



Research Article

Key Knowledge Challenges Impacting an ERP implementation in an Emerging Economy Context

Anjali Ramburn and Lisa Seymour

Information Systems Department, University of Cape Town, Private Bag, Rondebosch, South Africa

Correspondence should be addressed to: Anjali Ramburn; Hiranjali.ramburn-gopaul@uct.ac.za

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Abstract

Knowledge Management (KM) has been identified as a critical success factor for an ERP implementation. A review of the existing literature reveals a lack of comprehensive research on the role of knowledge management during the ERP implementation phases and particularly, in emerging economies. As such, the primary research objective is to investigate the knowledge management challenges posed during an ERP implementation phase in a large organization in South Africa. Enterprise resource planning (ERP) software provides a consistent integrated electronic business management environment for enterprises. Many companies are now reliant upon these systems for their daily operations. However, despite the various positive outcomes of adopting ERP systems, the implementation process poses a number of challenges for organizations. The value of knowledge management, more specifically for the implementation of ERP systems, is steadily gaining more importance. Through use of semi-structured interviews and thematic data analysis, this study unveils the core knowledge challenges faced by organizations. Initial findings include lack of process, technical and project knowledge as key challenges. Other concerns include lack of knowledge on the need for change, lack of contextualization and management support. This paper closes some of the identified research gaps in this area and should benefit large organizations in the emerging economies.

Keywords: Knowledge Management, Knowledge challenges, ERP Implementation, Emerging Economy.

Introduction

Enterprise Resource Planning systems (ERP) allow enterprises to integrate various processes across different functional areas in an attempt to increase productivity, efficiency and to sustain their competitive edge. (Bhatti, 2005; Holland & Light, 1999). Many large organizations are now dependent on ERP systems for their

daily operations. In order to differentiate themselves from their competitors and to integrate their processes, a number of small medium enterprises (SMEs) have also invested in ERP systems (Seethamraju & Seethamraju, 2008). Similarly, an increasing number of organizations are investing in ERP systems in South Africa. There have been many implementations in the South African public sector such as the

SAP implementations at the City of Cape Town and Tshwane Metropolitan Council. The implementation process is however described as costly, complex and risky whereby firms are not able to derive benefits of the systems despite huge investments. Half of all ERP implementations fail to meet the adopting organizations' expectations (Jaspersen, Carter & Zmud, 2005). This has been attributed to the disruptive and threatening nature of ERP implementations (Zorn, 2002). With ERP adoption, comes the requirement of adapting work practices to the global processes inherent in the ERP system. This requires the organization to undergo a major transformation; users have to come to terms with the organizational changes, new ways of work and unlearn previous practices (Robey, Ross & Boudreau, 2002).

Managing ERP systems knowledge has been identified as a critical success factor and as a key driver of ERP success (Leknes & Munkvold, 2005). An ERP implementation is a dynamic continuous improvement process and "a key methodology supporting ERP continuous improvement would be knowledge management" (McGinnis & Huang, 2004). The implementation process can be less challenging and more effective through proper use of knowledge management (KM) throughout the ERP lifecycle phases.

Research Objective, Scope & Importance

The primary objective of this research is to investigate the KM challenges faced by large organizations during the implementation of ERP systems. Additionally, the dimensions of KM practices required during the ERP system implementation are summarized. Based on the emphasized knowledge challenges, this study attempts to validate the three dimensional KM framework as depicted by Chan (1999).

This research focuses on the implementation of an ERP system in a large organization in South Africa. The analysis focuses on the experiences of different

stakeholders who have been impacted by the implementation of the ERP system.

This research should be of immediate benefit to both academics and practitioners. From an academic perspective, this study looks at the ERP implementation phase from a KM perspective, hence contributing to the existing body of knowledge in this area by attempting to offer a better explanation of the KM challenges and dimensions applicable to large emerging economies. Since there has not been any prior study in South Africa in this area, this research is unique in nature and is expected to break some new ground in South Africa, aiming to provide an advancement of knowledge in this particular field. This research also aims to provide a reference for any further future research which might be undertaken in the context of KM and ERP systems in South Africa. Through a practical lens, this research should be of immediate benefit to large organizations.

Literature Review

Enterprise Resource Planning Systems

Enterprise Resource Planning (ERP) systems include a set of software products which are mostly targeted to serve a large variety of enterprises. These systems support day to day operations, decision making and automation, streamlining and improvement of processes in organizations (Sedera, Gable & Chan, 2004). An ERP system can be defined as "an information system that enables the integration of transaction-based data and business processes within and across functional areas in an enterprise" (Parry & Graves, 2008). Some of the key enterprise functions that ERP systems support include supply chain management, inventory control, sales, manufacturing scheduling, customer relationship management, financial and cost management and human resources (Sedera et al., 2004; Soffer, Golany & Dori, 2002).

Despite the cost intensive, lengthy and risky process, the rate of implementation of ERP systems has increased over the years.

Most of the large multinational organizations have already adopted ERPs as their de facto standard with the aim of increasing productivity, efficiency and organizational competitiveness (Pan, Newell, Huang, Cheung, 2004).

Knowledge Management

KM is defined as an on-going process where knowledge is created, shared, transferred to those who need it, and made available for future use in the organization (Chan, 1999).

In the first phase, organizations need to identify their critical knowledge, that is, knowledge which is both important and essential. The second phase consists of creation of new knowledge followed by knowledge storage. Knowledge may be stored electronically, in documents or it may even exist in the form of an analogy. Organizations need to ensure that knowledge is effectively captured so it can easily be distributed, reused, reviewed and renewed at a later time. It is then crucial to transfer the knowledge back into the organization, where the knowledge can be reused, reviewed and renewed.

Role and Challenges of Knowledge Management in ERP implementation

Effective use of KM in ERP implementation has the potential to improve organizational efficiency during the ERP implementation process (Leknes & Munkvold, 2005). Successful transfer of knowledge between different ERP implementation stakeholders such as the client, implementation partner and vendor is important for the successful implementation an ERP system.

Use of KM activities during the ERP implementation phase ensures reduced implementation costs, improved user satisfaction as well as strategic and competitive business advantages through effective product and process innovation during use of ERP (Sedera et al., 2004). Organizations should therefore be aware of and identify the knowledge requirement for any implementation. However, a number of challenges hindering the proper

diffusion of KM activities during the ERP implementation phase have been highlighted. The following potential knowledge barriers have been identified by (Pan et al., 2004).

Knowledge Is Embedded in Complex Organizational Processes. ERP systems' capabilities and functionalities span across different departments involving many internal and external users, leading to a diversity of interest and competencies in specific knowledge areas. A key challenge is to overcome any conflicting interest in order to integrate knowledge in order to promote standardization and transparency.

Knowledge Is Embedded in Legacy Systems. Users are reluctant to use the new systems, constantly comparing the capabilities of the new systems to legacy systems. This is a prevalent mindset which needs to be anticipated and Pan et al. (2004) suggest the ERP system looks outwardly similar to the legacy system through customization. This can be achieved by "integrating knowledge through mapping of the information, processes, and routines of the legacy system into the ERP systems with the use of conversion templates" (Pan et al., 2004).

Knowledge Is Embedded in Externally Based Processes. ERP systems link external systems to internal ones, as a result external knowledge from suppliers and consultants needs to be integrated in the system. This can be a tedious process and the implementation team needs to ensure that essential knowledge is integrated from the initial implementation phases through personal and working relationships.

Knowledge Management Dimensions

A section of the literature on KM and ERP implementation focuses on the different dimensions of KM across the ERP implementation life cycle. Since ERP systems integrate different business processes across different functions, "a divergence in the required knowledge of organizational members" is created (Jones, Cline, Ryan, 2004). As a result, employees have to understand the whole

organizational process as opposed to only their functional one which they are used to. Consequently, the demand for ERP implementation knowledge and support resources is high (Chan, 1999). Organizations should therefore be aware of and identify the knowledge requirement for any implementation. This knowledge can be derived from the lessons learnt of people who have suffered from failed ERP implementations as well as those who have gained useful knowledge and experience from successful ERP implementations. Hence, based on past research, experiences and failed implementation cases, Chan (1999) puts forward a three dimensional framework of KM required for successful ERP implementation. These refer to project management, business and management and technical knowledge. The identified dimensions in the KM framework should be considered using a holistic approach as opposed to treating each of them separately. Knowledge is created, transferred, stored and reused through each attribute of the 3 different dimensions of the framework.

Research Method

A qualitative research method is deemed suitable as opposed to a quantitative one, as qualitative research emphasizes on non-positivist, non-linear and cyclical forms of research, allowing the scientist to gain new insights of the research area through each iteration whilst aiming to provide a better understanding to the social world (Thomas, 2003). Semi-structured interviews have been used to allow unrestricted responses from the sample, providing richer insight into the users' opinions and perceptions of ERP implementation, hence allowing the researcher to understand the subject from different perspectives. An inductive research approach has been used, to ensure the derived findings have resulted from the raw data. Thematic analysis has been used for this purpose (Attride-Stirling, 2001). These findings have then been linked to the pertaining literature. Iterative analysis of the collected data has enabled the researcher to understand and investigate the main research problems posed. All the

interviews have been recorded and transcribed. The transcripts of the interviews have been read a number of times to identify, conceptualise, and categorise emerging themes. Approval for this research has been obtained from the University of Cape Town's ethical committee. Participants have been asked to sign a voluntary participant consent form and their anonymity has been assured.

Case Description

This section provides a brief overview of the case organization. Founded in 1923, the company has a number of branches throughout South Africa, employing over 39 000 people. The organization is currently launching a number of SAP modules throughout its different branches across the country. Currently in the implementation stage, an organization wide initial training, involving the employees, has already been conducted. A number of interviews have been carried out in one of organization's division in Cape Town and purposive sampling has been used to select the interviewees. All the chosen participants had been through the training and were impacted by the SAP implementation process. They were interviewed individually. The sample includes 6 users and 2 support staffs. The users are required to use the ERP system as part of their core, daily functions while the support staffs are support administrators who are mainly responsible to support the users in terms of any technical issue experienced.

Analysis

The findings reveal several challenges with regards to KM in the ERP implementation phase. Most of the barriers identified were either directly or indirectly related to the inadequacies and inefficiencies of knowledge transfer. Additionally, lack of management support, change management initiatives, information overload and inadequate training were some of the noted concerns. The section below provides a comprehensive account of the major challenges that have been identified.

Trainer's Lack of Process Knowledge

Interviewees mentioned the training provided was inadequate in various ways. The trainers were not knowledgeable enough; Not only did they lack key SAP skills and did not understand the process from the users' perspective. Since none of the trainers had any experience as end users of the system, there were some inconsistencies in their understanding of the new system from a user's perspective. Ownership of roles and tasks were not clearly defined. They also lacked the expertise to engage with the different problems that surfaced during the training and there was no clarification on the information and process flow between the different departments and the individuals as per their role definition. "Things were not clear, we have all this data, and it was unclear who was supposed to do what. A number of questions were left unanswered with regards to the ownership of the different processes." "However what makes it difficult is that the trainers do not work with the project. They do not understand the process entirely and are not aware of what is happening in the background, they only collect data."

Lack of Technical Knowledge

Trainer's Lack of Technical Knowledge. The technical knowledge and qualification of the trainers were put into question. Employees felt they did not understand how to use the system because of the trainer's lack of technical knowledge with an ERP system. The trainers were the administrator support technicians who are experts in the current system the interviewees use but did not have enough expertise to deal with the upcoming ERP system. "There were a lot of unanswered questions. Data needed to be put in the system, we did not know where...We asked the trainers but they did not know themselves, I felt they were not very qualified either."

Interviewees' Lack of Technical Knowledge. Interviewees also struggled with use and understanding of the ERP system. They found the user interface and navigation

increasingly complex as opposed to their existing system. As a result, they were overcome with frustration and they did not see the importance of the training.

"I have not used the system before, so I do not understand it. We struggled with the complexity of the system. The number of steps we had to do made it worse. No one understood what and why we were doing most of the steps."

Poor Project Configuration Knowledge

Another key concern voiced related to the complexity of the ERP system as opposed to the existing system the participants are using. They have been working with the current system for a number of years and believed it operated in the most logical way, the same way as to how their minds would function. On the other hand, the ERP system was perceived as complex, the number of steps required to perform for a task seem to have increased drastically. The system did not make any sense to them, they felt they were only filling blocks on the screen. This may be attributed to the lack of system configuration knowledge which could have been essential in substantially decreasing the number of steps required to perform a particular task. "So the training showed us how to click on SAP. This is what we did; 'Click, Click, Click, Copy Paste, Copy Paste'...It was ridiculous, it was insane to have more than 300 steps of clicking." "It was about filling blocks"

Lack of Project Knowledge

Interviewees were unaware of the clear project objectives, milestones and deployment activities. The employees did not have any information regarding the status of the project activities. They were only aware of the fact that they had to be trained in SAP as management had a set deadline set up by which all employees had to complete the training. Employees were also uninformed of the date they were required to start using the system. Some of them believed they were not near the implementation stage, and the training was only a pilot activity to test whether they were ready for implementation. However,

others hoped that the implementation had been cancelled due to the number of problems experienced in the training sessions.

“All they said was that now you have had the training for SAP and this is the system we will phase into. No one knows when it will happen for sure. I am hoping it won't be anytime soon....We do not get frequent emails or updates to inform us of the status of the project.” “All management said was that you need to complete the training for the new system and this is the system we will phase into.”

Lack of Knowledge on Management Initiatives

The interviewees felt they did not have to use or understand the system until they got the 'go ahead' from top and middle management. Interviews indicated that top and middle management had not supported the initiative as yet. Interviewees had received no information or communication on planning, adoption and deployment of the new system from management; hence they showed no commitment towards using the new system.

“We will only start using it when we get the word from top management; well basically when they tell us, as from now you are expected to use this program. Then I will make an effort to learn the program.”

Lack of Knowledge on Change Management Initiatives

Managing change is arguably one of the primary concerns of ERP implementation. The analysis show the lack of importance attributed to this area. Lack of proper communication channels and planning coupled with the absence of change management initiatives resulted in employees' confusion, instability and resistance as shown by quotes below. A number of the employees were unhappy of their new system, they did not understand why they should change to a new system, and others felt the new system would make

them unproductive and inefficient. “We should not have used SAP at all, they should scrap it”

“I don't understand how this system will make me more productive when I do not even understand how to use it.”

Lack of Knowledge on Need for Change

The lack of change management also resulted in a lack of knowledge on the need of change. Employees did not understand the benefits of using SAP from a strategic perspective. They questioned the importance of the implementation of the new system as they felt their previous system could do everything they needed it to. They had never felt the need for a new system. Most of them had their own understanding as to why the new system was being implemented. “To me, the previous system worked in a logical way; should I have to enter project information in my head, I will work in the same way as our current system. I do not see the benefit of using SAP.”

Knowledge Dump (Information Overload)

Information overload was another identified challenge. The training included people from different departments who are associated with different aspects of the process. As a result, the trainers covered various tasks related to various processes in one training session as opposed to focusing on the specific processes that the interviewees understood and were involved with. The participants got confused with regards to their role definition and the ownership of the different activities. The trainers were unable to clear this confusion. This caused a certain level of panic amongst the group; subsequently they lost interest in the training and attributed it as an unproductive process. Employees said the training would have been easier and beneficial if the training was limited to their specific and individual department and process.

“If you are planners, this is all you need to do. I do not feel we had to do all these steps and a lot of the information needs to be entered before we would see it as planners, someone else would have already entered that data but when we doing the training everyone was confused with what and why we need to do certain tasks.”

“If the trainers said, this is only 2 pages of information you need to do, we would be calmer. So there was too much of information given which was not specific to anyone and you did not know what to focus on and where this data is supposed to come from.”

Poor Knowledge Contextualization

Another concern raised was with reference to the lack of customization of the training materials and exercises used resulting in a poor focus on local context. Interviewees could not relate to the training examples given as they were based on the process flow from a different suburb. Interviewees said each suburb has its own way of operating and has unique terms and terminologies. The fact that the examples used came from Johannesburg and not from Cape Town made it harder for the interviewees to understand the overall process.

“The examples used were from Joburg, I could not relate to the examples. It would have been nice to have our terminologies.”

“The examples they used were from Joburg, so they work in a different way to us. The examples should have been customized to how we work in order for us to better understand the process.”

Findings

Based on the above KM challenges, this section provides an overview of the dimensions of KM for successful ERP implementation. Most of these findings can be traced back to the pertaining literature. The emergent themes of this research have been categorised into the 3 main knowledge dimensions put forward by (Chan, 1999). It should be noted that although the identified themes of this research are not identical to the original components of the knowledge dimensions, the 3 dimensional KM framework is applicable to an emerging economy context.

Figure 1, adapted from Chan (1999), illustrates the different dimensions of KM applicable to a large emerging economy.

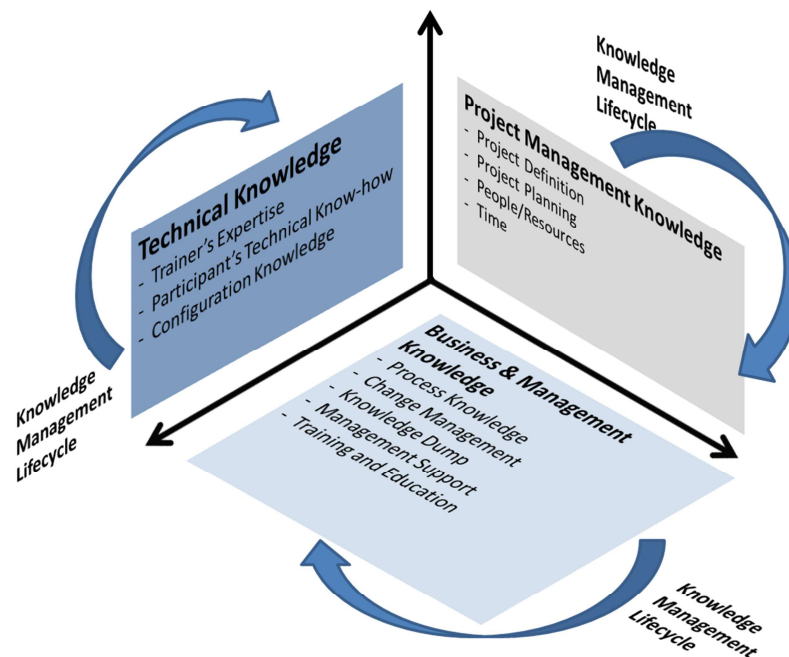


Fig 1. 3 Dimensional Knowledge Management Framework for ERP Implementation

Technical Knowledge

This dimension looks at the primary level of technical knowledge required to ensure successful implementation of ERP systems. Process engineering, Programming, System administration and Hardware/Network form part of this dimension (Chan, 1999). The findings of this research revealed 3 different aspects which impacted the ERP implementation. Participants struggled to use SAP due to the system's complex configuration, their lack of technical knowledge of the system. Moreover, users felt that their trainers' lack of expertise and the system's lack of configuration also contributed to the negative perception.

Project Management Knowledge

For the previous 12 years, project management has been amongst the key critical success factors required for successful ERP implementation (Huang, 2010). Project management knowledge denotes "the knowledge required to manage the entire implementation process as a single project" (Chan, 1999). The findings of this study show that project

knowledge such as project objectives, milestones, deployment activities, people and time are the key project dimensions required for successful implementation of an ERP system. Lack of key project knowledge accounted for employees' resistance, uncertainty and negative attitude towards the overall implementation process.

Time has also been identified as a key component of project management. With statistics showing more than half of ERP projects going over time, knowledge about the time required to install ERP systems is crucial to the organization and is a crucial aspect of project management that needs to be carefully assessed. The lack of clarity with regards to the project activities had a negative impact on the employees and they strongly felt that they would have been more interested in the system, had they been aware of project timelines and milestones.

Identification of the right mix of people and resources required to implement the ERP system is another crucial activity. Project team competence has been identified as the

2nd most important critical success factor as per executives (Bhatti, 2005). The findings reveal the incompetence of the training team and their failure to transfer key project knowledge to the employees accounted for the implementation failure.

Business & Management Knowledge

This particular dimension deals with the soft issues of ERP implementation. These issues do not have hard, codified facts or definite solutions, thus each organization has its own unique way of dealing with each of them (Chan, 1999). Process knowledge, customization & contextualization knowledge, management support, change management and training have been identified as key components of this dimension. Since the research was carried out in a large organization with multiple branches throughout South Africa, process knowledge and knowledge on contextualization and customization of the training content from the users' perspective is essential.

Undoubtedly one of the most influential factors for successful ERP implementation, management support has always been rated the number one critical success factor by most previous studies (Fang & Patrecia, 2005). Senior management commitment plays a fundamental role in the entire implementation process as it forms the basis of security for a successful implementation (Fang & Patrecia, 2005). The findings revealed that there was a complete lack of management support and, as expected, employees did not engage in knowledge sharing and integration. Employees relied on their management's support and were waiting for management's go-ahead and communication to accept and use the system.

ERP systems introduce large-scale change that can cause confusion, redundancies, and errors, resulting in resistance and loss of confidence amongst the employees. As such, managing change is of the primary focus in ERP implementations. Research has demonstrated that half of the ERP implementations have, actually, failed to

achieve expected benefits as a result of misjudging the efforts involved in change management (Somers & Nelson, 2001). As per the findings, knowledge about managing change was not prioritized in the organization. Change was being implemented without any prior planning or strategy, resulting in major confusion and uncertainty amongst employees and in a lack of knowledge on the need of change. Employees mentioned that they would have been keener to learn and use the system had they been informed of the strategic need for change.

Another significant aspect of this dimension is training. Training is crucial for everyone and is important so employees' are familiar and proficient with the ERP system. The critical success factor here is that implementation knowledge is transferred from the consultants to the organization and its employees and that this knowledge ultimately resides within the organization (Chan, 1999). Studies have shown that lack of user training is associated with ERP implementation failures (Somers & Nelson, 2001). The results indicate that although the organization has invested in the training and education of their employees to enhance their skills and to ensure they are capable of understanding their business processes and functions, they were not sufficient to transfer knowledge from the trainers to the employees. , "We got trained in October now we are in April, I hope they will train us again as I have forgotten so much of that stuff. I did not gain anything from the training."

Conclusions

This paper reports on the on the implementation challenges of an ERP system in a large organization in Cape Town. The study provides a comprehensive insight on the core KM challenges and the different knowledge dimensions required for successful ERP implementation.

A number of intra-organizational barriers to efficient knowledge transfer have been identified. Inadequate training, lack of technical and process knowledge, lack of

management support and change management have been cited as major KM challenges. Other fundamental KM challenges include lack of process knowledge and lack of customization and contextualization of knowledge. Seemingly, in a large organization with multiple branches throughout South Africa, understanding the process, contextualization and customization of the training content from the users' perspective are key aspects to consider during an ERP implementation process. The 3 knowledge dimensions by Chan (1999) have been established as an applicable knowledge framework in an emerging context.

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