MANAGING KNOWLEDGE FOR ENTERPRISE SYSTEMS IN INDIAN ORGANIZATIONS: CASE STUDY INSIGHTS

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MANAGING KNOWLEDGE FOR ENTERPRISE SYSTEMS IN INDIAN ORGANIZATIONS: CASE STUDY INSIGHTS

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Abstract

Many Enterprise Systems (ES) projects have reported nil or detrimental impacts despite the substantial investment in the system. Having expected positive outcomes for the organization and its functions through the weighty spend, the effective management of ES-related knowledge has been suggested as a critical success factor for these ES projects in ES implementations. This paper suggests theoretical views purporting the importance of understanding on knowledge management for ES success. To explain the complex, dynamic and multifaceted of knowledge management, we adopt the concepts in Learning Network Theory. We then conceptualized the impact of knowledge management on ES by analyzing five case studies in several industries in India, based on the Knowledge-based Theory of the Firm that captures the performance of the system.

Keywords: Knowledge base, Enterprise System, Knowledge-based theory of the firm, Learning network theory
1 INTRODUCTION

Managing knowledge has been identified as a vital resource for any organization for their well-being (Al-Mashari & Zairi, 2000; Grant, 1996b; Lee & Lee, 2000; McNurlin, 2001; Pan, Newell, Huang, & Galliers, 2007; Sederer, Gable, & Chan, 2003). Over the years, research in knowledge management (KM) has grown substantially, where the: (1) types of knowledge (Davenport & Prusak, 1998; Sederer et al., 2003), (2) dynamics of knowledge creation (Nonaka, 1994), (3) knowledge management phases (Jones, Cline, & Ryan, 2006; Ko, Kirsch, & King, 2005), and (4) in general knowledge management lifecycle (Alavi & Leidner, 2001; Nonaka & Peltokorpi, 2006) receiving much attention.

In the context of Enterprise Systems (ES), knowledge management (KM) has been suggested as its critical success factor (Grant, 1996b, 1996c; Jones et al., 2006; Lee & Lee, 2000; Pan et al., 2007; Pan, Newell, Huang, & Cheung, 2001; Volkoff, Elmes, & Strong, 2004). Managing an Enterprise System is a knowledge intensive task that necessarily draws upon the experience and involvement of a wide range of stakeholders with diverse knowledge capabilities. Employing the knowledge classification of (Swanson, 1994), (Sadagopan, 2003) categorized ES projects as the most demanding innovation domains. Despite the contributions of the aforementioned studies in both disciplines (ES and KM), our understanding of knowledge management for Enterprise Systems has not evolved much beyond its identification as a critical success factor, with many fundamental questions and enduring issues remaining largely unanswered.

Building on the resource-based view of the firm, knowledge-based theory of the firm considers knowledge as a unique, the most strategically significant resource (Grant, 1996a, 1996b) by focusing on knowledge integration (J. Barney, Wright, & David J. Ketchen, 2001; J. B. Barney, 2001; Kearns & Sabherwal, 2006-7). Employing two complementary theories on the knowledge management aspect, this study attempts to understand the nature and its impact of knowledge management as an important resource for the Enterprise Systems lifecycle. The complex, dynamic and multifaceted knowledge management is conceptualized using the Learning Network Theory (LNT), while the impact of knowledge management on ES lifecycle has been demonstrated using the Knowledge-based theory of the firm (KBT).

With the intention of better understanding the nature of knowledge management, the paper begins with a review of knowledge management literature. This review of literature then enables the authors to identify the key-facets, main players and the types of knowledge. The paper then defines the concept of knowledgebase and discusses learning activities through the knowledgebase interaction by adopting LNT. Followed by a discussion of KBT on the relationship between the knowledgebase and ES success, we then analyze five case studies in the next section. The paper concludes with a summary and our research contributions.

2 KNOWLEDGE BASE

Alavi and Leidner (2001) describe the knowledge management lifecycle in four phases: knowledge creation, knowledge retention, knowledge transfer and knowledge application (or knowledge re-use). It is clear that each phase of their KM lifecycle discussion makes a unique contribution to the formation of a ‘knowledge base’ for the Enterprise System (where referred to as the ES-knowledgebase hereafter).
In addition to the aforementioned people (stakeholders) who contribute to the creation of a knowledgebase, KM literature suggests organization resources such as another vital source of knowledge. The examples of organization resources include: organization’s strategies, policies, procedures, documentation or reports, training, assignments, tasks, routines and practices. Moreover, knowledge is embedded in organization resources, like procedures, policies, reports, documentations, tasks, routines, practices, courses and seminars. In recent literature in the domain of IS, technology has been identified as a possible source of knowledge. Some examples cited include: databases, media communications, and network. Also, it is argued that the knowledgebase is changing with the on-the-job-training, lessons learned, the use of tools or software, from system development activities, best practices transfer and via interaction. Table 1 below provides a summary of journal papers (from year 2000 onwards) on the knowledgebase source from how the knowledgebase is created and provides comments in relation to the knowledgebase advantage.

<table>
<thead>
<tr>
<th>Knowledge base creation</th>
<th>Knowledge base for competitive advantage</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Markus, 2001)</td>
<td>(Nielsen, 2006)</td>
</tr>
<tr>
<td>Knowledge base is embedded in knowledge repositories and tool.</td>
<td>Creation of new value using existing knowledge base of the firm is significant source of innovation and competitive advantage in industries.</td>
</tr>
<tr>
<td>(Alavi &amp; Leidner, 2001)</td>
<td>(Stonehouse &amp; Minocha, 2008)</td>
</tr>
<tr>
<td>Individuals gain their knowledge base via a shared knowledge space. In order for individual A to understand individual’s B knowledge, there must be some overlapping in their knowledge bases.</td>
<td>Knowledge base has been created and deployed to gain and sustain a significant competitive edge.</td>
</tr>
<tr>
<td>(Alavi et al., 2005)</td>
<td>(Prieto &amp; Easterby-Smith, 2006)</td>
</tr>
<tr>
<td>Intellectual resources are part of a knowledge base.</td>
<td>The role of knowledge base process has been central: dynamic capabilities evolve through pathways that can be described in terms of knowledge evolution within organizations.</td>
</tr>
<tr>
<td>(Barrett, Cappleman, Shoib, &amp; Walsham, 2004)</td>
<td>(Marsh &amp; Stock, 2006)</td>
</tr>
<tr>
<td>All past incidents created knowledge base in incident-tracking support system to aid the solutions of similar problems in future.</td>
<td>Organization can nurture, adapt, and generate its knowledge base and develop and retain the organization’s capabilities that translate the knowledge base into useful actions.</td>
</tr>
<tr>
<td>(Paul, 2006)</td>
<td>(Liu, 2006)</td>
</tr>
<tr>
<td>Worker’s knowledge base increases by continuous learning processes and the breadth and depth of expertise.</td>
<td>Organization can continually reconfiguring their knowledge base by spotting trends in their external environment and internalizing the knowledge, so competitive advantage can be obtained.</td>
</tr>
<tr>
<td>Each knowledge base may learn more or less than the other. Firm may learn and internalize foreign knowledge base to their own local knowledge base (technology, practices, skills, information, know-how).</td>
<td>To develop and maintain knowledge base competitive advantage should be preferably rooted on implicit, collective, firm-specific knowledge</td>
</tr>
<tr>
<td>(Koh et al., 2005)</td>
<td>(Maula, 2000)</td>
</tr>
<tr>
<td>Database (used to capture and store complaints, customer details, solutions) is a treasure of knowledge base.</td>
<td>Knowledge can be accumulated in structured knowledge base that can be screened and used as a source for competence creation.</td>
</tr>
<tr>
<td>(Zhang, 2007)</td>
<td>(Martz, Jr., &amp; Shepherd, 2003)</td>
</tr>
<tr>
<td>IS integrates skills and expertise, allow firm develop knowledge base.</td>
<td>Knowledge base applications (active learning activities) are becoming the key success for many businesses.</td>
</tr>
<tr>
<td>(Moffett &amp; McAdam, 2006)</td>
<td>(Zarraga-Oberty &amp; Saa-Perez, 2006)</td>
</tr>
<tr>
<td>Small-Medium Enterprises create new knowledge into their knowledge base which is further enhanced by practical interactions between individuals with different knowledge</td>
<td>Interactions between individuals with different knowledge</td>
</tr>
</tbody>
</table>
experience. 
(Nidumolu, Subramani, & Aldrich, 2001)

*Individuals contribute as part of organization's knowledge base.*

To derive knowledge-based competitive benefits, firm needs to integrate, combine the specialized knowledge of its employees. 
(Zhang, 2007)

Individuals contribute as part of organization's knowledge base.

(Rech, Decker, Ras, Jedlitschka, & Feldmann, 2007)

*Individuals make their knowledge explicit, and stored in knowledge base for later reuse.*

(Hlupic et al., 2002)

*Knowledge base is found in the human and cultural aspects of businesses (experiences, tacit knowledge of employees), integration of 'hard'-technology, 'soft'-organization &human and 'abstract'-philosophical.*

(Herschel & Yermish, 2008)

*Structuring an expert's knowledge leads to the ability to store their expertise in a computer knowledge base.*

### Table 1: Knowledge base views

From Table 1, it is observed that prior researchers explain the knowledge base from three main aspects: physical, conceptual or combination of both physical and conceptual aspects. Physical views refer the term knowledgebase as largely technical exist through the development of a formal organization system, tool and repositories for its identification, definition and evaluation where the knowledgebase is continually updated (Kumar & Thondikulam, 2005; Vertommen, Janssens, Moor, & Duflou, 2008). The summary suggests the importance of knowledge base as a significant factor for a competitive advantage, as shown by several papers in Table 1.

The Knowledge-based theory of the firm (KBT) confirms the above results. From its theoretical viewpoint, it is said that the knowledge base resources are hard to imitate. Thus, it is provides an organisation with capabilities, competitive advantage and performance (Grant, 1996a, 1996b). Applying to the study context of ES, it can be argued that such knowledge base resources lead to ES success. However, given the complexity with the stages of the ES lifecycle and the corresponding KM phases, different types of internal stakeholders and the probable changes in knowledge base through the interaction with the ES, the knowledge base itself must be carefully understood.

It is argued that the ES-knowledge base is created by the consultant, vendor and the client organization, where the knowledge itself is of three types (software, business process and organizational knowledge). It is also demonstrated that the engagement of consultants and vendors changes at various phases of the ES lifecycle. Figure 1 below shows graphically the changing involvement of the parties during the ES pre-implementation, implementation and post-implementation.
The consultant and the software vendor initiate the knowledge base at the pre-implementation phase by bringing in software knowledge and business process knowledge. The client organization shares the relevant organizational knowledge with the consultant and the vendor. During implementation, the client organization ideally wants to transfer all created knowledge to the organization. Thus, retaining knowledgeable employees and consultants and vendors alike is important. This transferred knowledge will then be used and applied by the internal stakeholders, when the commence using the ES. The internal stakeholders in an organization include (1) the managers, (2) technical staff and the (3) operational staff.

Herein, we seek a theoretical explanation from the Learning Network Theory (LNT) by Rob F. Poell et al. (2000) to demonstrate how the knowledge base is produced and re-produced with the interactions amongst employees, consultants, software vendors and other relevant learning actors through learning networks. The learning networks rely on its learning actors (e.g. internal: employees, training staff, managers, officers etc., and e.g. external: professional association, trades union, consultants, external trainers, government authorities), learning processes (e.g. policies, programs and learning programs execution), and learning structures (e.g. content structure, organisational structure and learning climate) which can be observed through the patterns of people interactions. Considering our aforementioned argument on the needs of understand on how learning is organized in an organization in order to understand the ES capabilities and performance, Figure 2 shows how learning interactions happen among individuals’ knowledge base by using the Learning Network Theory (LNT) perspective. The internal and external learning actors learn continuously to perform new and changing ES tasks, by adapting new knowledge and learn efficiently by re-producing their flexible knowledge base.

Learning Network Theory (LNT) demonstrates how learning networks are produced and re-produced (as illustrated in Figure 2) by interactions of employees, managers, consultants and other internal and external learning actors who have their own theories and strategies in organizing their work related learning (Rob F. Poell, Chivers, Krogt, & Wildemeersch, 2000). According to the theory, there are three main components to a learning interaction, which appears in the above figure: (1) learning actors, (2) learning processes and (3) learning structures. Figure 2 exposes how we conceptualizes the knowledge base through the learning activities (Rob F. Poell et al., 2000). The figure also shows how people (learning actors) learn continually within organization (Rob F Poell & Krogt, 2003), which usually happens unconsciously, informally or incidentally during their interaction. There three main components appear: learning actors, learning processes and learning structures.
When **learning actors**, or stakeholders from internal and external acquire and develop norms, rules and ideas, then the learning is considered to have occured. The learning actors interact with each other through the three **learning processes**: learning policies (what and in what way people should learn), learning programs (sets of activities), and the execution of learning programs (solving problems, job coaching, receiving instructions). When people have been interacting in longer learning period of time, certain more stable pattern tend to develop that can be observed by **learning structures**; content structure (profile of learning programs), organizational structure (divisions of tasks and responsibilities), learning climate (norms and values).

People undertake learning activities that reflect on their work, give each other feedback, conduct discussion, develop new ideas, do experiments, participate in training and so forth. As people interact with each other on the basis of their own believe and interests, people adapt and adopt new knowledge, and produce and re-produce their dynamic knowledgebase. When the knowledge of the ES is shared, the ES related knowledge base then changes, which triggers the process of producing and re-producing the knowledge base during interactions. When this occurs, previously-created knowledge base becomes the input in a new round of ES related knowledge base creation and the evolution process continues. This process is significantly important to the success of the ES.

Considering those aspects, we define our knowledge base as a **collection of tacit**\(^1\) and **explicit**\(^2\) knowledge from software, organisation and business processes that is brought to bear by consultant, vendor and client in the organisation through the process of knowledge creation, knowledge retention, knowledge transfer and knowledge application (re-use). This knowledge base is not only views to a physical knowledge base, but in its place it refers to a conceptual aspect of a collection of knowledge. As people is the central actor of the knowledge, people may use tools to improve their individuals knowledge base, where the knowledge embedded in practices and training, courses and seminars, experiences and education by involving the internal and external stakeholders.

Knowledge-based theory of the firm (KBT) considers knowledge as the most strategically important resource of organization, where the knowledge resides in specialised form among individual organizational members in which the essence of organizational capability is the integration of individuals’ specialized knowledge (Grant, 1996a). The KBT argues that when the specialised knowledge becomes the

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\(^1\) Tacit knowledge pertains to skills, rules and capabilities that cannot be articulated, where the knowledge expands through learning and interaction.

\(^2\) Explicit knowledge exists in information carriers, such as books, documentation, hard-disk or internet pages.
common knowledge, the organizational capabilities enhance. To increase the common knowledge, the specialized knowledge should be integrated by four mechanisms: (1) rules and directives, (2) sequencing, (3) routines and (4) group problem solving and decision making. The achievement of many people’s specialist knowledge enhances the organizational capabilities and increases the organization’s performance. In the research of ES success, we consider the organizational capabilities explanation in KBT as the ES capabilities to success. People have their own knowledgebase which refers to their specialized knowledge. Therefore, the more people’s specialized system knowledge is integrated means the higher system’s capabilities to achieve better performance, which leads to the success of the system.

The success of ES depends upon the efficiency of knowledge integration which is a function of: the level of common knowledge among organizational members, frequency and variability of activity, a structure which economizes on communication. The ES capability’s potential for establishing and sustaining competitive advantage increases with the width of knowledge integrated. Sustaining competitive advantage under conditions of dynamic competition requires continuous innovation which requires flexible integration through either extending existing capabilities to take in new knowledge, or reconfiguring existing knowledge within new patterns of integration (Grant, 1996a).

3 ES-KNOWLEDGE BASE AND ES SUCCESS

The capability of ES requires integrating the specialist knowledge base of a number of individuals, which the knowledge integration is across quite large numbers of employees. The KBT discusses knowledge integration as the combination of various specialized knowledge bases held within individuals groups. Referring to the KBT perspective by Grant (1996a), the efficiency and effectiveness of integrating the individual’s knowledge base is affected by various mechanisms: (1) rules and direction (communication, manual, directives, policies, procedures), (2) sequencing, (3) routines (not dependent upon the need for communication, that is, developing sequential patterns of interaction that permit the integration of their knowledge base without the need for communicating the knowledge) and, (4) group problem-solving and decision-making. Rules are viewed as a standards which regulate and facilitate the interactions between individuals, while directions is a method of communication between specialist and the large number of persons who either are non-specialists or who are specialist in other fields (Grant, 1996b). Sequencing can be explained by organizing activities in a time-patterned sequence which can minimize communication by integrating individuals’ specialist knowledge. Routines are patterns of behaviours or grammars of action. These routines support complex patterns of interactions between individuals in the absence of rules, directives, or even significant verbal communication. In the aspect of group problem-solving and decision-making, efficiency tends to be associated with maximizing the use of rules, routines and other integration mechanisms by teams to unusual, complex and important tasks.

For the basis of competitive advantage, (Grant, 1996a) identifies three characteristics of knowledge integration pertinent to that advantage: (i) the efficiency of integration: the extent to which the capability accesses and utilizes the specialist knowledge held by individuals; (ii) by the scope of integration: the breadth of specialized knowledge the organisational capability draws upon; (iii) the flexibility of integration: the extent to which a capability can access additional knowledge and re-configure existing knowledge.

According to Grant (1996b), increased common knowledge against decreased specialists knowledge will enhance organisational capabilities that in the organisational capability is viewed as the outcome of knowledge integration. Here, we refer the organisational capabilities as the capabilities of information system, specifically to the Enterprise System success.
5  CASE STUDY ANALYSIS

This paper is based on 5 case studies in Indian organisations which implemented an ES. Interviews were conducted with 5 operational managers in different organisations in India, who daily uses ES. The selection of respondents and organisations were driven by several considerations. First, the respondents were selected from managerial group of operational in various busy activities, who were heavily needs the integration of knowledge from other employment cohorts, from their subordinates and their superiors, intra and inter department in their own context. Second, the respondents were selected from various industries that were using an ES in their daily activities with experiences in using the ES for at least more than a year. Third, the studied organisations were among the largest private company in India; represent various sectors of industries, with huge business activities throughout the nation. We deemed the respondents require a deep understanding of knowledge integration and practising it in their daily task. Considering those factors, the selection of respondents was based on the need to understand the impact of the ES-knowledge base integration in the organisations among their employment cohorts onto the success of the ES.

The case studies questions was pilot tested with an academic expert on knowledge management. Comments on item wording, suggestions, questions and clarity were incorporated based on the expert's feedback. All interviewees were contacted prior to interview, and assured of anonymity in the research findings. The interview sessions were last from 45 minutes to an hour, tape-recorded and transcribed. Table 2 describes each of the respondents that participated in this research.

<table>
<thead>
<tr>
<th>Position</th>
<th>Company identifier</th>
<th>Business type</th>
<th>Department</th>
<th>Name of system</th>
<th>Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales and marketing manager</td>
<td>Company A</td>
<td>Petroleum and Petrochemical</td>
<td>Marketing, 5,000 employees</td>
<td>SAP</td>
<td>12 months</td>
</tr>
<tr>
<td>System manager</td>
<td>Company B</td>
<td>Power transmission and generation</td>
<td>Human Resource, 25 employees</td>
<td>RAMCO</td>
<td>14 months</td>
</tr>
<tr>
<td>Assistant manager</td>
<td>Company B</td>
<td>Power transmission and generation</td>
<td>Treasury and Finance, 40 employees</td>
<td>RAMCO</td>
<td>13 months</td>
</tr>
<tr>
<td>Assistant manager</td>
<td>Company C</td>
<td>Pharmaceutical</td>
<td>Marketing, 5 managerial staff Techno-Commercial (TCM), 5 employees</td>
<td>SAP</td>
<td>12 months</td>
</tr>
<tr>
<td>System manager of operation</td>
<td>Company C</td>
<td>Pharmaceutical</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Background of respondents

The respondents are either currently using an Enterprise System or had experience with the system. Out of five, three companies use SAP, while two others using RAMCO and are looking forward for SAP implementation. All respondents represent each company which specifically concentrates on their operational activities in using an Enterprise System. The data from the respondents is believed to be pertinent as so many interactions with the system happen daily and the selected group uses the system regularly.
The data is analysed to show the constructs’ relationships in that theoretical model and how they are interrelated with each other. To explain on how knowledge is integrated to create the Enterprise System capability, we use the concept from Knowledge-based theory of the firm (KBT) as suggested by Grant (1996), as shown from example of two cases in Table 3.

<table>
<thead>
<tr>
<th>Case</th>
<th>Level of common knowledge</th>
<th>Level of coordination</th>
<th>Organisation structure</th>
<th>ES success</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 1</td>
<td>Receives a thorough training for 6 months, followed by practical, assignments and report analysis. Refers to senior staff as guidance after training, in terms of technical and practical aspects. Use a tele-conversation to communicate with others. Sends report of marketing and its analysis to sales department and get their feedback based on the report.</td>
<td>Coordinates and implements marketing strategies with marketing department staff. Provides reports monthly about percentages, improvements, reasons, and analysis to sales department, and get feedbacks. Brainstorms and discusses monthly with head quarters’ staff on where efforts should be focuses on.</td>
<td>Each people in the division have different tasks. There is a central division with 15 to16 staffs. The organisation has an IT helpdesk to refer technical problems. There is a staff hierarchy, medical rep→ regional manager → general manager. Reports are distributed to all levels, but the reports accessibility is restricted. For general managers, there are some reports exclusively authorized to them.</td>
<td>Get real time information on a daily basis. Lots of integration, SAP gives us information in a quick time. The system is user friendly, informative, backbone.</td>
</tr>
<tr>
<td>Case 2</td>
<td>Low level of interaction with others. Poor practice communications among staffs. Lack of knowledge sharing. Receives no training. Gets knowledge from external party with self-initiated. The department has no book as a reference. Individuals initiated their own responsibility.</td>
<td>Limited knowledge. The tasks are repetitive; no above routine role. Refers to other department (IT department, HR department) when necessary, depends on the problem.</td>
<td>35 to 40 staffs work with different roles in the department, which divided by 4 zones with 4 offices. Have IT department to solve technical issues.</td>
<td>Improves data management and its efficiency. Frustrated, lost lots of time. The system made some processes difficult.</td>
</tr>
</tbody>
</table>

Table 3: Example of analysis on the efficiency of ES-knowledge base integration

Table 3 demonstrates an example of our analysis on the efficiency of ES-knowledge base integration according to the level of common knowledge, level of coordination and organisation structure. We presume that the level of common knowledge in an organisation is closely interrelated to the level of interaction, the received of training or seminar, the use of communication technology and documentation. The interaction is easier when the employees have common understanding on the language and terms used and have a common knowledge on organisation’s business process. When problems need to be solved, interaction is needed among employees from same domain knowledge or different domain knowledge. Communication from formal and informal channels helps to increase the level of common knowledge. The comment below shows the difficulties experienced by one of our respondents:

“When I first joined the company, I missed some stages of the projects. I’m not understood what is going on because of communication gap between techno-commercial people and the scientist that I’m not able to understand exactly”.
Employees who work in teams allow better knowledge integration as they could discuss problems and learn together how to most effectively use the ES. When unexpected problems occurred, project members approached each other and the right party to discuss and sort out what could be done. Having regular meetings, actively involved in work group or team project discussion, or involve in giving and receiving feedback rigorously from experts, superiors or subordinates are several examples of the employees’ frequency task performance. In our most case study findings, it demonstrates that having more frequent of knowledge interaction increases the level of common understanding among employees. Often, team members will send their representative to the party (such as IT help desk) to engage in such problem solving, and then discuss with their fellow team members, as illustrated by the comment below:

“If I have an important issue that I can’t figure it out, I’ll seek for finance people’s help. They’re better, that will be my first point of contact. If the problem still continuous, I’ll get back to them. Actually we work in group ...together. If I have a meeting with the finance people, then the other group members do not have to go there. So that’s how we solve our problem.”

We argue that the level of interactions will affect the level of common knowledge. Here, the higher level of interactions is very important to gain the higher level of common knowledge, where it will result to the factors of employees’ satisfaction, sharing willingness and healthy work environment that reflects to the success of the ES. Nowadays, the use of technology to communicate is a quite common way to integrate knowledge and contribute to make the knowledge less individual. Through the encouragement and facilitation provided by an organisation, such a technology of communication is able to encourage the sharing of knowledge and experience to ensure there is continuous learning of the ES. The technology is very useful in developing a better ES practices by connecting employees and facilitating knowledge sharing networks in an organisation. The statements below show some example of communication technology used by our respondents:

“When the people enter their complaints, it will be recorded into the system. Based on those complaints, we resolve the problems and then give our feedbacks and answers to the people”.

“We have an appointment through network; this is a formal channel that we go through”.

Usually, organisations help increase the level of common knowledge among employees by providing training. Lack of training will cause of the lack of common understanding on what have happened before, what is happening, what should happen. Our respondents show that the knowledge integration happens through training, processes of induction and orientation from trainers and senior staff. Despite that, lack of documentation in an organisation will result a frustration, as demonstrates by one of our respondents:

“The department has no book. People initiate their own responsibility. This is something very bad. What I did is I wrote down each process and do it several times to understand the process. Everyone write down their own processes. This is what my boss told me. So if I lose my processes diary, that’s it. The diary is more important than anything else right now”.

Our finding also demonstrates that good structure helps employees solve problems in a quick time, eases the employees in solving their problems; integrate knowledge as shown in most cases. When looking at the case analysis, it seems that most of studied organisations relations were established, which the employees know whom or which party to contact if they had difficulties that needed to be solved. Based on case studies analysis, employees have various levels of knowledge understanding, which some have a better understanding of the system than others and some are not. The common knowledge about an ES facilitates the integration of knowledge among employees. When problems needed to be solved, there is a need for interaction and communication with responsible staff with complementary and different knowledge domains.
Table 4 show the analysis based on the few worst practices of knowledge integration, which then results to the ‘unhealthy’ performance of the system. As a contrast, Table 4 also demonstrates some examples of excellent practices on knowledge integration in the study organisations. As predicted, the results show better system performance, and prove the KBT views on capability and competitive advantage. Note that, the analysis of knowledge integration offers insight into the linkage between organisational capability and competitive advantage, which refers here as the capability and competitive advantage of information system, specifically refers to Enterprise System success.

When looking to the case analysis, it leads to a conclusion that there is a case that shows the required common knowledge for knowledge integration does not achieved. The situations in the case show that the knowledge is clearly individual, where each employee represents a quite huge range of knowledge bases. The willingness to integrate knowledge among employees and the limited facilities and encouragement provided by organisations are limited, which affected to the difficulties in establishing deeper relationships in the organisation. This affects the possibilities to understand each other’s knowledge and work activities. There is a lack in the knowledge about each other’s knowledge, and the knowing process between different departments is not sufficient.

To measure the success of the ES, this paper employed the success measures from the IS-Impact measurement model offered by Gable et al. (2008). The model entails four quadrants, namely, individual impact, organisational impact, information quality and system quality. Below are examples of the contradict level of ES success from our respondents.

Respondent 1:
“We can see what the position of our division, our branch and compare last month’s total sales of our division as compared to across India. When we put sales order for dispensing across India, we are able to see how many inputs displaced from our factory, which is far from our head office, in different plants and different states. We get information in a quick time. For example, if we put some information in the morning, after half an hour, the information gets transit from plant to Gujarat”.

Respondent 2:
“Data management is very important; it is the heart and soul of the company. This system did help with it. But, when working with RAMCO, I lost lots of time. It is frustrating. I am not happy about RAMCO. If I know more, if I had more training; I know I can do more and I can deliver more”.

From our findings, it should be clear that different organisations have different level of ES success. The system’s performance are varies, aligned with the level of knowledge integration practices among employment cohorts in the organisations. Interestingly, our findings give a strong support to our main hypothesis, where we argue that having an ES-knowledge base in place, while necessary, is not sufficient. Thus, in order to maximise the positive effects of the ES-knowledgebase on ES success, the ES-knowledgebase must be maximally integrated. We assume that improving employees’ knowledge base has important positive outcomes for ES performance, which resulting to ES success. We also predict that to maximize the capability of the system, knowledge flows between individuals should be enhanced. In that sense, we argue that the value and competitive advantage for ES is heavily rely on the ES-knowledge base integration aspect.

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3 System quality construct is used to measure the performance of the system from technical and design perspective. Information quality is a measure of the system output concerning the quality of the information. Individual impact refers to the measure of influence by an individual’s capabilities and effectiveness, while Organisational impact measures the organizational results and capabilities.
<table>
<thead>
<tr>
<th>Knowledge base integration practices</th>
<th>Case example</th>
<th>System success</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Worst practices</strong></td>
<td></td>
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<tr>
<td>Lack of communication/interaction</td>
<td>“Nobody in department come and teaches me. They never ask me how I do my work, how to improve it, what problems am I facing”</td>
<td>“Little bit traditional and conservative”</td>
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<tr>
<td>Lack of training</td>
<td>“They have a training module but I don’t know where it is, nobody knows where the training module is”</td>
<td>“The steps in the system are defined but how you can create efficiency, nobody tells you”</td>
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<tr>
<td></td>
<td>“I received no training”</td>
<td>“It takes 2-3 hours to send a voucher. I lose lots of time”</td>
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<tr>
<td>Lack of professional support</td>
<td>“IT department never asks. Only when problem happens, I take a snapshot of the screen and I send to them”</td>
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</tr>
<tr>
<td></td>
<td>“They go to the back and they fix it, and they call you to say its working. They never ask how we can add value to it and what other problems we have”</td>
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</tr>
<tr>
<td>Negative learning practice</td>
<td>“There is no SOP for my job, no sharing. I just do my own work”</td>
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<tr>
<td><strong>Excellent practices</strong></td>
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<td>Learned from stakeholders</td>
<td>“We have training team and we go for them”</td>
<td>“SAP gives us information in quick time”</td>
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<td>“We had a thorough training for 6 months, after training, we were given practice assignments, we need to run reports analysis”</td>
<td>“The system improves the data management, there is no denial”</td>
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<tr>
<td>Knowledge can be accessed via system</td>
<td>“There is a quality in the system providing the feedback. So we just use the system, using any modules”</td>
<td>“From a finance perspective, the system has helped to reduce fraud”</td>
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<td></td>
<td>“We have an appointment module through network; this is a formal channel that we go through”</td>
<td>“We can keep track using the system. I can access to the orders across the country, I can manage that in 10 seconds”</td>
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<td></td>
<td>“When we put sales order for dispensing across India, we’re able to see how many inputs displaced from our factory, which is far from head office where we are, different plants and different states”</td>
<td>“I can say wonderful”</td>
</tr>
<tr>
<td>Knowledge is shared during interactions</td>
<td>“Most of them share knowledge, give feedback”</td>
<td>“The team is really helped in our source code, discover cost for the project, and find the right market”</td>
</tr>
<tr>
<td>Knowledge divisions/organisation structure</td>
<td>“There is a central division and other 4 divisions. Talking to other division improves share knowledge, how to use ES”</td>
<td>“For general managers, there are some reports exclusively authorized to them, we cannot run these reports”</td>
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<td>“For general managers, there are some reports exclusively authorized to them, we cannot run these reports”</td>
<td>“I can say wonderful”</td>
</tr>
<tr>
<td>Knowledge routine</td>
<td>“Pre-specified reports in SAP and customized reports for our company in SAP, every month we run the reports and tell head quarter where they should be focusing their efforts on”</td>
<td>“The system is very efficient, convenient”</td>
</tr>
</tbody>
</table>

*Table 4: Knowledge base integration practices*
This research makes some novel contributions in the research of knowledge management and Enterprise Systems. First, the discussion in this paper integrates two theoretical streams from Learning Network Theory (LNT) (Krogt, 1998; Rob F. Poell et al., 2000) and Knowledge-based Theory of the firm (KBT) (Grant, 1996a, 1996b). Second, this study defines the notion of knowledge base, which has contributed to knowledge management research by conceptualizing the knowledge base with a theoretical foundation from LNT. In doing that, this study introduces the ES success by explaining the role of knowledge base through the theoretical view. Third, this study provides the case study analysis to explain the relationship between knowledge base and ES success by employing the knowledge integration concepts from KBT.

In applying both theories in this research context, the research seeks to understand the impact of knowledge on Enterprise Systems and to demonstrate empirically the inter-relationship between the ES-knowledge base and success of Enterprise Systems, as research and practice alike would benefit from this empirical assessment. Contemporary Information Systems also will gain positive impact from this research where Enterprise Systems are being used as an archetype.

References


