User participation in ERP Implementation: A Case-based Study

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Abstract: Information Systems (IS), such as Enterprise Resource Planning (ERP) systems, are being developed and used in organizations to achieve their business goals and to enhance organizational effectiveness. The effect of user participation on successful systems development and implementation of ERP systems continues to be an area of interest to researchers. Common understanding has been that extensive user participation is not only important, but absolutely essential to system success. Even with this understanding of user participation as one of the critical factor in successful IS development and implementation, empirical studies have been unable to conclusively link user participation to systems success. This paper uses a private university as a case study to examine the role played by user participation in the implementation of an ERP system. In order to achieve its objective, this study adopted a mixed method where both qualitative and quantitative approaches were used in the collection of data. The results of the study reveal that user participation has a positive impact on the likelihood of ERP system success, user participation by choice is the best, user participation leads to better understanding of system requirements, the more participation the more the satisfied the users are, and participation builds support for the system during implementation. From our results we conclude that user participation in ERP system implementation is critical for successful implementation.

Keywords: *Enterprise Resource Planning, ERP systems, ERP implementation, User Participation.*

1. INTRODUCTION

Implementation of an ERP system is a complex IT-related social phenomenon with a large body of knowledge (Sarkera and Leeb, 2003). Amoako-Gyampah (2007) asserts that this implementation involves large expenditures, lengthy periods, and organizational commitment. An organization that decides to implement an ERP system is subjected to technological, information, business processes and people challenges. This implementation affects users at various levels of the organization since it cuts across all functional units. These users range from top management to low level users who use the system on their day-to-day operations. Earlier studies on ERP systems that focused on critical success factors, such as Al-Fawaz *et. al*. (2008), have identified user participation and involvement as one the important factors for successful ERP implementation.

The subject of user participation and involvement in implementation of information systems has been an area of interest to researchers and practitioners. Panorama consulting group (2010) claim that user involvement is one of the most cited critical success factor in ERP implementation projects. The result of involving users in the ERP implementation is a better fit between the resulting system and the business processes (Panorama Consulting Group, 2013). Users are invited to participate in an information system development (ISD) process because they have accumulated rich application domain knowledge through long period of exposure to their job context. User participation is advocated in order to discover users' needs and points of view, validate specifications, and hence build better IS for the organization (Esteves *et al.,* 2005). Other benefits include enhanced system quality, increased user knowledge about the system, greater user commitment and user acceptance (Harris and Weistroffer, 2008).

Ever increasing competition, expanding markets and enhanced customer expectations are among the challenges that organizations face today. To overcome these challenges, Enterprise Resource Planning (ERP) systems offer an integrated, enterprise-wide view of an organization's corporate information. According to Ibrahim *et al.* (2008, pp. 1), "an ERP software is a set of applications that links systems such as manufacturing, financial, human resources, data warehousing, sales force, document management, and after-sales service together, and helps organizations handle jobs such as order processing and production scheduling". This characteristics differentiates ERP systems from the traditional information systems that are considered to be information *silos* of various operational units of the organization. These *silos* are not integrated. Another distinction between ERP systems and the traditional information systems is the fact that majority of ERP systems are commercial of the shelf (COTs) systems which are bought and customized by the implementing organizations.

Due to their complexities, the implementation of ERP systems is a process of great complexity strongly involving the whole company and users at all levels of the organization. This implementation has many conditions and factors which potentially influence its success and the success of the entire project. One of these factors is user participation (Al-Fawaz *et. al*., 2008). ERP systems are complex pieces of software. Consequently, many such implementations have been difficult, lengthy and over budget, were terminated before completion, and failed to achieve their business objectives even a year after implementation (Somers and Nelson, 2004). The significance and risks of ERP make it essential that organizations focus on ways to improve ERP implementation. Because of the promise of integration and facilitation on rapid decision-making, more organizations and institutions globally are implementing ERP systems (Markus and Tanis, 2000).

Along with this adoption, there has also been a greater appreciation of the challenges that arise from implementing these complex technologies. Al-Mashari (2003) asserts that many organizations are now adopting ERP systems making them today's most widespread IT solutions. For the benefits to be achieved, the ERP implementation should be successful. Many researchers have identified user participation as a critical success factor in the implementation of information systems and ERP systems. The way users participate during the development of a traditional information system is different from the way users participate in an ERP implementation. This paper investigates the role of user participation in ERP implementation using a private university as a case study.

The paper is divided into five remaining sections. Section 2 presents a review of related literature on user participation and past research on ERP implementation. Section 3 describes the methodology followed in collection and analysis of data. A brief description of the case study university and how an ERP system was implemented in this university is presented in section 4. The data on user participation in the ERP implementation process is presented in this section. Section 5 gives a brief discussion of the findings while section 6 concludes this paper.

2.REVIEW OF RELATED WORKS

Research on user participation in the past has focused on identifying the link between user participation or involvement and success in system development. No conclusive proof of this link has been offered by these past researches (Cavaye, 1995). Part of the reason for the inconclusive results can be traced back to the lack of clear definition of what user participation is. Prior to 1989, user participation and involvement were used interchangeably. Cavaye (1995) emphasizes that a clear definition of these terms will resolve ambiguities which might have brought about several interpretations of the research findings.

Traditionally, user participation was defined as user representatives' participation in IS development process (Ives and Olson, 1984), with reference to a series of specific activities undertaken by users (Baroudi et al., 1986). The term user participation in the information systems discipline used to be used interchangeably with user involvement till clear distinction was made between the two by Barki and Hartwick (1989; 1994).

Barki and Hartwick (1989) argue that user participation and user involvement are two distinct concepts with different meanings as used in other disciplines. It is worth noting that in the IS literature, these two concepts have been used interchangeably. In trying to differentiate these two concepts, Barki and Hartwick argue that *user participation* should be used to refer to those activities and behaviours of users and their representatives during the development process of an information system while on the other hand *user involvement* should be used to refer to the subjective psychological state that reflects the level of importance and personal relevance of the information system to users. We adopt this understanding of user participation in this study. We perceive user participation to be activities of users and their representatives during the development and implementation of an information system.

Despite the existence of various methodologies, there is a lack of measures to secure effective user participation. Qualitative research has found that users tended to play a marginal,

passive, or symbolic role in IS development (for example, Beath and Orlikowski, 1994). For example, joint application development (JAD) fell short in promoting effective user participation, contrary to common expectation (Davidson, 1999; Gasson, 1999). Although participatory design (PD) places a strong emphasis on the cooperation between users and IS developers, there exists little evidence on the adaptability of this approach beyond the Scandinavian cultural settings (Carmel et al., 1993).

It is difficult for users to participate meaningful for the following reasons: (1) Led by IS staff, users tended to be drowned in technical materials (Davidson, 1999). (2) The language of communication between the two sides tends to be technical, often involving a great deal of jargons (Beath and Orlikowski, 1994; Davidson, 1999). And lastly, (3) Users are put into a passive position, lacking motivation for substantive participation (Wilson et al., 1997). These problems prevent users from participating in IS development in a meaningful and effective manner. Therefore, there is a clear need for further research on methods for effective user participation since users are the domain experts and carry a wealth of experience when it comes to their operation areas.

Few studies have been conducted on ERP implementation from the perspective of user participation. However, user participation issues were also touched upon in two other bodies of research on ERP implementation, albeit not as the main focus. The first one investigates critical success factors for ERP implementation. Secondly, user participation occasionally appears in recent research on ERP implementation team from the client side. Prior research has addressed the following themes: (1) the important role of absorbing ERP knowledge by the user team (Lorenzo et al., 2005; Robey et al., 2002); (2) the various types of ERP knowledge to be learned, such as the functionality of the software, idea of integration (Ko et al., 2005), and project management methods (Xu et al., 2006); and (3) factors affecting the user team's absorption of ERP related knowledge (Ko et al., 2005).

Due to the complex nature of these systems, there have been reports of ERP implementation projects that do not succeed. Sumner (2000) states that there are a number of potential explanations for these failures. The failures can broadly be classified as human/organizational reasons such as lack of strong and committed leadership, technical reasons such as challenges or difficulties that arise from software customization and testing and economic reasons such as lack of economic planning and justification). Sumner (2000) further asserts that as much as each of these classes is important there appears to be a growing consensus among researchers that human factors are critical to the success of ERP projects.

In summary, the significance of user participation, as an important issue in ISD, has not been duly recognized in ERP implementation research. Research on ERP implementation from the perspective of user participation is lacking, and this could be an area of significant research contribution.

3. METHODOLOGY

A case study methodology was used in this study. The data collected for the purposes of this study comes from one case study conducted in a private university in Kenya. Qualitative data collection method (mainly semi-structured interviews) and quantitative data collection method (mainly a questionnaire were utilized. The interviewees were heads of departments, internal ERP project manager and IT

technicians. The questionnaire was administered using an online tool (SurveyMonkey) and it focused on the end users in various departments such as Finance, Human Resource, Registrar's office, Examinations and some teaching staff. The users who filled the questionnaire were identified by the IT Manager and the internal ERP project manager.

The survey questionnaire asked for information on user participation in the ERP implementations. ERP implementation has different phases and the users participated in either all or some of these phases. The questionnaire was four pages long and had a total of 16 questions addressing the various phases of ERP implementation. The questions in the survey required multiple responses while others were open-ended. The responses were encoded using a mix of check boxes (for multiple choices), radio buttons (for single choice) and open-ended answers. After the initial development of the survey questionnaire, it was sent to two ERP project leaders from our case study university and the ERP vendor. The primary objective was to test whether the instrument provided consistent and accurate information. Their responses were checked against the information collected during the case study. In addition, the questionnaire was checked by two ERP consultants. Based on the information provided by these experts, the instrument was fine-tuned and finalized.

The Case Study University

The case study was a private university in Kenya located in Nairobi which has adopted an ERP system and implemented several modules in several functional units. The university has broken down the ERP system into modules that handle several of its functional departments/units. These include finance, human resource, student management (admissions and examinations management). Other modules have been left out to be installed in the future. The university has four campuses which are all connected together and use the ERP system. At present, it employs in excess of 300 staff (both administration and teaching). This university is among the first private universities to implement an ERP system.

Before the implementation of the ERP system, the university had a legacy system that was not complex and was mainly used in the finance function. All other functional units used either a spreadsheet or a database application. All units were operating as information silos with no link or connection to other functional units. Prior to the implementation of the ERP system, the campuses were operating in isolation.

ERP Implementation in the Case Study Institution

The process of implementing the ERP system in the case study institution was triggered by the desire to have an integrated information system that will integrate the information generated from different functional units into one seamless system.

The university management set up an ERP Project committee which comprised of the ICT Director, an ERP Project Manager (a newly appointed staff) and representatives from the Academic and Administration divisions. This is the committee that was mandated by the university's management to spearhead the ERP adoption and implementation project. This committee commenced its work mid 2004.

The ERP lifecycle framework proposed by Esteves and Pastor (1999), figure 1 below, presents the main phases that the case

study university followed in the implementation of the ERP system. A review of literature reveals that there is no consensus regarding the ERP lifecycle phases.
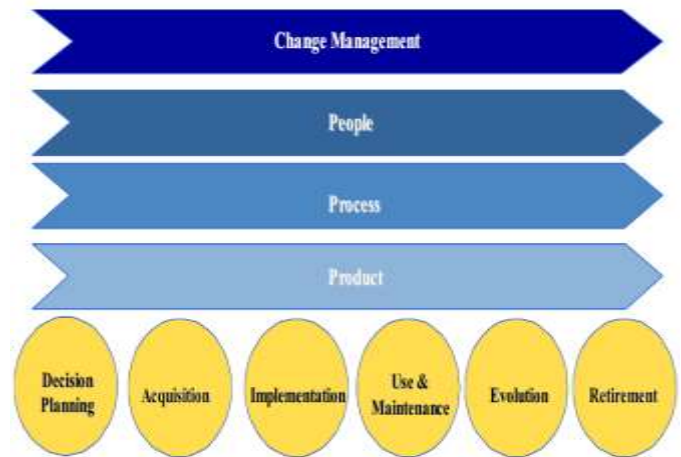

Figure 1: ERP Lifecycle Framework. *Source: Esteves and Pastor (1999)*

In the Adoption decision phase, the ERP Project committee reviewed the need for a new ERP system against the information needs of the university. This involved identifying the university strategic direction with regard to information systems solutions that best address the critical business challenges and improve the organizational strategy. The outcome of this phase is clear definition of system requirements, its goals and benefits, and an analysis of the impact of adoption at a business and organizational level. The Acquisition phase consists of the product selection that best fits the requirements of the organization. This aims at minimizing the need for customization during the implementation phase (Esteves and Pastor, 1999). Factors such as price, training and maintenance services are analyzed and, the contractual agreement played a major role in the identification of the ERP vendor. The committee settled on Microsoft Dynamics NAV as the ERP system to adopt. At this point, a team from the ERP vendor was constituted and liaised with the committee on the university side to continue with the ERP implementation.

During the Implementation phase, focus shifted from the ERP Project committee to the ICT department and the system developers from the vendor's side for the technical aspects of the implementation. This phase consists of the customization or parameterization and adaptation of the ERP package acquired according to the needs of the organization/institution (Esteves and Pastor, 1999). Other than the financial module, all the others required customization to meet the needs of the university. It is during this phase that the user participation was evident since they are considered to be the domain experts. This participation is discussed further in the next section.

The case university is currently in the Use and maintenance and the Evolution phases which involve the use of the product in a way that returns expected benefits and minimizes disruption and the integration of more capabilities into the ERP systems. The ERP system is under a maintenance contract which provides for any maintenance if and when it malfunctions and has to be corrected, special optimization

requests have to be met, and general systems improvements have to be made. The university has also added more modules onto the system such as the Procurement and is the process of adding Customer Relations Management (CRM).

4. FINDINGS

A total of fifteen users who had been identified by the IT manager and the internal ERP project manager as those that had participated in the various phases of the implementation process responded to the questionnaire. A web link was sent to them by email. As mentioned in the methodology section, these users come from different functional units of the university.

User participation in the ERP implementation in the case study university was evidence in all phases of the implementation. Users from different departments and sections of the university were selected to participate in the ERP implementation. These sections included finance, human resource, registrar office (which included Exams and Admission sections) and faculties. 29% participated in project definition, 62 % participated in requirements definition.

In terms of what capacity the users participated in the implementation 62% participated as end users who use the system in their daily operations while 38% participated as representatives of their departments/sections. A good example for this case was in the finance department where a team of users was identified by the department head to participate in the implementation process since the whole department would not be allowed to participate due to the critical nature of the department and provision of services to the clients.

With regard to the area that they participated in whether technical (which involved identification and purchase of the hardware and ERP software), social (human interface design, for example, design of forms, reports, etc) or module implementation (for example, participation in the implementation of a specific module such the finance or HR module), 36% of the users participated in the social aspect while 64% participated in module implementation. 30% of the users also participated in the testing of the system. The users who stated that they had participated in the social aspect were more interested with how the interfaces looked like and positioning of the menu items on the forms while the those that participated in module implementation were instrumental in the technical aspects of the system such as the modules meeting the requirements of the department.

In terms of communication from top management and ERP Project committee to the users is concerned, 53% stated that to a large extent users were adequately briefed about the ERP implementation process before it started, 82% were given an opportunity to perform various tasks relating to the implementation. 65% of users agreed that there was adequate communication between the ERP experts and users during the implementation process. With regard to reviewing of the work done by the ERP vendors, 56% of the users stated that they were given an opportunity to review the work done by the ERP vendors.

In assessing whether the ERP implementation was successful or a failure, 55% of the users stated that it was a success while 45% indicated that the implementation was average to below average. No user stated that the implementation was a total failure. 55% of the users are satisfied with the system most of the time while 42% are only satisfied some of the time when using the system. 15% of the users considered the implementation of the ERP system to be very successful, 40% consider the implementation to be successful, and 25% think it is average while 20% of the users believe that the implementation is below average.

5. DISCUSSION

In the case study university, there is evidence that there was effort by the university management to involve users in the ERP implementation process. The setting up of the ERP Project Committee to spearhead the implementation provided a form of project team that would engage users within the university and the experts from the ERP vendor team. The university has no policy on user participation when it comes to system development or implementation and hence not institutionalized.

An ERP system is a complex system that integrates the various functional units of an organization presenting uniform and real time information to these units. It comprises different modules that may be implemented at one go or in a phased approach. The ERP systems adopted by the university are a Commercial-Of-The-Shelf (COTS) system. The university adopted a phased approach where modules of some key functional units were implemented first. Users participated in different phases of the implementation with some participating in the project definition, others in requirements definition while others in the module implementation and testing.

Users were allowed to interact with the ERP experts from the vendor's team where their contributions were considered and taken seriously. This presented them with an opportunity to share their expertise and knowledge in their domain area. Departmental/section heads requested the users to participate voluntarily in the various meetings and sessions during the implementation.

The present study confirms the role played by user participation in ERP implementation. Users presented insights into their areas of operations which made it easier to identify the system requirements. During the meetings, the needs of the users were also discovered and incorporated into the implemented system. This was achieved through customization of some features of the system. Due to the participation, most users have accepted the system and are using it.

This study illustrates that user participation indeed contributes greatly to the success of ERP implementation. The successful elicitation of what were complex requirements led to a better understanding of both the business practices that the ERP system presents and the operations and duties performed by users.

6. CONCLUSION

The introduction of a new information system such as an ERP system will definitely change the way people work. These changes arise from new a platform, new and different interfaces, data entry is changed and report formats are different. Users often find these changes unnecessary and therefore refuse to accept them. One of the ways to address and reduce the impact of these changes is to encourage user participation in the implementation of ERP systems.

ERP implementations are expensive and complex undertakings, but once they are successfully implemented, significant improvements can be achieved such as easier

access to reliable information, elimination of redundant data and operations, reduction of cycle times, increased efficiency hence reducing costs (Zhang *et al*., 2003). This implementation differs from that of any traditional information system due to that it integrates different functional units of the organization. This leads to dramatic changes on how work is carried out, organizational structure and on the way people do their jobs. Most ERP systems are not built but adopted and thus they involve a mix of business process re-engineering (BPR) and package customization. This makes them unique and their implementation goes beyond technical concerns but also a socio-technical challenge since it affects how users perform their tasks.

ERP implementation differs from traditional systems development where the key focus has shifted from a heavy emphasis on technical analysis and programming towards business process design and human elements (Gibson *et al*., 1999). Unlike most home-grown legacy systems or those systems that are developed internally that were designed to fit individual working convention, ERP systems provide best practices, in other words generic processes and functions at their outset.

Aligning standard ERP processes with the organization's business process is considered to be an important step in the ERP implementation process (Botta-Genoulaz *et al*., 2005). Implementing a packaged ERP system inevitably changes the way people work. Successful implementation of an ERP system requires cooperation among different parties and departments.

In this paper, we investigated the contribution made by user participation in the ERP implementation process. A private university that implemented an ERP system was used as a case study. The implementation process followed the ERP lifecycle framework presented in figure 1 above. User participation positively impacted the implementation process and the majority of the users stated that the process was successful. Information systems are designed for use by users during their daily operations hence they are considered to be user-interfaced. This is also true of ERP systems which are designed to provide information processing capability to support the strategy, operations, management analysis, and decision-making functions in an organization. The user is at the center of an information system. Our study confirms that user participation is a critical to the success of the ERP implementation process.

There is a need, however, to investigate the role played by users in the process of customizing these commercially-of-the-shelf systems that have been designed for an educational institution. Educational institutions have different business processes unlike the manufacturing organizations. One of the limitations of this study was the fact that the adopted ERP system is not developed with university operations in mind. This system is strong on its financial modules. Another area for further research could be to investigate the role of user participation in internally developed ERP systems especially in Higher Education Institutions (HEIs).

In conclusion, we would like to reiterate the fact that ERP implementation is a complex IT-related social phenomenon. A substantial number of ERP implementations fail with a number of potential explanations for these failures presented. These failures, according to literature, may broadly be classified as human/organizational, technical, and economic. While each of these is important, there appears to be a growing consensus among researchers that human factors, more than technical or economic, are critical to the success of ERP projects.

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