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ACCOUNTING INFORMATION SYSTEMS EFFECTIVENESS: EVIDENCE FROM THE NIGERIAN BANKING SECTOR

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ABSTRACT

Aim/Purpose	The purpose of this study is to investigate the interrelationship among the quality measures of information system success, including system quality, information, quality, and service quality, that eventually influence accounting information systems effectiveness.
Background	It is generally believed that investment in an information system offers opportunities to organizations for business process efficiency and effectiveness. Despite huge investments in accounting information systems, banks in Nigeria have not realized the full potential benefits of using these systems because of persistent failures. Few studies have been conducted to address the problem.
Methodology	A survey research design was used to collect data, and a total of 287 questionnaires were retrieved from respondents in the Nigerian banking sector.
Contribution	This study contributes to the understanding of the most important antecedent factors of the quality measures, the interrelationship among the quality measures, and the influence of these measures on the accounting information systems effectiveness.
Findings	The result of the study revealed that security, ease of use, and efficiency are key features of system quality, while the information quality dimension includes accuracy, timeliness, and completeness. The result of the study further revealed that information quality and system quality have significant influences on accounting information systems effectiveness.
Recommendations for Practitioners	This study provides practitioners with important measures for evaluation of AIS effectiveness in the context of Nigerian banks.

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Recommendation for Researchers	Future researchers may build on the findings of current study to conduct further research in the area of AIS effectiveness in different contexts.
Keywords	accounting information systems effectiveness, system quality, information quality, service quality, Nigeria

INTRODUCTION

Information systems are generally designed and implemented to enhance organizational impacts. The rapid changes in technology and the dynamic nature of the business environment, as well as increasing demand from customers, have transformed the activities of making business at both the technical level and strategic level of the organization (Damera, Garilli, & Ricciardi, 2013). The success of organizations depends on their ability to respond to changes in the market environment they are operating. In this way, managers strive to ensure that their organizations successfully adapt to such changes. Accounting information systems have been recognized as an effective tool for achieving not only internal changes but also external organizational changes. As such, many organizations, but particularly banks, are left with no other option but to invest in the latest technology such as Accounting Information Systems (AIS) to satisfy the needs of their customers and compete favorably. The Nigerian banking sector has witnessed a significant transformation over the last several decades with respect to the adoption and usage of technological innovations. Banks in Nigeria have increased their investments in information systems (IS) as a fundamental e-banking tool, capable of yielding significant contributions to their financial results especially in cost efficiency (Adewole, 2013). From a strategic perspective, IS makes it possible to exploit the opportunities offered by technology such as AIS to expand and improve products and services offered to banks customers to increase the quality of work processes and save costs by virtualization of banking services. Accounting information systems enable managers to have relevant and timely information for effective decision making from an operational point of view (Bruno, Iacoviello, & Lazzini, 2015). Investment in IS is less effective when banks continue to struggle to identify the positive outcomes that they hope to achieve from their large investments in IS (DeLone & McLean, 2016). But, little attention has been given to provide a solution for increasing IS ineffectiveness.

Information systems are believed to improve organizational outcomes. However, banks in Nigeria are faced with an IS crisis, which has resulted in an increase in operational costs (Dandago & Farouk, 2012), uneconomical utilization of resources, errors in financial reports, maintenance issues, technical problems, underutilization and the waste of valuable organizational resources (Aali, Sargazi, & Tayyar, 2014; Abbasi, Zamani, & Valmohammadi, 2014; Kurti, Barolli, & Sevrani, 2013; Molavi & Emamverdi, 2014). Moreover, users have complained of persistent system failure due to a large amount of data being processed, a lack of system stability, operating system crashes, and undetected data transmission errors (Dandago & Rufai, 2014; Ekwueme, Egbunike, & Okoye, 2012). A poorly designed system will likely run into persistent system crashes, which have adverse effects on the operational efficiency of the banks and result in increased product costs, and, ultimately, the loss of the bank customers (Cenfetelli & Schwarz, 2011; Gorla, Somers, & Wong, 2010). These unexpected outcomes may lead to issues that challenge the fundamental ways of carrying out normal business activities of the banks. This issue might affect the real-time transaction processing for bank customers such as online transfers, withdrawals, or deposits. In turn, the failure or delay of online transactions may lead to a negative spillover effect, causing the user to lose confidence in other facets of transaction process (Tan, Benbasat, & Cenfetelli, 2016). Thus, the absence of key system attributes may undermine the delivery of service content of AIS, which may lead to a complex transaction process for the user (Cenfetelli, Benbasat, & Al-Natour, 2008). This is an indication that the quality-related features of the AIS such as information quality, system quality, and service quality are ineffective. This situation leads to system ineffectiveness that eventually affects the decision-making process of management (Shagari, Abdullah, & Saat, 2015) This is an indication that investment in AIS in Nigerian banking sector is not yielding either the expected or promised benefits. Therefore, a need exists to investigate the quality measures of IS success.

Many studies have been conducted over the years on how to measure IS success (Bach, Belardo, Bajwa, Kantharaju, & Prasanth, 2011; Hien, Nguyen & Cuong, 2014). These studies have contributed to IS literature by investigating the direct effects of DeLone and McLean's (2003) quality-related factors: information quality, system quality, and service quality. However, an insufficient number of studies in the field of IS have examined the interrelationships among the success factors and the positive impacts provided by specific IS like the AIS (DeLone & McLean, 2016). In spite the importance of the quality dimensions of the DeLone and McLean model, few studies have examined the interrelationships among the constructs (Kafaji, 2013; Montesdioca & Macada, 2015; Nelson, Todd, & Wixom, 2005; Xu, Benbasat, & Cenfetelli, 2013). Also, researchers need to identify the antecedents that are likely to have a positive influence on information and system quality constructs (DeLone & McLean, 2016). Although these studies have increased the understanding of the success factors, more attention seems to be placed on evaluating general IS rather than specific IS such as the AIS (DeLone & McLean, 2016). Thus, a need exists for more understanding of the interrelationships among information quality, system quality, and service quality and the antecedents that influence information quality and system quality within the context of the AIS environment. Based on our knowledge, no study has examined the interrelationship among system quality, information quality, service quality measures, and their antecedents as well as their combined effects on AIS effectiveness.

Therefore, this study aims to fill this gap highlighted by focusing on the specific type of IS, which is AIS. The DeLone and McLean model of 2003 provides a valuable framework for understanding the relationship of the multi-dimensionality of IS success. Thus, this current study adopted the model because it has been tested and validated by many researchers in the IS domain and was found to be appropriate for both theoretical and empirical research (Ballante, Levy, & Powell, 1998; Shagari, Abdullah, & Saat, 2015; Xu et al., 2013). The next section of this paper provides the underpinning theory and a review of relevant literature for AIS, followed by discussions of the types and importance of AIS to the banks. The paper also presents a discussion of the latent variables and their related hypotheses after that the conceptual framework was developed based on the reviewed literature. The methodology used and the analysis of the data collected is subsequently discussed. Finally, a discussion of the findings and the implications of the study along with conclusions, limitations, and recommendation for future research are presented.

THE IS SUCCESS MODEL

The IS success model was first introduced by DeLone and McLean (1992), which is an IS research framework for measuring the system success in an organization. They identified six major interrelated dimensions of IS success: system quality, information quality, use, user satisfaction, individual impacts, and organizational impacts. The model provided a scheme for classifying the multitude of IS success measures and suggested a temporal and causal interrelationship among and between the success dimensions (Petter & McLean, 2009). The original IS success model was updated in 2003 after scholars in the IS system domain critiqued it. DeLone and McLean's updated model was designed to increase its usefulness by considering the rapid changes in Information Technology (IT), to which they added service quality as a key dimension of IS success. The addition of service quality was made to emphasize the importance of service and support in successful e-commerce system (Petter, DeLone, & McLean, 2008).

Similarly, the addition of intention to use to measure user attitudes and combining individual impact and organizational impact into net benefits was added. This model offers some important contributions in successful e-commerce systems by providing measures of multidimensional constructs and developing a research model for the causal relationship between the constructs (Lin & Lee, 2006). Prior studies have empirically attempted to validate the model and have found evidence of its importance to the success of organizations (Gorla et al., 2010; Rai, Long, & Welker, 2008; Sabherwal, Jeyaraj, Chowa, 2006; Seddon, 1997). The application of the IS success models in different context and settings through various empirical studies reveals that the model is well accepted by scholars in

the field of IS. Therefore, this study adopts the updated IS success model to the Nigerian banking sector. The current study focuses on the three quality measures (system quality, information quality, and service quality); these measures are considered essential for evaluating the effectiveness of AIS in Nigeria where there are reports of persistent system failure. In support of this, Bernroider (2008) concluded that combining and evaluating the quality measures in a single model could yield a valid measure for AIS effectiveness.

LITERATURE REVIEW

ACCOUNTING INFORMATION SYSTEM

Evaluation of AIS has been a popular research topic over the years in terms of success and effectiveness, which are used interchangeably. An accounting information system is a set of interdependent activities, documents, and technology designed to collect, process, and report information for decision-making purposes (Hurt, 2013). The efficient integration of accounting applications enhances the flexibility of information generation, improves the quality of the financial report produced, and provides timely and reliable information to support planning and decision making within the organization (Roberts & Strikes, 2011; Shagari et al., 2015). Successful implementations of AIS in organizations have impacted positively the methods of data collection, processing, and dissemination of the information to the intended user(s) (Damera et al., 2013). Damera et al. further explained that there are three levels of AIS integration in organizations: 1) information integration, which states that the data collected or the information produced are managed under a unified database; 2) operational integrations, which involves the linkage of business activities of various unit of the organization; and 3) time integration, which allows different units to carryout operations concurrently, in this way the process of data entry into the system allow user(s) to enter data once, so as to minimize the possibility of errors and inconsistency. Such methods enable organizations to have a clear picture of happenings in their chain process.

Moreover, AIS are believed not just to improve the effectiveness and efficiency of business processes and reduce cost but also to provide reliable real-time data on demand, facilitating global knowledge and new reporting tools, as well as the integration and collaboration between areas of risk and business operations (Bruno et al., 2015). Considering the nature of IS today, rarely is AIS distinguished separately from IS (Gelinas, Dull, & Wheeler, 2012). Mancini, Dameri, and Bonollo (2015) opined that the integration of IS and AIS influences the quality and quantity of information available to support decision making. The connection between these two elements at the operational level affects not only the technical aspects of the system, it is also capable of showing its overall effects on the accountability processes of organizations. Thus, accounting information systems are an important component in creating value to banks (Bruno et al., 2015)

Empirical research on IS has been carried out across different organizations and contexts, but most previous studies related to IS success focus on the general IS rather than on the specific. For example, Seddon, Graeser, and Willcocks (2002) investigated IS effectiveness in both Europe and the United States. The findings of their study identified the emergence of three group of constructs that influence IS effectiveness: 1) systems quality and information quality, 2) perceptual measures on net benefit about IS use, and 3) IS behavior. Consistent with Seddon et al.'s stakeholders' perceptions, Elpez and Fink (2006) evaluated IS success factors in three major Western Australian organizations. Their study developed a model based on user requirements, and findings revealed that information quality and system usability are some of the key influential measures of IS effectiveness in organizations. Similar evidence was documented in the context of the Iranian oil sector; Ramezan (2009) showed that a significant relationship exists between system quality and information quality with IS effectiveness. These studies suggested that user perceptions of the quality measures play a significant role in determining the system effectiveness. Conversely, the absence of the key measures of success might be detrimental to the system success. Bentley, Cao, and Lehaney (2013) argued that low data

quality, a lack of system specification, a lack of communication within the system, inflexibility of the systems, and poor system management were causes of IS ineffectiveness (failure). In addition, Kanungo, Duda, and Srinivas (1999) indicated that facilitating information retrieval, improving product and services quality, and minimizing errors in system functional areas have a significant influence on IS effectiveness. Furthermore, the study revealed that improving system integration is the most influential factor that leads to the IS effectiveness.

Unlike the above studies that examine one or two of the quality measures, Gorla et al.'s (2010) and Hien et al.'s (2014) studies indicated that information quality, system quality, and service quality have a significant influence on AIS effectiveness. Basel, Bakar, and Omar (2016) stressed that these three factors were the key ingredients for AIS effectiveness in banks. Thus, AIS is considered an essential managerial decision-making tool capable of handling accounting-related information of the banks (Bonollo, Lazzine, & Merli, 2015). While acknowledging the contributions of these studies to IS literature, emphasis seems to have been placed on general IS assessment. Furthermore, most studies have investigated IS effectiveness at the technical level by examining one or two of the success measures (information and system quality). However, evaluation of IS effectiveness would be incomplete without the inclusion of service quality measures (DeLone & McLean, 2003). Therefore, this current study will address the literature gap by incorporating the three quality measures (information, system, and service quality) in the context of the Nigerian banking sector. Given the preceding review of past studies, the next section will discuss AIS subsystems.

Types of Accounting Information Systems

An accounting information system offers managers transaction processing services, reporting, and information for effective decision-making purposes. As explained by Hall (2010), AIS comprises three main subsystems: 1) the transaction processing system that supports organizations in recording of daily business activities and produces reports to various users for decision making; 2) the general ledger/financial reporting systems that assists organizations in producing traditional financial statements that include income statements of cash flow, balance sheets, and other reports mandated by law; and 3) the management reporting system that provides special-purposes information (reports) to internal managers for effective decision making.

The transaction processing system is central to the overall function of the IS by converting economic events into financial transactions. These are the basic business systems that serve the operational level of a given organization (Abdelhak & Dalel, 2009). The transaction processing system is further classified into three subsystems known as cycles: the expenditure, the revenue, and the conversion cycles. These cycles exist in all types of organizations irrespective of their focus. Although each cycle performs different functions and supports different objectives, they share the same characteristics about the recording and storing of financial transaction and provide information to users in support of their daily routine activities. Also, these three cycles generate the require data through which management information (reports) and financial statements are produced (Hall, 2010).

The general ledger and financial reporting systems are two closely related subsystems, which are often used interchangeably. Nonetheless, because of their interdependency in processing business transactions, they are considered as a single integrated system. The general ledger is a hub that is connected to the other systems of the organization through spokes of information flows while transaction cycles process separate events that are recorded in special journals and subsidiary accounts. These transaction flows are summarized into the general ledger system and become sources of input for the management reporting and financial reporting system (Hall, 2010). The financial reporting system measures and reports the financial resources position of the organization and the changes in those resources. This is referred to as non-discretionary reporting because the law requires it, and the management has the responsibility to provide stewardship information to external parties to allow them to evaluate organizational performance over the period and make comparisons between different organizations (Hall, 2010).

Unlike a financial reporting system, the management reporting system provides internal financial information for managers to enable them to manage the business efficiently and effectively. Abdelhak and Dalel (2009) claimed that managers need this information to monitor the status of internal operation and the organization's relationships with the external environment. Management reporting is often referring to as discretionary reporting because it is not required by law and the organization can select what type of information to produce as well as how to present it. The reports may be in the form of a paper document or a digital image displayed on a computer terminal. The report may express information in numerical graphics or in a verbal form or in a combination of both. Management reporting systems direct management attention to any problems in a timely manner. Hence, management reporting is an important component of an organization's internal control structure (Hall, 2010). Given the discussion on AIS subsystems, the next section discusses the importance of AIS to the organizations.

Importance of Accounting Information Systems

Banks have made IT implementation one of their key strategies for creating competitive advantage and sustainability. It is critical for banks to understand their customers' needs and the changes in the market environment in a timely manner. Therefore, an effective AIS benefits an organization in several ways. A study by May, Dhillon, and Caldeira (2012) identified four fundamental benefits of systems as follows: 1) minimizing cost, 2) enhancing products and services, 3) enhancing the relationship between organization and customers, and 4) enabling the organization to realize the expected benefits of the systems. Also, Bach et al. (2011) believed that an effective AIS system allows an organization to improve operational effectiveness and efficiencies. An accounting information system enhances work quality, enables the organization to solve complex problems, and helps in the integration of all departments. It also enables organizations to compete favorably in the market environment. Furthermore, AIS facilitates the exchange of data between different programs; it helps in aligning the various subsystems in organizations, and overall it provides efficient and effective service delivery systems (Al-Khozendar, Assumpcao, & Campeanu, 2014).

In addition, Al-Kassawna (2012) found that AIS help to provides timely financial information that facilitates decisions regarding fund borrowing and making financial policies. An accounting information system provides an accurate picture of the financial and market position of the organization. It also enables organizations to make a comparison between current and previous financial positions for performance evaluation (Alzoubi, 2011). Hien et al. (2014) stated that, besides enabling organizations to evaluate the internal strength and weakness through the financial report, effective AIS facilitates communication, planning, and decision-making in organizations.

Fengyi, Olivia, and Sheng (2005) maintained that effective AIS plays a vital role in enhancing modern organizations, especially in the banking sector through the provision of an integrated value chain system that leads to rapid financing services, excellent fund allocation and payments, global capital logistic services and cost savings compared to traditional bank accounting information. Furthermore, investment in IT is well recognized as key for creating a competitive advantage to the banking sector. Today's AIS provide an enabling environment, which supports bank information exchange, integrates the flow of information (internal and external), and provides links to the supply chain platform. This greatly enhances the relationship between bank and users. Thus, the conclusion can be made that the use of AIS has enhanced the computing power and standardization of organizational activities and, thus, leads to the provision of more accurate and timely information to the various users in organizations (Rodriguez & Spraakman, 2012). Based on the preceding discussion, the use of AIS has greatly improved the quality of banking operations and still has an enormous potential to change the Nigerian banking sector, thus facilitating outreach and sustainability. Having discussed the importance of AIS, the next sections discusses quality-related factors: information quality, system quality, and service quality.

Information quality

The information quality dimension has received greater attention among scholars in IS effectiveness studies and has been regarded as an important measure for the successful implementation of the systems in organizations (Al-Mamary, Shamsuddin, Aziati, 2013). High-quality information is seen as a key resource for organizations that can be used in sustaining their competitive advantage (Barney, 1991). However, measuring the construct has been difficult due to divergent views of how the construct should be operationalized and what it comprises (Redman, 1998). Recognizing the inconsistency in the measures of information quality, DeLone and McLean (1992; 2003) conceptualized the concept as a holistic construct comprising various characteristics such as accuracy, completeness, timeliness, and relevance, among others. Despite the conceptualization of the information quality concept as a composite construct in IS literature, previous studies have usually treated this construct reflectively, thus leading to incorrect specification of the measurement model, which, in turn, could lead to biases in evaluating the structural model (Petter, Straub, & Rai, 2007).

Information quality measures the ability of a system to provide timely, accurate, relevant, and complete output to a user for effective decision making. This study operationalized the construct as a second-order formative construct and measure with three first-order dimensions: 1) accuracy, 2) timeliness, and 3) completeness, which are all adapted from Chang, Chen, and Lan (2012). Accuracy is concerned with the correctness of the output produced by the system. Timeliness refers to the extent to which the information is made available at the right time that is needed by the user(s). Completeness measures the extent to which the output is relevant and satisfies the needs of the user(s). Moreover, previous studies (e.g., DeLone & McLean, 2016; Shagari et al. 2015) have suggested a positive relationship between information quality and AIS effectiveness. Also, the empirical findings of Nicaoula (2000), Nelson et al. (2005), Alzoubi (2011) Al-Kasswna (2012) and Shatat, Yosouf, and Abdulaziz (2013) have determined a positive relationship between information quality and AIS. Based on previous research, the current study considers information quality in the context of Nigerian banks as an important factor that could lead to the success of AIS. This is because Emeka-Nwokeji (2012) argued that, considering the importance of information quality in an organization, it is unfortunate that today many organizations such as banks failed due to inaccurate and misleading information provided by AIS. According to First Bank audit reports as cited by Nnenna (2012), falsified information was the reason for the failure of many banks in Nigeria. In support of this claim, Ogah (2013) contended that untimely and inaccurate information has an adverse effect on the organization at operational, tactical, and strategic levels, consequently leading to malformed decision making in the banks. Thus, good information quality (i.e., accurate, timely, and complete) that is used for effective decision making by managers leads to AIS effectiveness. Therefore, the study hypothesizes the following relationships.

H1a: Accuracy has a significant influence on information quality.

H1b: Timeliness has a significant influence on information quality.

H1c: Completeness has a significant influence on information quality.

H2: A positive relationship exists between information quality and AIS effectiveness.

System quality

Unlike the information quality construct, system quality has received little attention in IS literature due to its technical focus on the system. Like information quality, measuring the system quality construct has never been easy as different approaches exist on how the system should be conceptualized and evaluated (Ding, 2008). From the perspective of the system developers, system quality was conceptualized based on the intrinsic attributes of the software (Ravichandran & Rai, 2000). Meanwhile, the DeLone and McLean model (1992) proposed system quality as an overarching construct that also represented the technical level of the system. The most commonly used measures of system quality are security, ease of use, and efficiency (Hien et al., 2014). Though the system quality construct had

been conceptualized as a composite concept in the DeLone and McLean model (1992), previous studies usually used it as via reflective indicators to measure the construct (Argyropoulou, 2011; Saha, Nath, & Salehi-Sangari, 2012). However, an incorrect specification of measurement model can lead to biases in evaluating the structural model, and thus make interpretation of the results difficult (Petter et al., 2007). Considering the flaws of previous researchers, Wixom and Todd (2005) and Chang et al. (2012) developed a multidimensional approach in which the system quality construct can be treated as a second-order formative construct.

System quality is concerned with the technical efficiency of the system, regarding user interface consistency, ease of use, programming errors, and the maintainability of the system. The system construct was conceptualized as a second-order formative construct in this study and measured with three dimensions, namely, security, ease of use, and efficiency, which are all adapted from Chang et al. (2012). Ease of use measures the extent to which the system user(s) perceived that system to be user-friendly. Security refers to the ability of the system to provide services that prevent unauthorized access and virus attacks on the system. Whereas, efficiency is concerned with the extent to which a user perceived the system to be helpful and facilitate efficiency. Furthermore, previous studies (e.g., DeLone & McLean, 2016; Shagari et al. 2015) suggested that a positive relationship was present between system quality and AIS. Consistent with this, empirical findings have found a positive relationship between system quality and IS effectiveness (Chang et al., 2012; Hein et al., 2014; Hyung & Jae, 2010; Quintero, Pedroche, & Ramos, 2009; Shatat et al., 2013; Xu et al., 2013). Based on previous studies, examining system quality construct in the context of Nigerian banks is important specifically where there is persistent complaints of the system failures, system instability, fraud, and security issues (Dandago & Rufai, 2014; Ekwueme et al., 2012). Which eventually affect the operational efficiency of the banks thus, result to increase of product cost and the demise of the bank customers (Cenfetelli & Schwarz, 2011; Gorla et al., 2010). These unexpected outcomes may lead to issues that challenge the fundamental ways of carrying out normal business activities of the banks in Nigeria. Thus, a good system would lead to AIS effectiveness. Based on these findings, the current study hypothesizes the following relationship.

H3a: Security has a significant influence on system quality.

H3b: Ease of use has a significant influence on system quality.

H3c: Efficiency has a significant influence on system quality.

H4: A positive relationship exists between system quality and AIS effectiveness.

Service quality

Information system researchers have recently adopted the SERVQUAL instrument, which is believed to have established validity in the marketing discipline. Previous studies have claimed that the commonly used measures of IS effectiveness focus more on the system rather than on the services provided by the IS department (Ding, 2008). Thus, researchers have called for the inclusion of the service quality dimension in the IS success model. The argument was that evaluating AIS effectiveness would be incomplete when the services delivered by IS personnel are not considered (Wixom & Todd, 2005). The service quality construct is regarded as a driver for the perception of value, which could improve the loyalty of organizational customers and enhance the image of banks. Based on the above results, the conclusion can be made that service quality is one key determinant of AIS effectiveness. In response to this call, DeLone and McLean (2003) updated their model by adding the service quality dimension. DeLone and McLean suggested five measures of service quality: 1) assurance, 2) responsiveness, 3) reliability, 4) empathy, and 5) tangibility. The service quality dimension has been widely used in IS research and has been an important determinant of AIS effectiveness along with the information quality and system quality constructs (DeLone & McLean, 2003). Thus, having adequate support from the IT unit personnel in the event of any problem through an excellent relationship with users in a timely manner is vital. As a result, user(s) may be more motivated to learn and

explore more functions of the system. Thereby, addressing the problem of system under-utilization, thus, leading to improved AIS effectiveness.

Service quality is concerned with issues such as responsiveness, assurance, and empathy of the bank IT units that support the efficient operation of the systems, which results in increased AIS effectiveness. Kwan (2006) operationalized service quality as a reflective construct and measured it with three first-order dimensions, namely, 1) responsiveness, 2) assurance, and 3) empathy. Responsiveness measures the extent to which the system responds rapidly to user(s)' demands. Assurance refers to the knowledge and courtesy of employees of the IT unit and their ability to inspire trust and confidence in system user(s). Empathy is concerned with individualized attention that the service unit staff offers to the system user(s). Moreover, previous studies such as Negash, Ryan, & Igbaria (2003), Shatat et al. (2013), and Lam, Than, and Pharm (2014) have found a positive relationship between service quality and AIS. Similarly, DeLone and McLean (2016) suggested a positive relationship between service quality and AIS. Service quality is recognized as a critical factor in achieving the system success as indicated by past studies. Therefore, delivering prompt and reliable service according to user-specific needs might lead to a better product or service delivery to bank customers. However, the absence of key service quality attributes may undermine the delivery of efficient service content of the system which may lead to complex transaction process for the user (Cenfetelli et al., 2008). Thus, higher service quality provisions may enable Nigerian banks to achieve AIS effectiveness. Hence, the following relationship is hypothesized;

H5: A positive relationship exists between service quality and AIS effectiveness.

Inter-relationship among DeLone and McLean Quality Measures

Previous studies have called for a need to explore the relationship between and among the quality measures of IS success model (DeLone & McLean, 2003, 2016; Xu et al., 2013) because the existing literature does not fully explain the relationship between and among system quality, information quality, and service quality constructs. However, only a few studies have attempted to investigate the interrelationships among some of the quality measures. For example, Wang and Chen (2006) examined the relationship between service quality and system quality. Gorla et al. (2010) analyzed the relationship between system quality and information quality, while Xu et al. (2013) explored the interrelationship between system quality, information quality, and service quality. Undoubtedly, their studies have increased our understanding of how these measures are related. However, the focus of these studies was on IS in general. Meanwhile, DeLone and McLean (2016) stated that a need existed for the researchers to explore the relationship among the quality measures in a specific IS environment such as AIS. Moreover, Petter, DeLone, and Mclean (2008) opined that the relationship between quality measures of DeLone and McLean might differ across contexts. Considering the inadequacy of the literature, this current study investigates the relationship of quality measures within an AIS environment.

If system quality is concerned with the technical efficiency of the system in terms of user interface consistency and security and information quality measures the quality of output produced by the system, then problems arising from the system can equally affect the accuracy and completeness of the output (information). This problem might eventually lead to delay (timeliness) in tactical and strategic decision making. Hence, having a good system is important to obtain high-quality information (Xu et al., 2013). Thus, user's perceptions of system quality will influence a person's beliefs about information quality. This proposed relationship is consistent with both theoretical assumptions by DeLone and McLean (2016) and empirical findings by Gorla et al. (2010) and Xu et al. (2013). Similarly, the absence of some key system attributes such as security, ease of use, and efficiency might undermine the delivery of good service content to system user(s), thus leading to complexity in transaction processing (Cenfetelli et al., 2008; Gronroos, Helnomen, Isoniemi, & Lindnolm, 2000).

The relationship between system quality and service quality and between information quality and service quality is based on the conceptualization that an evaluation of service quality measures should combine both content and delivery. When IS user(s) perceive a high quality of what is offered (content) and a high quality of how it is offered (delivery), then service quality is also believed to be high (Gronroos et al., 2000). Accordingly, Xu et al. (2013) posited that information quality is an important antecedent of the service quality measure. This theoretical assumption is consistent with both DeLone and McLean (2016) and Gronroos et al. (2000). Thus, when the user(s) perceive a system to be of a higher quality and produce a higher degree of output (information) quality, then they perceive a higher level of service quality. Based on the studies above, this study investigates the following hypotheses.

H6a: System quality has a positive relationship with information quality.

H6b: System quality has a positive relationship with service quality.

H6c: Information quality has a positive relationship with service quality.

Figure 1 presents the conceptual framework of the study showing the antecedents, the interrelationship among the quality measures and their relationship with AIS effectiveness.

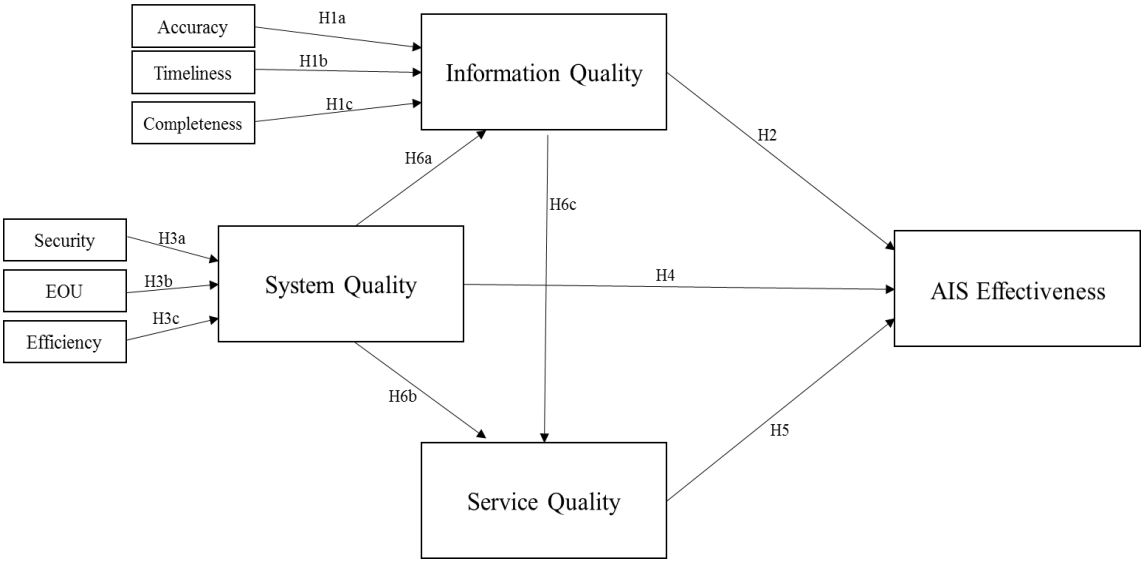

Figure 1. Research Framework

METHODOLOGY

CONSTRUCT MEASUREMENTS

Table 1 presents the operationalization of the research constructs. Although the measures were based on prior studies, items were first reworded to suit the context of the current study. Then, the instrument was sent to experts in the field of AIS for content validity of each item. The first measures of the dependent variable, i.e., AIS effectiveness, were taken from Shatat et al. (2013) and Hien et al. (2014). The measures for system quality were adapted from Chang et al. (2012). Items for information quality were adapted from Saha et al. (2012). The measures pertaining to the service quality was taken from Kwan (2006). Participants were asked to indicate their level of agreement with each item using a 5-point Likert-type scale ranging from 1 = strongly disagree to 5 = strongly agree as recommended by Sekaran and Bougie (2010). Table 1 summarizes the measurement items of all the four constructs of the study.

Table 1. Measurement items of all the Constructs

Variables	Code	Measurement item
AIS effectiveness	AIS1	The use of AIS assists our bank in achieving a competitive advantage.
	AIS2	The use of AIS helps in satisfying our customers.
	AIS3	The use of AIS does not facilitate effective integration between departments in our bank.
	AIS4	The use of AIS does not assist in reducing cost.
	AIS5	The use of AIS issues periodic reports on all organizational activities for decision making.
	AIS6	The use of AIS allows our bank to save a lot of time.
	AIS7	The use of AIS enables us to manage our tasks effectively.
System quality		*Security*
	SYSQ1	User login is required to access the online banking facilities.
	SYSQ2	Auto logout is enabled after a period of inactivity on line.
	SYSQ3	The antivirus software does not prevent the systems from being attacked by a virus.
	SYSQ4	Our AIS is not regularly examined and maintained by IT unit staff.
		Ease of Use
	SYSQ5	The user interface of our bank information systems is easy to use.
	SYSQ6	The tutorials or instructions provided by our AIS help me to use the system easily.
	SYSQ7	The user interface design by our AIS is user friendly.
	SYSQ8	I understand every function of the AIS.
		Efficiency
	SYSQ9	I am not familiar with the interface of our AIS.
	SYSQ10	The user interface items of our AIS are easy to understand.
	SYSQ11	Our AIS greatly facilitates my work efficiency.
	SYSQ12	The processing speed of the AIS assists me in accomplishing my work very fast.
Information quality		*Accuracy*
	INFQ1	Our AIS does not provide me with accurate information.
	INFQ2	Our AIS does not provide me with relevant information.
		Timeliness
	INFQ3	Our AIS does not provide me with the necessary information in a timely manner.
	INFQ4	The information contained in our website is timely and regularly updated.
	INFQ5	The information from our AIS improves the quality of my work.

Variables	Code	Measurement item
		Completeness
	INFQ6	Our AIS does not provide sufficient information related to my tasks.
	INFQ7	Our AIS provides me with comprehensive information to complete my tasks.
Service quality	SERQ1	When I have problem, an official of the bank IT units shows a sincere interest in solving it.
	SERQ2	The employees of the bank IT units do not have the knowledge to maintain the system and solve the problems well.
	SERQ3	The employees of the bank IT units have never given me personal attention.

Sampling and Data Collection Procedure

The sampling frame of the current study comprises 21 commercial banks listed on the Nigerian Stock Exchange, which, in total, have more than 5,750 branches across the country. Considering the size of the population under study, collecting data from every branch of the population would be difficult. Even if it were possible, such as collection would be constrained by time, cost and other human factors (Sekaran & Bougie, 2010). Thus, a probability sampling technique was employed because it has greater credibility, validity, and reliability in research (Henry, 1990). Thus, a total of 571 questionnaires were distributed using clusters sampling across three geopolitical zones (North, Central, and South) of the bank branches in Nigeria. Selecting 571 subjects from the population of about 5,750 is considered adequate to ensure representation based on Krejcie and Morgan, (1970) and Babbie (1990).

The research instrument was divided into two sections (see Appendix). Section A covered information related to the variables under study, and a respondent was required to provide their views based on a 5-point Likert-type scale. Section B contained demographic information of the respondents. Using a self-administered survey approach, the questionnaires were distributed to regional/branch managers and the head of the IT unit of the banks with the help of a research assistant who was trained on how to distribute and collect the data from the targeted respondents. Managers and head of IT were considered the most appropriate in responding to the research instrument because they are directly involved with the jobs and tasks. Therefore, they are in the best position to provide information regarding AIS effectiveness or otherwise.

Before conducting the large-scale survey of the study, a pilot study was carried out to determine the reliability of the instrument, although a reliability test is only required for reflective constructs but not formative one (Coltman, Devinney, Midgley, & Venaik, 2008). Hence, 50 questionnaires were administered to the targeted respondents, and 32 valid responses were received and tested. Based on the results of the pilot survey service quality construct indicates adequate reliability, and some items were rephrased to improve their clarity. The main study was conducted between June and September of 2016. The study retrieved 276 valid responses after removing 11 incomplete responses resulting in a 50.4% response rate, and these responses were used in the analyses of the study.

Data Analysis

The data collected were analyzed using descriptive and inferential analysis. SPSS version 20.0 was used to analyze the demographic characteristics of the respondents. Findings from the analysis revealed that 16.1 percent of the respondents were below the age of 30 years, 50.5 percent were 30 to 39 years, 28.2 percent were 40 to 49 years, and the remaining 5.1 percent of the respondents were 50

years and above. About 85.9 percent of the respondents were male, whereas 14.1 percent were female. Of the respondents, 3.6 percent had a diploma, 55.5 percent had a degree, and while 40.2 and 0.70 percent had a Masters and Ph.D. respectively. This implies that significant numbers of the respondents were highly educated; hence, they were in an appropriate position to answer the survey instrument. Furthermore, about 28.8 percent of the respondents had working experience of fewer than five years, 47.4 percent were 5 to 9, 17.2 percent were 10 to 14, while only 6.6 percent of the respondents had working experience of 15 years and above.

To begin the analysis, a test for multicollinearity using tolerance and variance inflation factors (VIF) was conducted, and the results indicated that they were no issues of multicollinearity among the constructs. The tolerance values of the constructs were above the minimum threshold of .20, and VIF had values below 5 as recommended by Hair, Hult, Ringle, and Sarstedt (2013). Therefore, there are no issues of high correlation among the constructs.

Table 2. Multicollinearity Test using Tolerance and VIF

	Collinearity Statistics	
Constructs	**Tolerance**	**VIF**
Security	.776	1.289
Ease of Use	.668	1.498
Efficiency	.620	1.613
Accuracy	.517	1.933
Timeliness	.427	2.340
Completeness	.723	1.383
AISEF	.629	1.590
Service Quality	.807	1.239

Measurement Model

Partial least squares (PLS) version 2.0 was used test the relationship existing between the latent variables of the model using both the measurement model and structural model, which is otherwise known as a two-step process. The adoption of this process in evaluating and reporting the path model is in line with Henseler, Ringle, and Sinkovics (2009). The measurement model, which is popularly known as the outer model, is a structural relationship between latent constructs and their indicators (Tabachnick & Fidell, 2007). The measurement model was assessed using five criteria; these included indicator reliability, internal consistency reliability, convergent validity, and discriminant validity (Hair, Ringle, & Sarstedt, 2011; Henseler et al., 2014). The result of the measurement model revealed that the factor loadings of all the items and AVE were above 0.5, and the CR were more than 0.70, as shown in Table 3, which is considered acceptable based on the benchmarks of Hair, Black, Babin, and Anderson (2010).

Table 3. Results of the Measurement Model

Latent Variables/Indicators	Standardized Loading	Composite Reliability	Average Variance Extracted (AVE)
Accounting information effectiveness		0.779	0.540
AISE2	0.777		
AISE3	0.701		
AISE7	0.726		
System Quality-Security		0.77	0.525
SYSQ2	0.618		
SYSQ3	0.725		
SYSQ4	0.817		
System quality-Ease of Use		0.817	0.529
SYSQ5	0.667		
SYSQ6	0.775		
SYSQ7	0.712		
SYSQ8	0.750		
System quality-Efficiency		0.815	0.525
SYSQ9	0.670		
SYSQ10	0.785		
SYSQ11	0.719		
SYSQ12	0.719		
Information quality-Accuracy		0.895	0.810
INFQ1	0.909		
INFQ2	0.891		
Information quality-Timeliness		0.798	0.569
INFQ3	0.776		
INFQ4	0.749		
INFQ5	0.738		
		0.821	0.696
Information quality-Completeness			
INFQ6	0.824		
INFQ7	0.845		
Service quality		0.817	0.599
SERQ1	0.763		
SERQ2	0.836		
SERQ3	0.719		

Table 4 shows that the square roots of the AVE of constructs were all above the value of the correlations of the respective construct with all the other constructs, and the correlation between the constructs were below 0.85 based on Brown's (2006) recommendations. Therefore, discriminant validity was also achieved.

Table 4. Discriminant Validity of Constructs

Construct	1	2	3	4	5	6	7	8	9	10
Accuracy	**0.900**									
AISEF	0.352	**0.735**								
Completeness	0.462	0.408	**0.834**							
Efficiency	0.345	0.415	0.372	**0.725**						
EOU	0.302	0.339	0.440	0.499	**0.727**					
Information Qty	0.844	0.474	0.785	0.445	0.462	**0.702**				
Security	0.318	0.261	0.338	0.292	0.296	0.340	**0.725**			
Service Qty	0.342	0.208	0.290	0.217	0.258	0.411	0.300	**0.774**		
System Qty	0.426	0.460	0.499	0.828	0.832	0.557	0.583	0.326	**0.542**	
Timeliness	0.675	0.450	0.626	0.418	0.444	0.621	0.234	0.403	0.506	**0.754**

Note: The diagonal values indicate the square root of the AVE.

Structural Model

After achieving an adequate measurement model, the structural model was created to clarify the extent of the relationship between latent constructs, as well as the cause and effect of the constructs that were hypothesized in this study model. The model was evaluated based on the values of the path coefficients, standard errors, t-values, and p-values as shown in Figure 2.

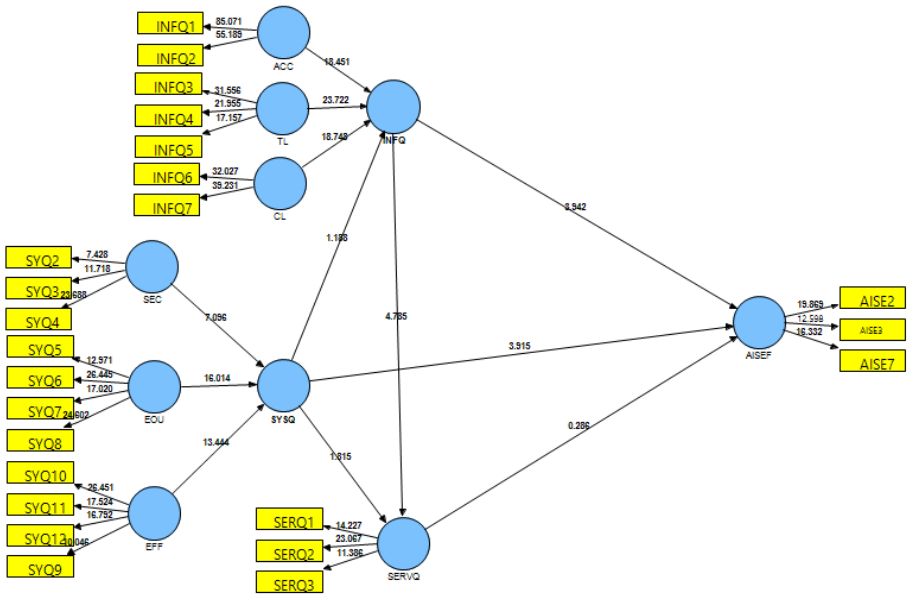

Figure 2. Structural Model

Note: ACC = Accuracy; TL = Timeliness; CL = Completeness; INFQ = Information Quality; SEC = Security; EOU = Ease of Use; EFF = Efficiency; SYSQ = System Quality; SERVQ = Service Quality; and AISEF = Accounting Information Systems Effectiveness.

FINDINGS

The results of the inferential analysis are presented in Table 5. They were the information quality dimension of accuracy ($\beta = 0.386$, $p < 0.001$), timeliness ($\beta = 0.460$, $p < 0.001$), and completeness ($\beta = 0.317$, $p < 0.001$) and were significant and positively related with information quality. Thus, these results confirm hypotheses H1a, H1b, and H1c. Hypothesis (H2) proposed that information quality positively affect AIS effectiveness, the result indicates $\beta = 0.322$, $p < 0.001$, thus, supporting the positive relationship, which implied that user perception of the quality of output produced by the system in term of accuracy, timeliness, and completeness helps in completing their task, which eventually influences AIS effectiveness. The findings are consistent with those of previous studies (Saha et al., 2012; Shagari et al., 2015; and Shatat et al., 2015). Meanwhile, the results for system quality dimension of security ($\beta = 0.291$, $p < 0.001$), ease of use ($\beta = 0.499$, $p < 0.001$), and efficiency ($\beta = 0.494$, $p < 0.001$) were significant and positively associated with system quality. Thus, these supported hypotheses H3a, H3b, and H3c. The results for Hypothesis (H4), which postulated a positive relationship between system quality and AIS effectiveness, are $\beta = 0.287$, $p < 0.001$, confirming the positive relationship. Such a finding suggests that security, ease of use, and efficiency significantly influence users' perceptions of quality. The study empirically confirms the result of the previous studies (Shagari et al., 2015; Shatat et al., 2013). The effect of service quality on AIS effectiveness was not significant (given a $\beta = -0.017$, $p > 0.05$). Thus, hypothesis (H5) was not supported. This result can be interpreted that the amount of service in terms of assurance, empathy, and responsiveness provided by the IT units of the banks does not improve or is less relevant in determining system effectiveness. In support of this finding, DeLone and McLean (2003) claimed that service quality dimensions might have different weights depending on the context of the analysis. Similarly, Montesdioca and Macada (2015) found no significant relationship between service quality and user satisfaction (which is a surrogate for AIS effectiveness). Table 5 also shows that the relationship between system quality and information quality was insignificant (given a $\beta = 0.002$, $p > 0.05$). Thus, hypothesis (H6a) was not supported, although the finding of this study was contrary to Gorla et al.'s (2010) and Xu et al.'s (2013) results. Nonetheless, this finding is in line with past assumptions that system quality and information quality are independent measures of success (Chalu, 2012; Seddon et al., 2002; Shatat et al., 2013). This implies that IS user(s) considered system quality and information quality differently in the context of this study. However, the relationship between system quality and service quality was significant ($\beta = 0.141$, $p < 0.05$), confirming the positive relationship. Thus, hypothesis (H6b) was

Table 5. Hypotheses testing

	Relationship	Beta	Stand Error	*t*-Stat	p Value
H1a	Accuracy -> Information Quality	0.386	0.020	18.450	0.000
H1b	Timeliness -> Information Quality	0.460	0.019	23.721	0.000
H1c	Completeness -> Information Quality	0.317	0.016	18.748	0.000
H2	Information Quality -> AISEF	0.322	0.081	3.942	0.000
H3a	Security -> System Quality	0.291	0.040	7.096	0.000
H3b	Ease of Use -> System Quality	0.499	0.031	16.014	0.000
H3c	Efficiency -> System Quality	0.494	0.036	13.443	0.000
H4	System Quality -> AISEF	0.287	0.073	3.915	0.000
H5	Service Quality -> AISEF	-0.017	0.060	0.285	0.388
H6a	System Quality -> Information Quality	0.002	0.001	1.188	0.118
H6b	System Quality -> Service Quality	0.141	0.077	1.814	0.035
H6c	Information Quality -> Service Quality	0.332	0.069	4.784	0.000

Note: Significant at: *$p < 0.05$ level ($n = 276$, t value = 1.960); ** $p < 0.01$ level ($n = 276$, t value = 2.576); and ***$p < 0.001$ level ($n = 276$, t value = 3.291).

accepted. The result for H6c revealed that information quality has a significant and positive relationship with service quality (given a $\beta = 0.322$, $p < 0.05$). Thus, hypothesis (H6c) was supported.

DISCUSSION

This study examines the inter-relationship of the quality-related factors information quality, system quality, and service quality of DeLone and McLean's (2003) IS success model. The study further explored the antecedents of these factors. Based on a review of extant literature from the IS research domain, the system, information, and service quality characteristics were selected and tested in the banking sector of Nigeria. The result of the analysis revealed that the IS success model might be applied effectively in specific IS environments like the AIS, thus achieving the expected benefits of the bank's investment.

In the context of the Nigerian banks, the study suggested that the accuracy, timeliness, and completeness of the output produced by the system are important antecedent variables that determine information quality based on the informant perspective (Regional/Branch Managers and Head of IT of the banks). Users of AIS want information produced by the system to be correct, unambiguous, and meaningful. The information should also be provided at the right time to the right user for an effective decision-making process. Information not only must be accurate and timely but also be complete because the lack of complete information may result in incorrect and untimely decision-making from the management. In line with current study's findings, Kafaji (2013) found that accuracy, timeliness, and completeness are the most key features of information quality. This is not surprising because both Nigeria and Saudi Arabia are classified as developing countries, thus produce consistent results with regards to the relationship between the two constructs.

This study indicated that system security, ease of use, and efficiency are factors that can be used to evaluate system quality as did Chang et al. (2012). The system should have adequate security, which would prevent unauthorized access and virus attacks. In addition to security features, if the system users developed a positive attitude with respect to ease of use, this attitude, then, would motivate the users to utilize and manage the system more effectively thereby reducing the problem of underutilization and system maintenance problem. This situation will support efficient transaction processing and management reporting of the banks thus, leading to efficient service delivery to bank customers. This, in turn, would lead to the achievement of the expected benefits of the system. In support of this finding in the context of data warehouses in North America, Nelson et al. (2005) stated that a system that is easy to use is also perceived to have high quality. Therefore, ease of use is an important antecedent of system quality. Beyond ease of use, system quality can also be influenced by efficiency. The system should have a high processing speed, which can improve the user's efficiency, cconsequently contributing to the operational, tactical, and strategic decision making in the banks. These findings provide further evidence on the applicability of antecedents of system quality in the context of Nigerian banks.

The findings of this study revealed that information quality, system quality, and service quality are not independent of one another; system quality has a significant influence on service quality. This finding implies that perceived system quality by the user(s) bears directly on perceived service quality. Therefore, an increase in system quality would lead to improved perceptions of service quality. The study further revealed that system quality has a positive and significant influence on AIS effectiveness. Results from the context of this study indicate that banks in Nigeria are more sensitive with finding more security to protect their customer's confidential information. Furthermore, the findings suggest that the system should be designed in a manner that users will find easy to use and efficient in carrying out their day to day routine. Using a well-designed AIS plays an important role to increased revenues and the quality of work processes, and save costs of banking services. Banks employs AIS in order to improve process efficiency such as collecting and transforming large amounts of data useful for tactical and strategic decision-making by managers. From the context of Nigerian banks, users believed that quality system helps them achieve their desired goals and improve the qual-

ity of task performed. This finding is consistent with the results in the previous studies (Quintero et al., 2009; Shatat et al., 2013; Hien et al., 2014). Interestingly, result similarities in the past studies are not surprising, because they shared contextual similarities with the current study. For instance, both BIS and AIS are information technologies that are used in to enhance transaction processing and effective decision making in banks. They are also similar considering both studies were conducted in developing countries.

Also, information quality has a significant relationship with service quality. This finding agrees with that of Gorla et al. (2010) as they indicated that information quality might have a significant relationship with service quality. Similarly, empirical evidence from Xu et al. (2013) revealed that information quality has a significant relationship with service quality. Thus, the implication is that perceived quality of information bears directly on perceived quality service. Implying that the more management focuses on the information quality and service quality of their system, the greater will be the positive effect on AIS of the banks. This situation ensures effective financial transaction processing and availability of accurate and up to date information to decision makers, which will improve the decision making processes in the banks, thus, contributing to the efficient and effective service delivery to bank customers. Therefore, Nigerian banks' management needs to pay close attention and integrate these factors that can assist banks to fully actualize their desired goal of having an effective system, thereby enabling banks to reap the promising benefits of their huge investment in AIS. Moreover, information quality has a significant relationship with AIS effectiveness in the context of Nigerian banks; several quality evaluation measures are important to the users, including the accuracy of the output information, the availability of the information at the right time, and the overall quality of service delivery. That is, users believed that high quality information has the ability to provide the effectiveness of the system, which minimize the occurrence of errors. This improved user's ability to rely on AIS to carry out different tasks across different functional areas of the banks such as the real-time transaction processing (e.g., online transfers, withdrawals, and or deposits) for bank customers, thus, improving the quality of products and services offered to users, leading subsequently to AIS effectiveness in Nigeria. The findings of the study indicate that information quality is important in determining AIS effectiveness. Also, in the perspective of both developed and developing countries, studies were conducted in the context of AIS adopted environments in North America, Jordan, and Malaysia. The findings of these studies reported a positive relationship between information quality and AIS (Al-Kwasswna, 2012; Nicaoula, 2000; Shatat et al., 2013). These findings revealed that information quality is an important determinant of AIS across different contexts. In essence, the findings of this study demonstrated that bank management should give adequate attention to information quality construct in order to have an effective AIS.

However, the findings of the current study revealed that an insignificant relationship existed between system quality and information quality. In particular, the results of the study revealed that bank managers perceive system quality as less important in determining the information quality. Their beliefs in these constructs are independent to each other, which indicate that system technicality and maintainability does not determine the quality of the produced output. Hence, problems arising from the system may not necessary affect the quality of the output (information). Similarly, the findings of the study indicated an insignificant relationship between service quality construct and AIS effectiveness. Specifically, in the context of Nigerian banking, the finding implies that no matter the extent to which AIS users are provided with prompt and reliable services by IS staff of the banks, AIS effectiveness remains unaffected. In which case is indicating that service quality construct has little or no adverse effect on the success of AIS in the Nigerian banking sector. Hence, users of the system do not consider the service quality dimension as relevant in determining AIS effectiveness in the Nigerian banking sector. Consistent with this finding, Petter and Mclean (2009) found that the relationship between service quality and IS effectiveness constructs revealed mixed findings in previous research. Therefore, it requires further studies to investigate the relationship.

CONCLUSIONS

The study investigates the interrelationship among DeLone and McLean (2003) quality-related constructs (information quality, system quality, and service quality) and the important antecedents shaping information quality and system quality. The study focused on the Nigerian banking sector in which there have been persistent reports of system failure, which lead to the AIS ineffectiveness. A quantitative research design was employed in the study, and the results of the data analysis revealed that accuracy, timeliness, and completeness were important antecedents of information quality. Security, ease of use, and efficiency were found to be the key antecedents of system quality. This study contributes to IS literature by extending the DeLone and McLean (2003) IS success model in AIS, a specific IS domain. This is in line with the call by DeLone and McLean (2016) for the need of further evaluation of their existing model in a specific domain such as the AIS. The study further indicates the robustness of the IS success model in a developing economy like Nigeria, hence, providing empirical evidence from a new context (Nigerian banking sector). Another important contribution of the current study was measuring of the information quality and system quality as second-order constructs because current studies have minimized the issues of incorrect measurement specification of previous studies. Thus, this study provides a more valid and reliable outcome than previous studies.

In addition to theoretical contribution, this study has some practical implications as well. One is that it is important for bank managers and other practitioners in the AIS domain to understand the factors that can contribute to AIS effectiveness in the Nigerian banking sector. The findings of the study would enable bank managers and practitioners to know the key antecedents to information and system quality constructs and to understand better the interrelationship among information, system, and service quality constructs. Moreover, the findings of the study suggested that managers need to pay close attention to the service delivery unit of the banks by ensuring that competent staff are employed. In doing so, adequate technical support would be provided to users as needed to carry out their daily operational activities promptly and successfully. In this way, AIS serves as a mechanism through which knowledge created by information technology is more easily applied across the organization. Successful applications of this knowledge provide means of acquiring and sharing knowledge about the business transactions of the banks as well as facilitating the creation of new knowledge. Therefore, AIS is an important instrument that facilitates effective knowledge management in a real-time adaptive decision support for banks. In a nutshell, banks may be able to reap the expected benefits of their huge investment in AIS, thus achieving AIS effectiveness.

LIMITATIONS OF THE STUDY AND FUTURE RESEARCH DIRECTION

As is in every social and management science studies, this current study also has limitations. This study collected data from the Nigerian banking sector. Therefore, an extension of the findings to other sectors such as financial institutions is subject to validation. Hence, future studies may consider investigating other sectors because there might be differences among the sectors. Moreover, this study collected data from three regions/zones of Nigeria, and future studies should extend this research to other parts of the country because there may be differences in the responses of the respondents to those of the current study. Similarly, future studies should further investigate the service quality construct using different measures as current findings indicated no significant relationship with AIS effectiveness. Furthermore, future studies might explore the antecedents of the service quality concepts. Finally, this study examined only three quality measures of DeLone and McLean's model and antecedents of information and system quality measures, neglecting contingency factors. Therefore, future studies should include other factors in the AIS effectiveness model to help in developing more specific theory in AIS domain.

REFERENCES

Aali, M, Sargazi, M., & Tayyar, S. H. (2014). The necessary factors and conditions in utilization of strategic information systems. *Kuwait Chapter of Arabian Journal of Business and Management Review, 3*(7), 48-58. https://doi.org/10.12816/0018271

Abbasi, S., Zamani, M., & Valmohammadi, C. (2014). The effects of ERP systems implementation on management accounting in Iranian organizations. *Education, Business and Society: Contemporary Middle Eastern Issues, 7*(4), 245-256. https://doi.org/10.1108/EBS-03-2014-0020

Abdelhak, D., & Dalel, H. (2009). Computerized information systems in the Jordanian banking sector: An empirical study. *Laboratoire finances, banques et management,* 3-17.

Adewole, J. O. (2013). The impact of automatic teller machines on the cost efficiency of Nigeria. *Journal of Internet Banking and Commerce, 18*(3), 1–21.

Al-Kassawna, R.O. (2012). Study and evaluation of government electronic accounting information systems - A field study in the Hashemite Kingdom of Jordan. *Research Journal of Finance and Accounting, 3*(4), 88-102. Retrieved from www.iiste.org

Al-Khozendar, T., Assumpcao, R. O., & Campeanu, M. (2014, March). *Building effective information systems session brief*. Social Protection and Labour, Learning forum. Latin America and Caribbean Region, World Bank.

Al-Mamary, Y. H., Shamsuddin, A., & Aziati, N. (2013). The impact of management information systems adoption in managerial decision making: A review. *Management Information Systems, 8*(4), 010-017.

Alzoubi, A. (2011). The effectiveness of the accounting information system under the enterprise resources planning (ERP): A study on Al Hassan qualified industrial zone's (QIZ) companies. *Research Journal of Finance and Accounting, 2*(11), 10-19.

Argyropoulou, M. (2011). *Information systems' effectiveness and organisational performance.* (Doctoral dissertation, Brunel University, Brunel Business School). Retrieved from http://bura.brunel.ac.uk/bitstream/2438/7496/1/FulltextThesis.pdf

Babbie, E. (1990). *Survey research method* (2nd ed.). California: Wadsworthy Inc.

Bach, C., Belardo, H., Bajwa, H. Kantharaju, P., & Prasanth, P. (2011). Factor analysis in measuring information systems effectiveness. *Proceedings of the 2011 ASEE Northeast Section Annual Conference.* University of Hartford.

Ballantine, J., Levy, M., & Powell, P. (1998). Evaluating information systems in small and medium-sized enterprises: Issues and evidence. *European Journal of Information Systems,* 7, 241-251. https://doi.org/10.1057/palgrave.ejis.3000307

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, *17*(1), 99-120. https://doi.org/10.1177/014920639101700108

Basel, J. A., Baker, R., & Omar, W. A. (2016). The critical success factor of accounting information systems and its impact on organizational performance of Jordanian commercial banks. *International Journal of Economic, Commerce, and Management, 4*(4), 658-676.

Bently, Y., Cao, G., & Lehaney, B. (2013). The application of critical systems thinking to enhance the effectiveness of a university information system. *System Practice Action Research, 26,* 451-465. https://doi.org/10.1007/s11213-012-9253-9

Bernroider, E. W. N. (2008). IT governance for enterprise resource planning supported by the DeLone and McLean model of information systems success. *Information & Management, 45*(5), 257-269. https://doi.org/10.1016/j.im.2007.11.004

Bonollo, E., Lazzine, S., & Merli, M.Z. (2015). Innovation in accounting information systems in public sector. evidence from Italian public universities. *Lecture Notes in Information Systems and Organisation*, 199-216. https://doi.org/10.1007/978-3-319-26488-2_15

Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. New York, NY: Guilford Press.

Bruno, E., Iacoviello, G., & Lazzini, A. (2015). The adequacy of information systems for supporting the asset quality review process in banks. Evidence from an Italian Case Study. *Lecture Notes in Information Systems and Organisation*, 59-75. https://doi.org/10.1007/978-3-319-26488-2_5

Cenfetelli, R. T., Benbasat, I., & Al-Natour, S. (2008). Addressing the what and how of online services: Positioning supporting services functionality and service quality for business to consumer success. *Information Systems Research 19*(2), 161-181. https://doi.org/10.1287/isre.1070.0163

Cenfetelli, R. T., & Schwarz, A. (2011). Identifying and testing the inhibitors of technology usage intentions. *Information Systems Research, 22*(4), 808-823. https://doi.org/10.1287/isre.1100.0295

Chalu, H. (2012). Analysis of stakeholder factors influencing the effectiveness of accounting information systems in Tanzania's local authorities. *Business Management Review*, *16*(1).

Chang, C. S., Chen, S. Y., & Lan, Y. T. (2012). Motivating medical information system performance by system quality, service quality, and job satisfaction for evidence-based practice. *Medical Informatics and Decision Making, 12*(135), 1-12. https://doi.org/10.1186/1472-6947-12-135

Coltman, T., Devinney, T. M., Midgley, D. F., & Venaik, S. (2008). Formative versus reflective measurement models: Two applications of formative measurement. *Journal of Business Research, 61*(12), 1250-1262. https://doi.org/10.1016/j.jbusres.2008.01.013

Dameri, R., Garelli, R., & Ricciardi, F. (2013). The didactic challenge of accounting information systems and ERPs for business schools: A proposal for the Italian universities. *Lecture Notes in Information Systems and Organisation*, 337-349. https://doi.org/10.1007/978-3-642-35761-9_21

Dandago, K. I., & Farouk, B. K. U. (2012). Impact of investment in information technology on the return on assets of selected banks in Nigeria. *International Journal of Arts and Commerce, 1*(5), 234-244.

Dandago, K. I., & Rufai, A. S. (2014). Information technology and accounting information system in the Nigerian banking industry. *Asian Economic and Financial Review, 4*(5), 655-670.

DeLone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, *3*(1), 60-95. https://doi.org/10.1287/isre.3.1.60

DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems*, *19*(4), 9-30. https://doi.org/10.1080/07421222.2003.11045748

DeLone, W. H., & McLean, E. (2016). Information systems success measurement. *Foundations and Trends® In Information Systems*, *2*(1), 1-116. https://doi.org/10.1561/2900000005

Ding, Y. (2008, August). Quality of IS in services: Theory of constructs for service, information, and system. *Proceedings of the 14th Americas Conference on Information Systems.* Canada, 1-9. Retrieved from http://aisel.aisnet.org/amcis2008

Ekwueme, C. M., Egbunike, P. A., & Okoye, A. (2012). An empirical assessment of the operational efficiency of electronic banking: Evidence of Nigerian banks. *Review of Public Administration and Management, 1*(2), 108–138.

Elpez, I., & Fink, D. (2006). Information systems success in the public sector: Stakeholders' perspectives and emerging alignment model. *Issues in Informing Science and Information Technology, 3*(2), 219-231. https://doi.org/10.28945/885

Emeka-Nwokeji, N. A. (2012). Repositioning accounting information system through effective data quality management: A framework for reducing costs and improving performance. *International Journal of Scientific & Technology Research, 1*(10), 86–94.

Fengyi, L., Olivia, R. L., & Sheng, S. W. (2005). An integrated framework for e-chain bank accounting systems. *Industrial Management & Data Systems, 105*(3), 291-306. https://doi.org/10.1108/02635570510590129

Gelinas, U. J., Dull, R. B., & Wheeler, P. R. (2012). *Accounting information systems* (9th ed.). South-Western: Centage Learning.

Gorla, N., Somers, T. M., & Wong, B. (2010). Organizational impact of system quality, information quality, and service quality. *The Journal of Strategic Information Systems*, *19*(3), 207-228. https://doi.org/10.1016/j.jsis.2010.05.001

Gronroos, C., Helnomen, F., Isoniemi, K., & Lindholm, M. (2000). The net offer model: A case example from the virtual marketplace. *Management Decision, 38*(4), 243-252

Hair, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2013). *A primer on partial least squares structural equation modeling (PLS-SEM)*. Thousand Oaks, CA: Sage Publications.

Hair, J. F., Black, W., Babin. B. J., & Anderson, R. (2010). *Multivariate data analysis*. Upper Saddle River, NJ: Pearson Prentice Hall.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *The Journal of Marketing Theory and Practice, 19*(2), 139-152. https://doi.org/10.2753/MTP1069-6679190202

Hall, J. A. (2010). *Accounting information systems* (7th ed.). South-Western: Centage Learning.

Henry, G. T. (1990). *Practical sampling (*1st ed.). London: SAGE Publications. https://doi.org/10.4135/9781412985451

Henseler, J., Dijkstra, T. K., Sarstedt, M., Ringle, C. M., Diamantopoulos, A., Straub, D. W., & Ketchen, D. J., Jr., Hair, J. F., Hult, G. T. M., & Calantone, R. J. (2014). Common beliefs and reality about PLS comments on Rönkkö and Evermann (2013). *Organizational Research Methods, 17*(2). https://doi.org/10.1177/1094428114526928

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. *Advances in International Marketing, 20*, 277-319.

Hien, L. T., Nguyen, T. L., & Cuong, P. H. (2014). Key determinants of information system effectiveness – An empirical case in Lac Hong University. *International Journal of Information Technology and Business Management, 32*(1), 1-14. Retrieved from www.jitbm.com

Hurt, R. L. (2013). *Accounting information systems: Basic concepts and current issues* (3rd ed.). New York: McGraw-Hill.

Hyung, S. L., & Jae, W. K. (2010). Student user satisfaction with web-based information systems in Korean Universities. *International Journal of Business and Management, 5*(1), 62–68.

Kafaji, M. A. (2013). Evaluating the roll of service quality as a mediator on user satisfaction in e-government applications. *Problems of Management in the 21st Century, 8*(8), 55-65.

Kanungo, S., Duda, S., & Srinivas, Y. (1999). A structured model for evaluating information systems effectiveness. *Systems Research and Behavioral Science*, *16*(6), 495. https://doi.org/10.1002/(SICI)1099-1743(199911/12)16:6<495::AID-SRES238>3.0.CO;2-R

Kurti, I., Barolli, E., & Sevrani, K. (2013). Critical success factors for business IT alignment: A review of current research. *Romanian Economic and Business Review, 8*(3), 79-97.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, *30,* 607-610. https://doi.org/10.1177/001316447003000308

Kwan, L. C. (2006). *Factors affecting the effectiveness of WebSAMS in Hong Kong secondary schools* (Doctoral dissertation, Hong Kong Baptist University, Hong Kong). Retrieved from http://libproject.hkbu.edu.hk/trsimage/hp/03007189.pdf

Lam, T. H., Than, L. N., & Pham, H. C. (2014). Key determinants of information system effectiveness: An empirical case in Lac Hong University. *International Journal of Information Technology and Business Management, 32*(1), 1-14.

Lin, H. F., & Lee, G. G. (2006). Determinants of success for online communities: An empirical study. *Behaviour Information Technology, 25*(6), 479-488. https://doi.org/10.1080/01449290500330422

Mancini, D., Dameri, R., & Bonollo, E. (2015). Looking for synergies between accounting and information technologies. *Lecture Notes in Information Systems and Organisation*, 1-12. https://doi.org/10.1007/978-3-319-26488-2_1

May, J., Dhillon, G., & Caldeira, M. (2012). Defining value-based objectives for ERP systems planning. *Decision Support Systems 55,* 98-109. Retrieved from https://doi.org/10.1016/j.dss.2012.12.036

Molavi, M., & Emamverdi, G. (2014). Any relationship between applications of accounting information & effectiveness of managers' functions at governmental organizations. *Switzerland Research Park Journal, 103*(1), 594–603.

Montesdioca, G., & Macada, A. (2015). Quality dimensions of the DeLone-McLean Model to measure user satisfaction: An empirical test on the information security context. *2015 48Th Hawaii International Conference on System Sciences*. https://doi.org/10.1109/hicss.2015.593

Negash, S., Ryan, T., & Igbaria, M. (2003). Quality and effectiveness in Web-based customer support systems. *Information & Management, 40,* 757-768.

Nelson, R. R., Todd, P. A., & Wixom, B. H. (2005). Antecedents of information and system quality: An empirical examination within the context of data warehousing. *Journal of Management Information Systems*, *21*(4), 199-235. https://doi.org/10.1080/07421222.2005.11045823

Nicolaou, A. I. (2000). A contingency model of perceived effectiveness in accounting information systems: Organizational coordination and control effects. *International Journal of Accounting Information Systems. 1*, 91-105. https://doi.org/10.1016/S1467-0895(00)00006-3

Nnenna, O. M. (2012). The use accounting information as an aid to management in decision making. *British Journal of Science, 5*(1), 52-62.

Ogah, I. J. (2013). An evaluation of the relevance of accounting systems as a management decision tool in Union Bank of Nigeria Plc. *Greener Journal of Business and Management Business Studies, 3*(1), 38-45. Retrieved from www.gjournals.org

Petter, S., DeLone, W., & McLean, E. (2008). Measuring information systems success: Models, dimensions, measures, and interrelationships. *European Journal of Information Systems*, *17*(3), 236-263. https://doi.org/10.1057/ejis.2008.15

Petter, S., & McLean, E. R. (2009). A meta-analytic assessment of the DeLone and McLean IS success model: An examination of IS success at the individual level. *Information & Management*, *46*(3), 159-166. https://doi.org/10.1016/j.im.2008.12.006

Petter, S., Straub, D., & Rai, A. (2007). Specifying formative constructs in information systems research. *MIS Quarterly*, 623-656. https://doi.org/10.1016/j.im.2008.12.006

Quintero, J. M. M., Pedroche, E. G., & Ramos, M. G. (2009). The impact of the human element in the information systems quality for decision making and user satisfaction. *The Journal of Information Systems and Technology Management, 6*(1), 25-44. https://doi.org/10.4301/S1807-17752009000100002

Rai, A. Long, S. S., & Welker, R. B. (2008). Assessing the validity of IS success models. An empirical test and theoretical analysis. *Information Systems Research, 13*(1), 50-69. https://doi.org/10.1287/isre.13.1.50.96

Ramezan, M. (2009). Measuring the effectiveness of human resource information systems in national Iranian oil companies and empirical assessment. *Iranian Journal of Management Studies, 2*(2), 129-145.

Ravichandran, T., & Rai, A. (2000). Quality management in systems development: An organizational system perspective. *MIS Quarterly*, *24*(3), 381. https://doi.org/10.2307/3250967

Redman, T.C. (1998). The impact of poor data quality on the typical enterprise. *Communication of the ACM, 41*(2), 79-82. https://doi.org/10.1145/269012.269025

Roberts, R., & Sikes, J. (2011). A rising role for IT: McKinsey global survey results. Insights & Publications. Retrieved from http://www.mckinsey.com/insights/business_technology/a_rising_role_for_it_mckinsey_global_survey_results

Rodriguez, C. S., & Spraakman, G. (2012). ERP systems and management accounting: A multiple case study. *Qualitative Research in Accounting & Management, 9*(4), 398-414. https://doi.org/10.1108/11766091211282689

Sabherwal, R., Jeyaraj, A., & Chowa, C. (2006). Information system success: Individual and organizational determinants. *Management Science*, *52*(12), 1849-1864.

Saha, P., Nath, A. K., & Salehi-Sangari, E. (2012). Evaluation of government e-tax websites: An information quality and system quality approach. *Transforming Government: People, Process and Policy*, *6*(3), 300-321. https://doi.org/10.1108/17506161211251281

Seddon, P. B., (1997). A specification and extension of the Delone and Mclean model of IS success. *Information systems Research, 8*(3), 240-253.

Seddon, P. B., Graeser, V., & Willcocks, L. P. (2002). Measuring organizational IS effectiveness: An overview and update of senior management perspectives. *ACM SIGMIS Database*, *33*(2), 11-28. https://doi.org/10.1145/513264.513270

Sekaran, U., & Bougie, R. (2010). *Research methods for business: A skill building Approach* (5th ed.) West Sussex: John Wiley and Sons Ltd.

Shagari, S. L., Abdullah, A., & Saat, R. M. (2015). The influence of system quality and information quality on accounting information system (AIS) effectiveness in Nigerian banks. *International Postgraduate Business Journal, 7*(2), 58-74.

Shatat, A. S. A., Yusof, Z. M., & Abdulaziz, J. (2013). The impact of information system success on business intelligence system effectiveness. *Journal of Theoretical and Applied Information Technology, 50*(3), 512-522. Retrieved from www.jatit.org

Tabachnick, B. G., & Fidell, L. (2007). Multivariate analysis of variance and covariance. In B. G. Tabachnick & L. Fidell, *Using multivariate statistics* (pp. 243-310). Pearson.

Tan, C. W., Benbasat, I., & Cenfetell, R. T. (2016). An exploratory study of the formation and impact of electronic service failure. *MIS Quarterly, 40*(1), 1-60. https://doi.org/10.25300/MISQ/2016/40.1.01

Wang, E., & Chen, J. (2006). Effects of internal support and consultant quality on the consulting process and ERP system quality. *Decision Support Systems, 42*(2), 1029-1041. https://doi.org/10.1016/j.dss.2005.08.005

Wixom, B. H., & Todd, P. A. (2005). A theoretical integration of user satisfaction and technology acceptance. *Information Systems Research, 16*(1), 85-102. https://doi.org/10.1287/isre.1050.0042

Xu, J. D., Benbasat, I., & Cenfetelli, R. T. (2013). Integrating service quality with system and information quality: An empirical test in the e-service context. *MIS Quarterly, 37*(3), 777-794. https://doi.org/10.25300/MISQ/2013/37.3.05

APPENDIX

PART A

Please indicate the extent of your agreement with each of the following statement by circling the appropriate option using the scale below. Please note that AIS stands for ***Accounting Information System.***

1-Strongly Disagree (SD), 2- Disagree (D), 3- Not Sure (NS), 4- Agree (A), 5- Strongly Agree (SA).

		SD 1	**D 2**	**NS 3**	**A 4**	**SA 5**
AIS1	The AIS assists our bank in achieving a competitive advantage.					
AIS2	The use of AIS helps in satisfying our customers.					
AIS3	The use of AIS does not facilitate effective integration between departments in our bank.					
AIS4	The use of AIS does not assist in reducing cost.					

AIS5	The use of AIS issues periodic reports on all the organization activities for decision making.					
AIS6	The use of AIS allows our bank to save a lot of time.					
AIS7	The use of AIS enables us to manage our tasks effectively.					
		SD 1	**D 2**	**NS 3**	**A 4**	**SA 5**
SYSQ1	User login is required to access the online banking facilities.					
SYSQ2	Auto logout is enabled after a period of inactivity online.					
SYSQ3	The antivirus software does not prevent the systems from being attacked by virus.					
SYSQ4	Our AIS is not regularly examined and maintained by IT unit staff.					
SYSQ5	The user interface of our bank information systems is easy to use.					
SYSQ6	The tutorials or instructions provided by our AIS help me to use the system easily.					
SYSQ7	The user interface design by our AIS is user friendly.					
SYSQ8	I understand every function of the AIS.					
SYSQ9	I am not familiar with the interface of our AIS.					
SYSQ10	The user interface items of our AIS are easy to understand.					
SYSQ11	Our AIS greatly facilitates my work efficiency.					
SYSQ12	The processing speed of the AIS assists me in accomplishing my work very fast.					
		SD 1	**D 2**	**NS 3**	**A 4**	**SA 5**
INFQ1	Our AIS does not provide me with accurate information.					
INFQ2	Our AIS does not provide me with relevant information.					
INFQ3	Our AIS does not provide me with the necessary information in a timely manner.					
INFQ4	The information contained in our website is timely and regularly updated.					
INFQ5	The information from our AIS improves the quality of my work.					
INFQ6	Our AIS does not provide sufficient information related to my tasks.					
INFQ7	Our AIS provides me with comprehensive information to complete my tasks.					
		SD 1	**D 2**	**NS 3**	**A 4**	**SA 5**
SERQ1	When I have problem, the official of the bank IT units shows a sincere interest in solving it.					

SERQ2	The employees of the bank IT units do not have the knowledge to maintain the system and solve the problems well.					
SERQ3	The employees of the bank IT units have never given me personal attentions.					

PART B

Please indicate your demographic background by ticking the appropriate option:

1- Age:

Below 30 years ☐
30-39 years ☐
40-49 years ☐
50-59 years ☐
60 years and above ☐

2- Gender:

Male ☐
Female ☐

3- Highest Qualification:

Diploma ☐
Degree ☐
Masters ☐
PhD ☐

4- Working Experience:

Below 5 years ☐
5-9 years ☐
10-14 years ☐
15 years and above ☐

5- Job Position (Please specify)……. ……

Thank you for taking your precious time to complete this questionnaire. Your support in providing this information is highly appreciated

BIOGRAPHIES

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