interactive effect on the relationship between IFMIS adoption (as a single independent variable) and FRQ (as represented by three dependent variables: UnderQUAL, RelevQUAL and ReliaQUAL). To assess this, a GLM multivariate analysis was applied to assess whether District LGAs and Urban LGAs had different FRQ in terms of UnderQUAL, RelevQUAL and ReliaQUAL. In addition, GLM was applied to assess whether there was interaction between IFMIS adoption and LGA type. The results, as presented in Table 4, below, indicate that the interaction was not significant, Wilk's $\Lambda = 0.990$, $F(3,320) = 1.109$, $p = 0.345$, multivariate $\eta^2 = 0.010$. However, the main effect of IFMIS adoption was significant, Wilk's $\Lambda = 0.763$, $F(3,320) = 33.130$, $p = 0.000$, multivariate $\eta^2 = 0.237$. This indicates that the linear composite of FRQ (that is UnderQUAL, RelevQUAL and ReliaQUAL) test differs for IFMIS adoption and non-adoption of IFMIS. The main effect of the LGA type was not significant, Wilk's $\Lambda = 0.984$, $F(3,320) = 1.725$, $p = 0.162$, multivariate $\eta^2 = 0.016$. This indicates that linear composite does not differ for different levels of LGA type. Follow-up analysis of the main effects indicates that IFMIS adoption shows a significant difference for only one dependent variable, UnderQUAL ($p < 0.01$) [Not Adopted IFMIS: $M = 0.878$; Adopted IFMIS: $M = 0.933$; $F(1, 322) = 97.406$, $p = 0.000$, multivariate $\eta^2 = 0.232$]. IFMIS adoption did not show a significant difference for the remaining two dependent variables: RelevQUAL [Not Adopted IFMIS: $M = 2.356$; Adopted IFMIS: $M = 2.600$; $F(1, 322) = 0.102$, $p = 0.749$, multivariate $\eta^2 = 0.000$], and ReliaQUAL [Not Adopted IFMIS: $M = 3.382$; Adopted IFMIS: $M = 3.403$; $F(1, 322) = 0.018$, $p = 0.894$, multivariate $\eta^2 = 0.000$]. Similarly, the LGA type showed a significant difference for UnderQUAL only [District: $M = 0.911$; Urban: $M = 0.900$; $F(1, 322) = 3.969$, $p = 0.047$, multivariate $\eta^2 = 0.012$], whereas for the remaining two qualities, RelevQUAL and ReliaQUAL, the LGA type did not show any significant difference (see Table 4, below)

Table 4(a): Means and Standard Deviation for dependent variables (FRQ measures)

Group	n	UnderQUAL		RelevQUAL		ReliaQUAL	
		M	SD	M	SD	M	SD
Not Adopted IFMIS							
District	129.000	0.886	0.050	2.390	5.592	3.384	0.859
Urban	34.000	0.870		2.320	6.786	3.379	0.697
Adopted IFMIS							
District	129.000	0.936	0.034	2.020	4.993	3.217	1.463
Urban	34.000	0.930	0.032	3.180	6.511	3.588	0.988

Table 4(b): Effects of IFMIS adoption and LGA type on dependent variables

Source	Dependent variable	df	F	η	p
IFMIS adoption	UnderQUAL	1	97.406	0.232	0.000
	RelevQUAL	1	0.102	0.000	0.749
	ReliaQUAL	1	0.018	0.000	0.894
LGA type	UnderQUAL	1	3.969	0.012	0.047
	RelevQUAL	1	0.508	0.002	0.476
	ReliaQUAL	1	1.393	0.004	0.239
IFMIS adoption X LGA type	UnderQUAL	1	0.997	0.003	0.319
	RelevQUAL	1	0.635	0.002	0.426
	ReliaQUAL	1	1.472	0.005	0.226
Error	UnderQUAL	322			
	RelevQUAL	322			
	ReliaQUAL	322			

Regression results

Table 5 below presents the OLS regression results for three models (Model 1, Model 2 and Model 3), comprising three dependent variables and seven independent variables, including the primary variable, IFMIS adoption. The results indicate that of the three models, one model (Model 2), dealing with relevant quality, (RelevQUAL) was not significant (Adjusted $R^2 = 0.001$, F-value = 1.045, p-value = 0.399). In other words, the primary variable IFMIS adoption ($t = 0.081$, p-value = 0.935), coupled with other independent variables, LGTYPE ($t = 0.796$, p-value = 0.427), LNSIZE ($t = 0.387$, p-value = 0.699), UTILIZCAPAC ($t = 0.549$, p-value = 0.584), ITCONTROENV ($t = -1.545$, p-value = 0.123), INTERNALAUDIT ($t = -1.037$, p-value = 0.517), as well as AUDITCOMM ($t = -0.648$, p-value = 0.517), was found to have no significant positive association with RelevQUAL. In the case of Model 1, it was found to be a significant predictor of UnderQUAL (Adjusted $R^2 = 0.353$, F-value = 26.294, p-value = 0.000). In this first model, the results show that IFMIS ($t = 8.841$, p-value = 0.000), LGTYPE ($t = 2.185$,

p-value = 0.030) and LNSIZE ($t = 4.899$, p-value = 0.000) were found to have a strong significant positive association with the quality of the understandability (FRQ). On the other hand, ITCONTROENV ($t = -1.762$, p-value = 0.079) was found to have a weak significant negative association with the quality of the understandability. The remaining variables, which included UTILIZCAPAC ($t = 0.721$, p-value = 0.471), INTERNALAUDIT ($t = -1.588$, p-value = 0.113) and AUDITCOMM ($t = -0.571$, p-value = 0.569), were found to have no significant association with UnderQUAL. For the last model (Model 3), the results indicated that the model had a significant prediction capability (with Adjusted $R^2 = 0.191$, F-value = 11.976, p-value = 0.000). In this third model, IFMIS ($t = 3.361$, p-value = 0.001) and UTILIZCAPAC ($t = 2.904$, p-value = 0.004) were found to have a strong significant positive association with ReliaQUAL, while INTERNALAUDIT ($t = -8.018$, p-value = 0.000) was found to have a strong significant negative association with ReliaQUAL.

Table 5: OLS results

	+/-	DV = UnderQUAL			DV = RelevQUAL			DV = ReliaQUAL		
		Coeff.	t-stat	Sig.	Coeff.	t-stat	Sig.	Coeff.	t-stat	Sig.
Intercept	?	-0.253	-4.550	0.000	-0.310	-0.039	0.969	1.986	1.358	0.175
IFMIS	?	0.047	8.841	0.000	0.062	0.081	0.935	0.467	3.361	0.001
LGTYPE	+	0.012	2.185	0.030	0.607	0.796	0.427	0.198	1.416	0.158
LNSIZE	+	0.012	4.899	0.000	0.131	0.387	0.699	0.008	0.125	0.900
UTILIZCAPAC	+	0.015	0.721	0.471	1.602	0.549	0.584	1.555	2.904	0.004
ITCONTROENV	+	-0.015	-1.762	0.079	-1.832	-1.545	0.123	-0.006	-0.029	0.977
INTERNALAUDIT	+	-0.013	-1.588	0.113	-1.219	-1.037	0.300	-1.727	-8.018	0.000
AUDITCOMM	+	-0.005	-0.571	0.569	-0.743	-0.648	0.517	-0.079	-0.376	0.707
Adjusted R ²			0.353			0.001			0.191	
F-Value			26.294			1.045			11.976	
F-Significance (p-value)			0.000			0.399			0.000	
Observations			326.000			326			326	

Source: Field data

DISCUSSION OF THE STUDY FINDINGS

This study aimed to assess the influence of IFMIS adoption on the FRQ of LGAs. The FRQ in this study was assessed using three QCs, namely, the quality of the understandability, relevance and reliability of the FRQ. For understandability, the findings of this study revealed that IFMIS adoption increased the number of LGAs which complied with the applicable accounting standards compared to the period before IFMIS adoption. These findings imply that IFMIS adoption improves the quality of the understandability of the FRQ. Likewise, the additional analysis with the control variables, which were LGA type, LGA size, utilization capacity and IT control environment, indicate that IFMIS adoption, together with the identified variables, had a positive influence on the quality of the understandability of the FRQ. This supports the theoretical framework, which showed that technology usage improves productivity, as found by Mathieson (1991). The study findings are in line with the empirical studies conducted by Wongsim and Gao (2011), Sugut (2012), Imeokparia (2013), as well as Murungi and Kayigamba

(2015). In their studies, they concluded that technology makes financial reporting easier for the accountants and more understandable and accessible for the users.

Regarding relevance, the descriptive findings reveal that IFMIS adoption reduced the number of days the LGAs took to prepare and submit their financial statements for the purpose of audit; hence, they were timely issued to the users for public consumption. The study findings are in line with the theoretical framework that indicates that technology usage improves productivity (Mathieson, 1991). The findings also concur with the views of Rupanagunta (2006), Hendriks (2012) as well as Beschel and Ahern (2012). However, when the data was tested statistically using a paired t-test, the results indicated that adoption of IFMIS had no significant impact on the relevance of FRQ. The findings were also similar when further analysis was conducted using OLS, whereby IFMIS adoption and control variables were found to have no influence on the quality of the relevance of the FRQ. These results are not consistent with the previous empirical studies conducted by Dang (2005), Wongsim and Gao (2011), Sugut (2012), Imeokparia (2013), Yazdanpanah (2014) and Murungi and Kayigamba (2015). These studies found that IT increased the relevance of financial reports by providing reports of the organisations efficiently and in a timely manner. There are a number of plausible explanations for these results not supporting the previous empirical studies. The first is the objective and procedures for adopting the IFMIS. While it might be seen that adoption of IT is to improve the efficiency of an accounting system, in this case the objective was to have control and to integrate the data, rather than improving the accounting system. Secondly, IFMIS may have not been utilized to the extent required and, as such, the full potential of the IFMIS are not achieved. As argued by the CAG in various reports, despite the implementation of IFMIS in various LGAs, the use was still limited. This may be connected to the revised D&M model, that use is one of the antecedents for an effective information system. Furthermore, these results could be based on IDT and TOE, whereby the organizational contexts of the LGAs were not taken into consideration when adopting IFMIS.

With regard to reliability, the descriptive statistics revealed that IFMIS adoption increased the number of LGAs which got a clean audit opinion compared to the period before IFMIS adoption. However, when the data was tested statistically, using a paired t-test, the results show that the adoption of IFMIS had not significantly influenced the quality of the reliability of the FRQ in the LGAs. Additional tests using OLS together with control variables with significant influence, namely, utilization capacity and internal audit effectiveness, show that IFMIS adoption had a positive influence on the quality of the reliability of the FRQ. In this aspect, the influence of IFMIS adoption on reliability had to go together with the control variables. As such, these findings on the quality of the reliability provide support for the control variables, as seen in previous studies. This finding implies that the quality of the reliability of the financial reporting had improved statistically and, hence, may improve the confidence of the public in financial reports produced by the LGAs. These findings, as with the quality of the understandability, support the theoretical framework, which showed that technology usage improves productivity (Mathieson, 1991). In this case, the findings are consistent with TOE and TTF, which argued that, when technology is matched with the task requirements of the organization, adoption of technology will improve the performance. For example, Dorotinsky (2011) argues that IFMIS projects are expected to focus on the quality and security of the information, which are expected to minimize the risk of corruption and improves the reliability of the information. Other empirical studies which are consistent with our findings include those conducted by Wongsim

and Gao (2011), Sugut (2012), Imeokparia (2013) and Murungi and Kayigamba (2015). They concluded that technology enhances the quality of the reliability of financial reporting to a sufficient level. Also, internal audit function was found to have a negative influence on FRQ, hence not supporting previous studies (Abbott, et al., 2016; Ahmad, et al., 2009; Prawitt, Smith & Wood, 2009; Xu, 2003). This result may not be consistent with the traditional perspective, which views internal auditing as assistance to management for safeguarding assets and monitoring control systems. The internal auditing settings in the LGAs seemed to be complementing the external auditing, as argued by Carey, Simnett and Tanewski (2000), hence failing to add value to the implementation of IFMIS.

CONCLUSION AND IMPLICATIONS OF THE STUDY

The main objective of this study was to evaluate the influence of IFMIS adoption in FRQ in the LGAs in Tanzania. The FRQ was measured using qualitative characteristics of financial reporting based on the D&M model and supported by IASB in its conceptual framework and various accounting literature. The findings reveal that the adoption of IFMIS has improved the quality of the understandability and reliability of the FRQ, while the quality of the relevance has not changed significantly. In addition, the study results show that for IFMIS adoption to influence reliability quality, the control variables of utilization capacity and internal audit effectiveness have to be taken into consideration. This study has a number of contributions. Firstly, the study contributes to the ongoing literature in accounting information systems that addresses the influence of technology and the automation of accounting systems on FRQ in public sector. Here, the study extends and complements studies such as those conducted by Dorantes, et al., (2013), as well as Paredes and Wheatley (2018). Also it extends the studies which have been conducted in public sector organizations such as Edmonds et al. (2017), Pinuuck and Potter (2009) as well as Sohl et al. (2018) by adding more FRQ measures apart from timeliness in assessing the influence of IT adoption. Furthermore, this study extends those studies conducted in Tanzania which have not assessed the relationship between IFMIS and FRQ (see Diamond & Khemani, 2005; Hendriks, 2012; Laizer & Suomi, 2016). Secondly, the study contributes by its multiple theoretical approach, comprising innovation diffusion theory, technology-organization-environment theory, task-technology fit theory, as well as the DeLone and McLean model of information system success. The use of theoretical pluralism has helped to expand the understanding of the influencing variables, as well as expanding measurements of FRQ. The third contribution is the methodological approach, whereby in this study we utilized external auditor's reports and generated indicators for the variables used in the study. The use of external auditor's reports provides new archival evidence of the influence of IFMIS on FRQ in the local government context.

The findings of this study should be of interest to both accounting practitioners and policy makers, because they not only show how IFMIS adoption influences FRQ, but also they identify critical factors for FRQ in LGAs. In relation to accounting practitioners, the study shows that FRQ can be measured by different methods and that some of them may be complex. As such, the accounting practitioners have to come with clear guidelines for assessing the quality of accounting information. This can only be achieved if the conceptual framework of financial reporting is improved by clearly linking it with theories and empirical analysis. The refining of the conceptual framework should take into consideration the economic reality of transactions. For policy makers and LGAs, this study provides inputs for them to consider information quality

when they make decisions concerning adopting or evaluating IFMIS. Hence, practitioners and policy makers may use these findings to foster the importance of information technology to FRQ.

Despite the contribution of this study, there are number of limitations which need to be recognized. These limitations, however, do not undermine the importance of this study in reducing the knowledge gap about the relationship between information technology and FRQ. The first limitation is that this study utilizes qualitative characteristics of accounting information; hence, the findings may be different if other approaches, such as accrual models and value relevance models, are used. As such, further studies may be carried out using other models. Secondly, the definitions of the variables were relevance, measured by timeliness in terms of days of submission differences, reliability, with verifiability using audit opinion, while understandability was measured by completeness, using the compliance level with IPSAS. While we think these measures reflect appropriately the measures intended, there are other measures, such as predictive value, confirmative value, comparability, materiality and so on, which may also be used to assess the FRQ. From that perspective, future studies may also use other measures to assess the influence of technology on FRQ. The third limitation is that the study has been carried out in Tanzanian LGAs; hence, these findings may not be generalized outside the scope of this study (i.e. LGAs in Tanzania). Thus, there is a need to carry out similar studies in other areas of the public sector which have not been covered by this study. Finally, this study only used secondary data, which may lack the opinions of stakeholders. As such, future studies could be carried out using primary data.

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