Enhancing ERP Adoption in Government Training Institutions for Effective Financial Management: A Case of Tanzania Institute of Accountancy (TIA)

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Abstract

Enterprise Resource Planning (ERP) system is the largest application software that increasingly being adopted by Higher Learning Institutions (HLI) both private and public institutions in developing countries. However, there is high rate of failures of ERP system implementation in higher learning institutions specifically in the strategies of integration with other information systems like Student Management System (SMS), human resource management and Accounting information systems for the purpose of enhancing financial management. Thus, this study aimed at enhancing the ERP system adoption in higher learning institutions with a special attention to government training institutions in Tanzania. Initially information was collected through literature review; primary data was gathered through structured questionnaires received from a total of 40 respondents working with Tanzania Institute of Accountancy (TIA) which implement ERP system (Epicor). The study revealed several factors that slow the process of implementing ERP system at HLIs. These factors are; lack of technical awareness about the system, user of the system are not involved in the system requirements, top management support, ERP system implementations strategies, IT-infrastructure and experience in IT adoption process. Furthermore, it is found that phased adoption strategy is more suitable approach for adopting new ERP system in the government training institutions environment. Similarly the study revealed that ERP system plays important role in enhancing financial management in HLIs. Conclusively, the study proposed the integrated ERP system implementation framework using phased approach to suite the government higher training institutions environment.

Keywords: ERP system, Government training institutions, adoption strategy

1. Introduction

In recent years Higher Learning Institutions (HLIs) are increasingly influenced in adopting Enterprise Resource Planning (ERP) system for the purpose if improving the operational efficiency and performance. Tanzania Institute of Accountancy (TIA) as among of HILs of the government training institutions that implemented ERP system (Epicor) with the aim of enhancing financial management. However, many challenges and barriers including inadequate ICT infrastructure, less ICT knowledge and experience makes ICT systems integration difficult (Sife, 2007; Lotrie et al., 2010; Rothenberger et al., 2010). Consequently, there are inefficiencies in ERP system such as accounting information system Epicor Version 9.05 due to the fact that Epicor systems are not integrated with other systems like Student Management System (SMS), Lawson and inventory which are important sources of information in accounting management as revealed by the Control and Auditor General (CAG) report (URT, 2014; 2015). As a result accountants within the institute finalize their final accounting report by doing some accounts consolidation and adjustments manually from different information systems. Therefore, the study aimed at enhancing the ERP system adoption by assessing strategies of integrating information systems.

1.1 The concept of ERP

Enterprise Resource Planning (ERP) is an enterprise software system that provides comprehensive functionality and allows integration of core business information flows through the different function areas within the organizations. (Rothenberger et al., 2010; Scholtz et al., 2013). ERP system helps integrate an organizational business operational functions (Finance, accounting, human resources, customer relationship, marketing) and data into a single database to be shared by all functional areas in order to deliver steady and real-time data across all business units (Monk & Wagner, 2009) and also provide effective way of managing resources (Noudoostbeni *et al*., 2010; Evans & Fred, 2014).

1.2 Background of the problem

Unlike other developed countries, ERP adoption rate in developing countries such as in Asia and Africa is very slow particularly in higher learning institutions (HLIs) (Rajapakse& Seddon, 2005); although it is slowly getting accepted since higher learning institutions are focusing to improve the quality and efficiency of service delivery and performance (Sife, Lwoga & Sanga, 2007). In particular, ERP adoption projects in higher learning institutions of Africa basically struggle with inadequate IT-experience and infrastructure, inadequate knowledge of ERP system as well as lack of strategic approach to ERP implementation (Sife, Lwoga & Sanga, 2007; Bistini, 2015)

of which making Information Systems (IS) integration in higher learning institutions (HILs) complex process (Lotriet et al., 2010; Gyaase et al., 2013).

Higher Learning Institutions (HLIs) in Tanzania both private and government institutes suffer the same consequences as stipulated above. However, the government of Tanzania is on its way to ensure the complete adoption of e-government to her ministries like Ministry of Education and Vocational Training including the government training institutions (URT, 2013). In addition, the government training institutions uses separate information system for processing their daily operation including Student Management System (SMS), Accounting Information System (Epicor, Sage Pastel, and QuickBooks), inventory System and human resource system (Lawson)

Tanzania Institute of Accountancy (TIA) is among of the government training institutions which implemented the ERP system (Epicor Version 9.05) for the purpose of improving its performance specifically in financial management. According to the Control and Auditor General (CAG) report (2014, 2015) there are inefficiencies in accounting information system Epicor Version 9.05 (ERP) due to the fact that Epicor system is not integrated with other systems like SMS, Lawson and inventory which is important source of information in accounting management (URT, 2014; 2015). As a result accountants make some adjustments and accounting consolidation manually in order to finalize their final accounts. Consequently, separation of these systems resulted into double work whereby the same transaction is processed more than once in separate systems.

In response to the challenges of information systems integration there is a need for enhancing the strategies and methodologies for adopting ERP system in the government training institutions for effective financial management. As a result, this study was established to enhance the ERP adoption strategies that can be employed by various educational institutions to effectively promote the ERP system adoption specifically in the government training institutions in Tanzania. Finally, the study proposes the strategic adoption framework to suite government environment.

1.3 Research model

The study focused on how the ERP system adoption strategies and methodologies could enhance the successful ERP system implementation towards the improvement of the government training institutions performance as well as align the business process management particularly in finance and accounting management.

Financial record keeping is a vital process in any organization to enhance effective financial management. In this study; ERP adoption strategy, ERP implementation methodology, user and technical awareness and perceived IT advantages are independent variables. The basic idea described in this framework (figure 1) is that, the technological resources and capabilities can enhance the effectiveness of financial management through enterprise application software such as ERP implementation as the modifying variable to bridge the effective financial performance as dependent variable.
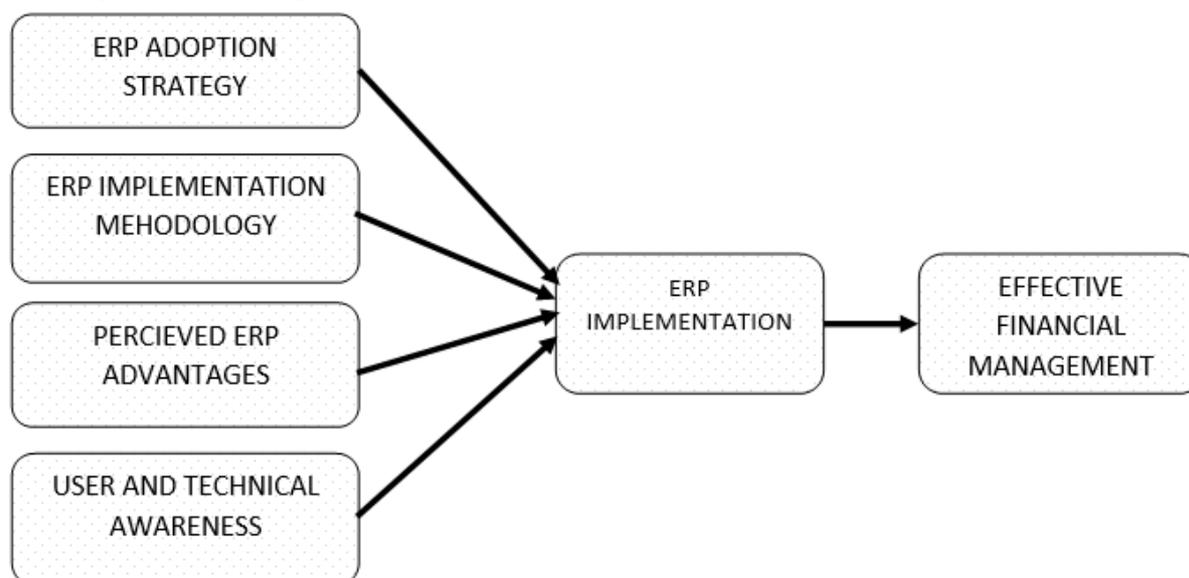

Figure 1: Conceptual framework on the ERP implementation for effective financial management

1.3.1 ERP adoption strategy

ERP adoption strategy refers to the techniques that focus on the strategy on how to make transition from a legacy system into new ERP system solution or how the ERP system can be installed in an organization (Khanna & Arneja, 2012). Madkan (2014) and Khanna & Arneja (2012) pointed out from various literatures the transition strategies namely; Big Bang, Phased, Parallel and Hybrid strategy.

Big Bang- this is the type of implementation strategy takes place on specified date called Go-live date where the installation of all modules is done across the entire organization in one go. The Go-live date is decided by both implementation team and Top management.

Phased strategy or *incremental approach* in which the modules of ERP systems are implemented slowly one-by-one in a well chronological order.

Parallel transition strategy - This strategy involves running both new ERP system and the existing legacy system at the same time.

Hybrid transition strategy - This strategy uses the combination of any two or more implementation strategies such as Phased strategy and parallel implementation strategy.

The important factors to consider when selecting the appropriate adoption strategy are; availability of resources, organization size and complexity, business process re-engineering (BPR). Moreover, other critical success factors for appropriate adoption strategy are; User involvement, clear definition of need and implementation plan, Change management and top management support (Moohebat *et al*., 2011).

1.3.2 Implementation methodology

The ERP implementation methodology involves a variety of procedure and process which comprises with the means of formulating the actual implementation of the ERP projects. The appropriate methodology will ensure the ERP implementation clearly addresses the business objectives and goals (Lutovac & Manojlov, 2012). This is to say that, ERP implementation involves personnel (technical, business, support and user side), software and hardware vendor (SAP, ASAP, Oracle, Peoplesoft, HP, Microsoft, etc) and adoption strategy (Dantes & Hasibuan, 2012). Each software vendor defined the implementation methodology based on the following five phases; Definition and planning phase, operational analysis phase, solution design phase, building phase, and transition and production phase accordingly. This study focused on the six sigma strategic implementation model (Define, Measure, Analysis, Improve and Control (DMAIC)) for effective and successful ERP system implementation. Therefore, six sigma approaches in this study is considered as a good tool for decision makers or management to indentify the possible causes of inefficiencies in adopting and integration ERP modules.

2. Theoretical conceptual framework

The study attempted to integrate the two proposed strategic framework (Technological acceptance model (TAM) and Six sigma DMAIC framework) for the purpose of enhancing the ERP system adoption and implementation in the government training institutions successfully.

2.1 Technological Acceptance Model (TAM)

TAM proposed as adaptation of Theory of Reason Action (TRA) (Davis *et al*., 1989). This is the most employed and accepted model of IS/IT adoption as well as predicting user's acceptance of Information Systems (Bazhair& Sandhu, 2015; Vankatesh &Bala, 2008). TAM model emphasizes that for any new IT-system to be adopted successfully, users should clearly anticipate the positive impact in terms of usefulness (PU) and ease of use (PEOU) for the purpose of improving their performance.

Davis *et al*. (1989) defined Perceived ease of use (PEOU) as "the degree to which a person believes that using a particular system will be effortless"; while Perceived usefulness (PU) as "the degree to which a person believes that using a particular system will enhance his or her performance". Tung *et al*. (2008) describes PEOU and PU as essential in the use of Information System (IS) and for solving problems related to technological acceptance. Therefore, TAM serves as the theoretical position which explain and examine the detailed understanding of the user`s behavior and intentions towards acceptance or rejection of new integrated system in an organization. In this study considers the financial performance and economic benefit from ERP system implementation are the motives for adopting ERP system within the organization in terms of usefulness and ease of use.

2.2 Six Sigma DMAIC framework

The Six sigma methodology is a strategic process improvement framework which basically provides the management with tangible facts that support in the process of decision making (Anthony *et al*., 2012). The DMAIC methodology is the fact-driven approach and consists of five phases namely; *Defining (D), Measuring (M), Analysis (A), Improving (I) the process and Control (C)* phase to avoid the recurrence of the problem (Abreu *et al*., 2012; Anthony *et al*., 2012). The Six Sigma (DMAIC) methodology is useful for identifying the root causes for an existing problem and proposes the solution that has a significant business impact. Therefore, the use of DMAIC methodology essentially fits in the quality improvement of an organization business processes and stay in the competitive environmental operations. Moreover, the six sigma methodology is helpful in alignment of the business strategy and streamlining the information flow within the institution.

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3. ERP system adoption planning and strategic change management
The adoption of new ERP system is associated with various changes that must support the new behavior of doing work. Therefore, In order for an organization to achieve a successful adoption of ERP system, they need to create a sustainable IS/IT infrastructure. As stated by Turban et al. (2013) Information Technology (IT) strategy describes exactly what information systems (IS) and its architecture that can support the business and how the services are delivered. Consequently, ERP planning must comply with the implementation of the ICT policy for standardizing the ICT processing and management of information records across all the organizational functional areas.

In the other words, there must be good strategic alignment approaches between the business processes and IT strategies so as to comply and deliver the government objectives. Ward & Peppard (2009) explained the IS strategy as a link between business strategy and the effective use of IT for strategic advantages. In the study of Bitsini (2015) contented that many ERP system implementation projects have failed and huge investment of money is wasted simply because organizations and institutions implementing the ERP project is taken as the surprise and hence they are unable to change and sufficiently catch up with technological requirements. All these literatures implies that for effective adoption of new system the government training institutions must be prepared for change and introduce the changes as suggested by the change management frameworks such as lewin`s framework for change.

4. Importance of IT governance in planning and managing ERP system adoption
To successfully adopt ERP system, the government training institutions ensure that there is a real value of an integrated system. Therefore, IT governance is critical in the process of implementing the new system. IT governance in the organization covers the organizational policy and cultural practices that gives the transparency of information technology as an integral part of corporate Governance (Pereira &Mira, 2012; Lingyu *et al.*, 2010; Turban *et al*., 2013). Moreover IT governance and planning has the intention of providing the strategic direction to ensure that the enterprise`s resources are used responsibly and objectives are achieved (NCC, 2005; Pereira &Mira, 2012; Grembergen & De Haes, 2008). Otherwise, IT governance basically implemented in favor of alignment of business strategies to improve business performance.

Pereira &Mira (2012) and NCC (2005) highlight the importance useful for planning and managing systems adoption with regard to IT governance in the following manner;

- IT governance ensures that the available IT systems support the business objectives, organizational resources are used responsibly and appropriate management of risks.
- IT generally play important role for enhancing the corporate governance practices and hence increases the technical awareness of IT related risks.
- IT Governance help the management to realize the ability of available IT infrastructure in terms of technology, People and processes to meet the expected business requirements
- IT governance support management in enhancing the control of IT activities. This resulted into reluctance for taking significant IT investment decisions in case of less transparency and clarity for the risks and failure to catch up with the new technology.

5. Methodology
The data was collected through the use of questionnaire, interview, literature review, and observations. Moreover the case study approach was employed simply because the government of Tanzania has already started implementing ERP system (Epicor Accounting system) to some of her agencies including training institutions like Tanzania Institute of Accountancy (TIA). Authors decided to touch on case study because it can easily give a deep insight and understanding of the problems facing the organization (Kothari, 2004).

The questionnaire arranged in 3-sections mostly consisted of a series of likert scale statements which was considered so as to examine the degree of response (strongly dis-agree through strongly agree) in terms of acceptance or rejection to some phenomena. Moreover, the researcher was available to clarify some difficulties as ERP system was not very familiar to respondents. The researchers distributed 55 questionnaires to different respondents of various professionals (Accountants, Procurement officers, management supporting staff, and IT officers). In response 40 questionnaires were returned and completed which is equivalent to 72.7% of all questionnaires. Finally, Ms excel was used in tabulating the quantitative data and presentation of frequencies, percentages and graphs.

6. Results, Analysis and Discussion
Respondents' characteristics
Respondent academic qualification - out of 40 respondents who successfully returned questionnaires, 23 (57.5%) were bachelor degree holder, 15 (37.5%) were masters degree holder, 2(5%) were diploma holder and no any PhD holder were found.

Respondents by professionals, 17(42.5%) were accountants, 13(32.5%) were procurement officers,

7(17.5%) were IT officers, 3(7.5%) were management supporting staff.

Respondents experience with government training institutions - out of 40 respondents, 1(2.5%) had experience of less than one year, 8(20%) had experience range of 1-3years, 10(25%) had experience of range 3-5years, 13(32.5%) had experience of range 5-10years and 8(20%) had experience of more than 10years.

Generally, among the 40 respondents majority 21(53%) had experience of the years between 3 to 10years. This indicates that the experience of working with the government training institutions basically can persuade the level of understanding and comprehend the existing problem in the process of adopting ERP system in HLIs.

6.1 The extent to which technical awareness of user influences the effective ERP adoption

Knowledge on ERP system

The result shown that, out of 40 respondents, 18(45%) have a knowledge about ERP system while 22(55%) of respondents have no knowledge about ERP system.
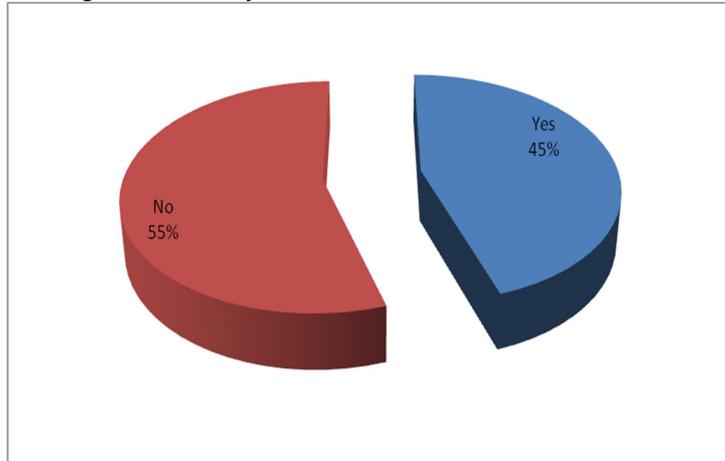

Figure 2: Technical aweraness of user

Furthermore, out of 18 respondent with ERP system knowledge majority have average knowledge such as 8(44.44%) and 4(22.2%) have good knowledge of ERP system while 3(16.67%) of respondents have high level knowledge of ERP system.
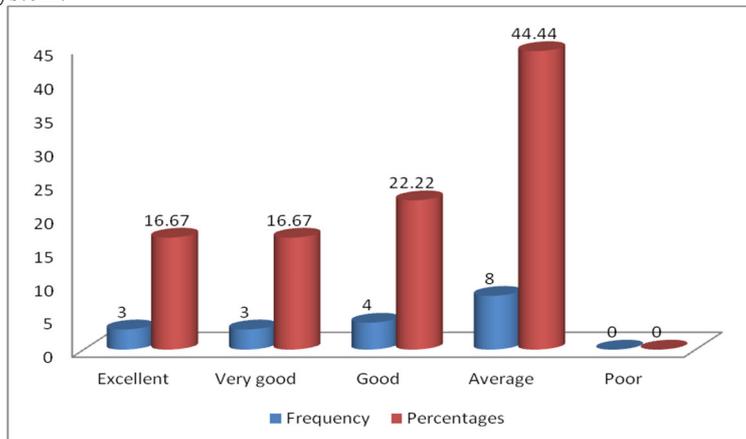

Figure 3: Level of knowledge of ERP system (n=18)

Therefore, it was revealed that half of users have no enough or average knowledge of ERP-system which means the government training institutions need to spare enough resources and energy to create awareness and competence to the system users. As shown by King, (2002) that lack of understanding of software capabilities is among of the critical factors that hinder the proper implementation of integrated financial information system.

Moreover the respondents were asked to rate the extent to which the benefits of technical awareness of user contribute to the adoption of the new system. The result shown that 88% of respondents agreed/strongly agree that technical awareness of user clearly help define the information system responsibilities and managing changes while 7.5% and 5% they don't know and disagree respectively. Similarly, 85.5% of respondents agree/strongly agree that technical awareness of user help to understand easily and catch up with the new IT-system. On the other hand 12.5% and 2.5% of respondents don't know and disagree respectively.
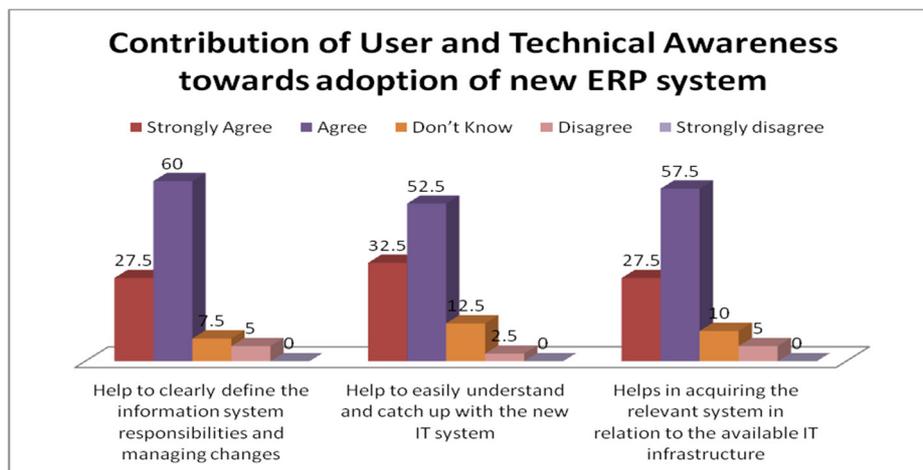
Figure 4: Contribution of user and technical awareness towards the new ERP system

The findings revealed that generally respondents agree that technical awareness of user is highly important in acquiring the relevant system, since it helps to absorb and manage changes. Therefore, it becomes easy for user to understand and clearly define the system requirement as well as ensuring that the new system adopted is clearly aligned with business processes and objectives in relation to the available IT-infrastructure. The findings are in line with conclusion made in the study of Gyaase et al., (2013) that IT-knowledge and appreciation motivates the users and stakeholders to adopt and use the ICT- system effectively. This is build based on the ability of the system performance expected to be delivered accordingly. Also in the study of Bitsini (2015); Rajapakse & Seddon (2005) found that, user knowledge is the key factor especially in the process of defining exactly what is required in the system so as to fit with the business processes. Therefore, the technical awareness of user is the potential benefit for adopting ERP system with minimal level of resistance to change and be anxious of technological innovations.

User involvement

The findings also revealed that there is less user involvement in defining and acquiring the system. It is observed that only 35% of respondents were involved in acquiring the new IT-system while 65% have never being involved. Consequently, the organization may fall into poor definition of needs; such that, the new system might be introduced and may not exactly fit the business objectives and demand which resulted into a lot of customization. The findings of Bitsini (2015) in his study revealed that most of the developing countries face the problem of mis-alignment of the organizational business strategies against the ERP system features due to inadequate knowledge and the system user involvement in system requirements.

6.2 The perceived ERP-advantages towards effective ERP system adoption

The findings shown that 35% and 65% of respondents respectively strongly agree and agree that ERP allows to access financial information easily only for authorized personnel. Again 40% and 55% of respondents strongly agree and agree that ERP gives an opportunity to improve speed of financial data access and retrieval while only 5% respondent don't know. Also the survey reveals that 62.5% and 25% of respondents agree and strongly agree that ERP-advantages contribute in improving the information quality in terms of completeness, timeliness and Correctness as well as financial reporting while 12.5% of respondent disagree.
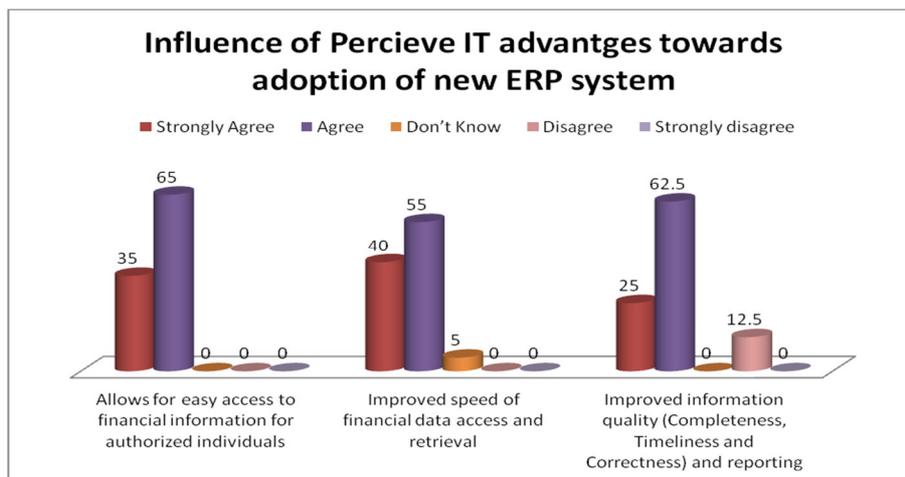
Figure 5: Contribution of user and technical awareness towards the new ERP system

The findings show that ERP-advantages such as ERP system implementation allow the centralized system control in terms of information access and authorization, enhanced speed and quality of financial information. Based on the usefulness and ease of use of the ERP-system further simplify the preparation of financial reporting for quality decision making. These findings also concur with the conclusion made in the study of Kanellou & Spathis (2011) in Greece, that the systems control, quality real-time information and improved business processing (access speed) are the key factors for Greek organizations to adopt ERP system. Spathis (2006) argued that the most important benefit of ERP system is the ability of the system to produce real-time data and sharing the common data across the organization. Furthermore the study signifies that, this benefit is the main reason of implementing of ERP system. Furthermore, respondents gave multiple responses on the roles of ERP system in enhancing financial management within the institute as presented in the table 1 below;

Table1: Roles of ERP system in enhancing financial management

Roles of ERP system (n=30)	Frequency	Percentage
Easy access to students fees outstanding and other financial records	11	36.7%
Ability to see and analyze the real-time integrated report	16	53.3%
Retrieve the accurate and reliable data instantly	13	43.3%
Easy preparation of financial report	4	13.3%
Improved functional flexibility and communication	6	20%

NOTE: The percentage do not add to 100% because of multiple responses

Findings from the table 1 above reveal the evidence that respondents understand the importance of ERP system in such a way that they manage to mention roles of the ERP system in the institute financial performance. The main idea portrayed here is that ERP system is going to help the user and institute at large to enhance the information distribution, accessibility, communication and the improved speed with which things get done.

6.3 ERP system adoption Strategies

The findings revealed that 53.3% of respondents witnessed that there is poor IT-system implementation strategies in government training institutions. This implies that IT-system implementation strategy is not good in public institutions, because, the respondents have experienced in working with public sector. As such the IT-system implementation strategy can be the hindrance factor for adopting the new system based on the fact that it cannot fit with the available IT-infrastructures and resources. Similarly, the study found that 55% of respondents said phased strategy approach is the good approach in the public institutions while 27.5% respondents said Parallel strategy while 10% and 7.5% responds to Hybrid and Big-bang strategy respectively.
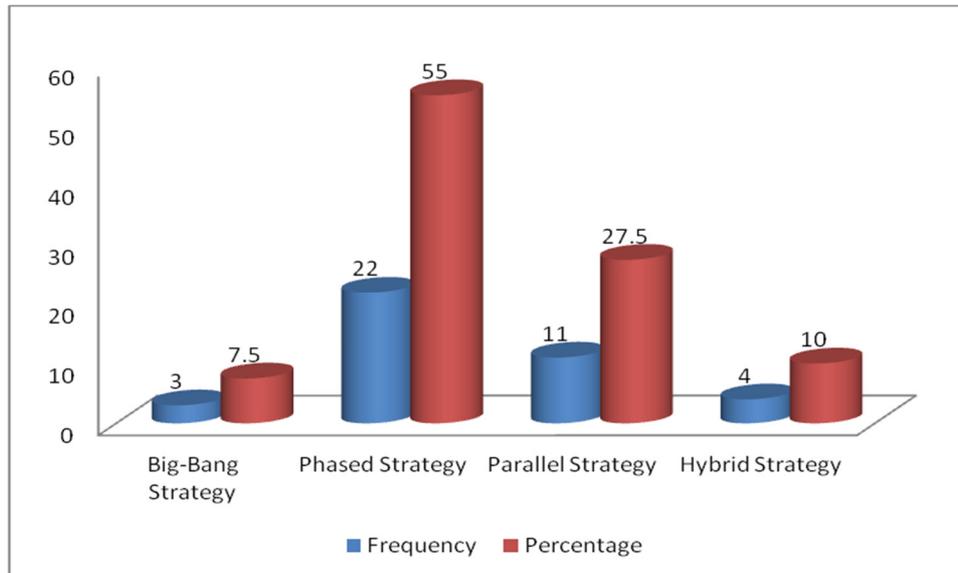
Figure 6: The suitable ERP implementation methodology in government training institutions (n=40)

As found by Nirmala et al., (2013) in India that 81% of the public organizations and universities preferred phased strategy. This is due to the fact that it gives an opportunity for user to study the weakness and clearly improve them in the next phase (Madkan, 2014). Moreover, these implementation strategies associated with other factors that influence the adoption of ERP system which was found in the results. Therefore, the findings revealed that 77.5% do agree that top management support; user training and education, system user involvement in system requirement acquisition are the important factors for user acceptance and smooth adoption of ERP system. Figure below illustrates:
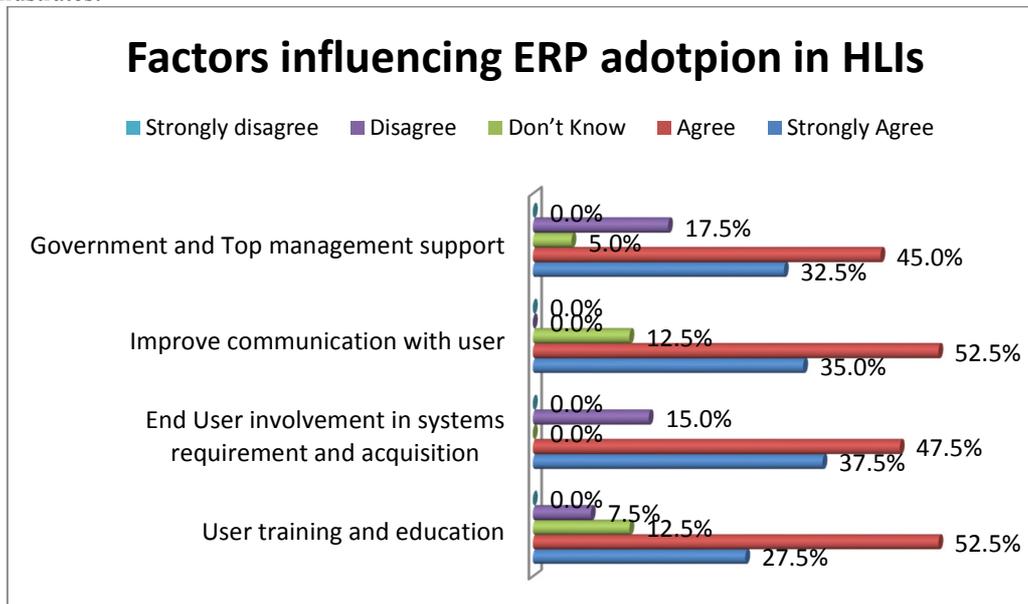

Figure 7: Other critical factors influencing ERP adoption in higher learning institutions (HLIs)

These findings are in line with the study findings of Zougaghi& Laghouag (2013) and Dagher& Kuzik (2013) that, user involvement basically deal with user psychology to facilitate the sharing of information in terms of system acceptance, training, utilization and participation so as to inspire the new system conceptualization. Similarly, Moohebat *et al.* (2011) concluded that the management support is important so as to facilitate with the detailed authoritative information to be presented and create clear line of communication with stakeholders to better control the project.

Most importantly, the phased strategy from the findings is highly supported by these factors. This is because, during the phased implementation there will be an opportunity for training and learning while involving user in the area of improvement. At this juncture, the two strategic models Technological Acceptance Model (TAM) and Six Sigma DMAIC are of importance with the aim of performance improvement compared to the expected standards. These models are concerned with improvement of the problem identified using statistical facts

(DMAIC). This is done through the use of phased implemented system in terms perceived usefulness (PU) and perceived ease of use (PEOU) in the transactional processing.

6.4 ERP system adoption framework for government training institutions

The study proposed strategic ERP system adoption framework based on the government training institutions environment in phased approach. Moreover, the framework expected to improve the process of implementing ERP system in HLIs. Based on the fact that ERP implementation involves people, software vendor (SAP, Oracle, and Peoplesoft) and adoption strategy in which, each software vendor defined the adoption methodology based on the following five phases; *Definition and planning phase, operational analysis phase, solution design phase, building phase, and transition and production phase*. Therefore, the framework is derived from vendor's implementation methodology and the six-sigma conceptual theoretical framework (DMAIC) which is based on the strategic business performance and delivery improvement.
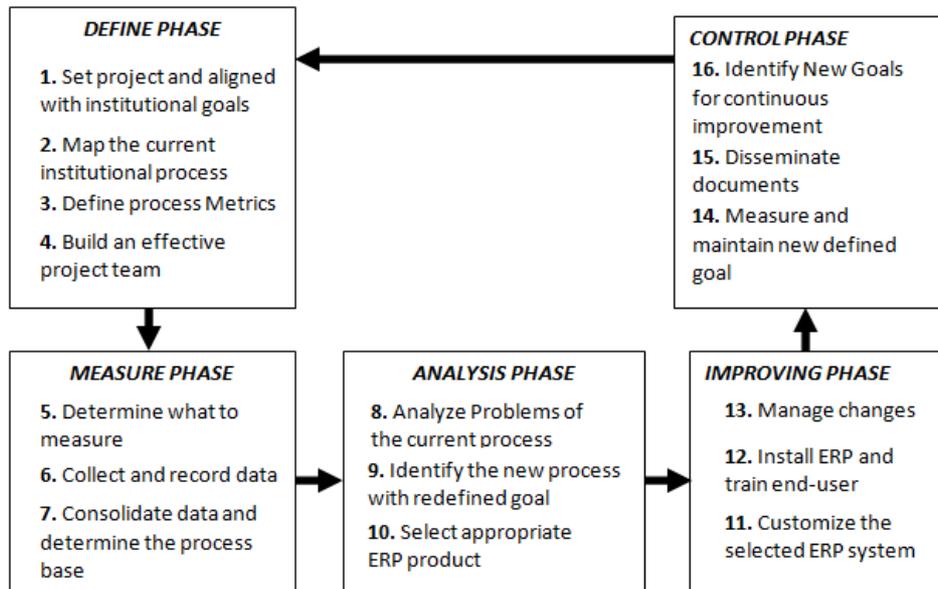

Figure 8: Integrated ERP implementation framework extracted from *(Anthony et al., 2012)*

This framework focuses the objective of the Six Sigma (DMAIC) framework which is the strategic process improvement that provides the management with tangible facts that support in the process of decision making

In the improving and controlling phase of the proposed framework from *figure 8* above are very important for improving the installed ERP system. At this phase the HIL must ensure the requirements are met by using the main two determinants proposed through TAM which are; perceived usefulness (PU) and perceived ease of use (PEOU). Here the vendor will have to improve the ERP system interface incase it does not met the specified requirement which is measured and improved again through the same steps of the strategic framework.

6.5 Priorities in the process of ERP adoption

Training

Training of the ERP system adoption strategies is important because it help to build the capacity of employees. Training will create awareness and impact knowledge to both employees and other stakeholders so that they clearly understand the benefit of the new ERP system. Furthermore, it will build and create positive behavior towards the new system as well as the better understanding of new IT adoption approaches.

The IT expert

The IT expert helps to learn the challenges and advice on the type of the ERP-system to be implemented based on the available infrastructure and IT environment. Therefore, the IT-personnel is responsible for providing technical support to the staff while ensure the new system requirement are met. Also IT-expert will assist the management in the process of acquiring IT equipment and installation of the system.

Creating IT-infrastructure and procurement of IT equipment

The HLI has to create the IT-infrastructure in such a way that it can be able to accommodate the new ERP system. Currently, most of HLI has good local area network (LAN) and almost all offices are supplied with computers already connected with internet. The recommendation here is to improve the infrastructure so as to ensure compatibility with new ERP technology. The updated IT-infrastructure will generally enable the complete installation of ERP system.

7. Conclusion

The impacts and benefits of ERP system motivate the governments and higher learning institutions to adopt them to enhance business performance. Most of the existing studies evaluate the success and failures of ERP system implementation in a business. In developing countries there is high rate of ERP system failure due to various factors discussed. Thus, this study attempted to assess the strategies of adopting new ERP system in HLI for the purpose of improving financial management. However, the ERP system technology is in infant stage in Tanzania particularly in HLIs. The researchers observed that top management support, technical awareness of user, training and user involvement in system requirement, technical support and adoption strategies are important factors in enhancing adoption of ERP system to suite the higher education environment. In the end, the study proposed the strategic implementation framework with the purpose of improving and controlling the process of implementing ERP system.

The previous studies and discussions mostly emphasized on the importance of adopting and implementing ERP systems to HLIs by considering the importance of the system itself. However, many system implementation strategies and methodology has been proposed by various researchers in business organizations than HLIs. Therefore, there is a significant reason of information system researchers and practitioners to focus on the ERP system adoption strategies for HLIs with special attention to government training institutions environment. This is due to the reason that, successful ERP system adoption is expected to improve effectiveness of HLIs performance specifically to financial management. Therefore, this study basically helps HLIs and other ERP professionals to improve their strategies for ERP adoption and put more attention on technical and organizational perspectives to suite user perspectives in terms of training and user involvement to meet the HLIs objectives and success.

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