

ERP System Implementation and Tacit Knowledge Sharing

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Abstract—Many organizations implementing ERP fail to understand the importance of tacit knowledge sharing during ERP implementation. The sharing of tacit knowledge is a key problem in any ERP system implementation because tacit knowledge is embedded in complex organizational processes, in legacy systems, in externally based processes.

This study presents findings about facilitators of tacit knowledge sharing in ERP implementation. It contributes to the body of knowledge about tacit knowledge sharing in ERP implementation by identifying and categorizing factors that facilitate tacit knowledge sharing during ERP implementation. By identifying relevant tacit knowledge sharing factors, managers can better prioritize implementation efforts and resources to maximize success of ERP implementations.

Index Terms—Tacit Knowledge, ERP implementation, Knowledge sharing

I. INTRODUCTION

Enterprise resource Planning (ERP) has become a key business driver in today's world. Organizations spend billions of dollars and countless hours implementing Enterprise Resources Planning systems (ERPs) to attain better performance (AHMAD *et al.*, 2011). ERP system is an IT solution that helps organizations to achieve enterprise wide sharing which results in faster access to accurate information required for decision making (Kale *et al.*, 2007). According Sudzina *et al* (2009) the enterprise resource planning (ERP) system is an enterprise-wide information system that integrates information from the entire company. Garg (2010) Submit that ERP system may be defined as a packaged business software system that enables a company to manage the efficient and effective use of resources by providing an integrated solution for the

organization's information processing needs (Garg, 2010; Newman and Zhao, 2008; Yang, 2010).

Kumar and Thapliyal (2010) also highlight that ERP provides the backbone for an enterprise-wide information system. A primary benefit of ERP is easier access to reliable, integrated information. The Earthgrains Company witnessed a net improvement in its operating margin from 2.4 to 3.3% in 1997 as a result of its ERP implementation (Novotny and Sabati, 2008). The company also improved its on-time delivery to 99% thereby improving its customer satisfaction metric (Ehie and Madsen, 2005). A successful ERP system can help an enterprise to reduce operating costs, generate more accurate forecasts of demand, accelerate production cycles, and enhance customer service. ERP also results in inventory reduction because material management planners have access to more accurate data, and can thus achieve more accurate forecasting of future demand (Yeh *et al.*, 2007). ERP systems also enhance inter-organization communication and collaboration between different functions and location (Haddara and Zach, 2011; Shirouyehzad *et al.*, 2011; Newman and Zhao, 2008; Gable *et al.*, 1998). However, the failure rate of ERP implementation is very high, with subsequent research interests focusing mainly on understanding the failure factors (Abugabah and Sanzogni, 2009; Vilpola, 2008). According to Escalle *et al.* (1999), ERP spending can run as high as 2–3% of company revenues. Many companies have been threatened with bankruptcy after their ERP projects failed (Tadinen, 2005). Moohebat *et al* (2011) went further to say that although, use of ERP has a lot of advantages, but ERP implementation can be very risky and if companies do not pay sufficient attention to their requirements and limitations which is known to through knowledge sharing. Tacit knowledge sharing is one critical piece of ERP success in any firm. Therefore it is very essential in every implementation project deals with facilitating the sharing of knowledge among members of the ERP team. Knowledge sharing in ERP implementation is somewhat unique because ERP redefines jobs and blurs traditional in-tra-organizational boundaries (Lee & Lee, 2000). There are three specific knowledge types that are required in an ERP project. They are software specific knowledge, business process specific knowledge and organization specific. Knowledge can be further classified as tacit or explicit. Tacit knowledge is subconsciously understood and applied, difficult to express, emerged from direct experience and action, and usually shared through highly interactive

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conversation and shared experiences. Also, knowledge can be internal or external to an ERP project (Noudoostbeni *et al.*, 2010). There are several factors that influence the sharing of tacit knowledge among team members (Sedera and Gable, 2010). The knowledge required during ERP implementation entails a wider variety of experiences, perspectives, and abilities than is needed during traditional information systems implementations. Tacit knowledge is developed and reinforced by the way people actually do their work and is difficult to rebuild after it is lost (Brown & Duguid, 2000). If this knowledge is lost during the transition to ERP, the organization may have trouble reclaiming valuable sets of skills, therefore, tacit knowledge sharing is one key to ERP implementation.

Knowledge sharing is the process of exchanging and communicating knowledge and information between employees in an organization. Effectively sharing knowledge increases the accumulation of organizational knowledge and develops the capability of its employees for better performing their jobs (Xiong and Deng, 2008). The implementation process of an ERP system also entails extensive knowledge creation, sharing and dissemination activities, both from external consultant to project members, as well from the project members to system users (Huang and Newell, 2003). The cooperation and bonding amongst the ERP project members are essential for ERP success (El Amrani *et al.*, 2008). The critical challenge of integrating knowledge at implementation lies in the ability to bring the key parties together. This sharing process is often met with obstacles, as knowledge is frequently tacit and embedded within routines of which few are stand-alone (Blackler, 1995). Tacit knowledge within the system and within the organization makes knowledge sharing in these implementations slow and painful (Nonaka 1994). Enterprise resource planning (ERP) systems provide a fertile ground for examining the phenomenon of tacit knowledge sharing when people from different, and often competing, units must work together to capture both the tacit knowledge about organizational processes. The primary objective of this study is to identify facilitators of tacit knowledge sharing in ERP implementation (Jones, 2005). While earlier studies have examined knowledge sharing and its implications, there are few studies that have explored the tacit knowledge sharing in ERP implementation. Therefore, there is a need for understanding tacit knowledge sharing as a theoretical gap in the existing in the ERP implementation. This study thus critiques literature to provide some insights into facilitators of the tacit knowledge sharing in ERP implementation. The study commences by examining conception of ERP implementation, leading to drivers of tacit knowledge sharing.

II. RESEARCH METHODOLOGY

This paper is based on a systematic literature review, conducted on journal papers, conference papers, and books on knowledge management, human resource management, technology management, and information management

particularly focusing on key themes such as tacit knowledge, knowledge sharing and ERP implementation. These themes were used as key words in searching for related journal articles, conference papers and books from electronic online repositories. The review first examined literature on ERP implementation and tacit knowledge sharing and then focused on the factors affecting fostering tacit knowledge sharing during ERP implementation.

III. KNOWLEDGE SHARING IN ERP SYSTEM

Managing knowledge in an ERP implementation project is a complex and difficult task, as a typical ERP system entails many users, both internal and external, ranging from top executives to data entry operators, external consultants and software vendors (Kuppusamy *et al.*, 2009). The knowledge required during enterprise system implementation includes a variety of expertise, experiences and skills and therefore cross-functional and cross divisional sharing of knowledge is necessary to ensure that the requisite enterprise system knowledge is available for a successful implementation (Scort A, 2008). Knowledge sharing takes place during various implementation stages among different individuals, teams, groups, units, departments, divisions, and external actors within organisation. Knowledge sharing during ERP implementation makes the employees work easier and also helps them to solve problem. Effective sharing of knowledge will lead to successful implementation, better maintenance and develop ERP system, which would create better fit between organisation and ERP system (Ramkumar Muralidharan, 2010). ERP implementation handles several knowledge that exists in the organization (Ramkumar Muralidharan, 2010). According to Rabaa'i (2009) organizations required knowledge sharing across the entire organization. The ERP implementation team often relies upon users for knowledge and advice in order to understand the business rules and processes embedded in the ERP software (Lee and Lee, 2000). Besides, the ERP consultants primarily possess technical knowledge, whereas the users (clients) possess business knowledge (Palanisamy, 2007).

ERP implementation teams can share knowledge across diverse business functions during ERP implementation. Knowledge sharing is one of the importance factors, especially the knowledge sharing among the key players of ERP project management such as ERP vendor, consultants, IT specialists, and business function users (Amoako-Gyampah and Salam, 2004). Knowledge of consultants sharing to other project team members when they participate in ERP implementation, especially tacit knowledge which is difficult to sharing and articulate (Kuppusamy *et al.*, 2009). The implementation process of an ERP system also entails extensive knowledge creation, sharing and dissemination activities, both from external consultant to project members, as well from the project members to system users (Kuppusamy *et al.*, 2009). Implementing an enterprise resource planning system requires a wide range of knowledge. This knowledge can henceforth be substantiated from experiences and knowledge from people who have

suffered from failed ERP implementations as well as people who have gained from successful ERP implementations (Chan, 1999). A key problem of an ERP implementation lies in the fact that knowledge sharing is difficult as most knowledge is embedded in the various organizational systems, structures, and relational processes. Sharing this embedded knowledge is crucial for ensuring successful ERP implementation (Huang and Newell, 2003).

IV. CONTRIBUTING FACTOR TO TACIT KNOWLEDGE SHARING IN ERP IMPLEMENTATION

While there are many factors that affect fostering tacit knowledge sharing in ERP implementation. An analysis of relevant literature leads to the following classification of critical factors that may contribute to fostering tacit knowledge sharing in ERP implementation.

1, Social Relation: According to Nor and Egbu (2010) the greatest willingness to share knowledge occurs when social relationships are based on emotional attachment, mutual trust, respect and genuine understanding of fellow ERP team members' strengths and capabilities. Critical to the development of knowledge sharing within a team are the recurring face-to-face interactions that allow ERP team members to get to know one another and to be able to predict how the other party will react or behave in various circumstances (Tseng, 2008). When team relationships have a high level of interaction members are more willing to engage in knowledge exchange (Gan *et al.*, 2006). The ERP team may instigated a process of relationship building through increased information sharing and an increase in social interaction among users and the implementation team members (Pan *et al.*, 2001). This may be done through informal discussions and numerous brainstorming sessions. As a result, stronger common knowledge links may be found, fostering social relationships among the users and the team. These relationships may be crucial as the team used them to determine implementation requirements later. To foster and create a set of supportive working relationships for the implementation work (Motwani *et al.*, 2002).

2, Communities of practice: The challenge for knowledge management is to identify those tacit knowledge domains possessing potential value for the organization that adopted the ERP system and converting them into actual value. If organizations want to identify and develop new knowledge domains they must seek the input of knowledge communities. The knowledge-based communities evolved as a result of knowledge sharing needs and may be used informally to coordinate activities across different regions (Pan *et al.*, 2001). Communities of practice (COP) are formed over time by employee with a need to associate themselves with others who are dealing with similar issues and facing similar challenges. It has become clear networking among knowledge workers can significantly improve their ability to share and create knowledge, opening the door to a new form of collaboration. Using personal networks to improve the organization's social capital and tap into hidden resources (Wenger *et al.*,

2002b). With the emergence of knowledge management came a new understanding of the importance of relationships in the workplace, and interest in communities of practice as a practical way to manage knowledge (Wenger *et al.*, 2002a). Sharing tacit knowledge requires interaction and informal learning processes such as storytelling, conversation, coaching, and apprenticeship of the kind that communities of practice provide (Usoro *et al.*, 2006).

3, Organisation culture: Organization's culture is a key driver and inhibitor of tacit knowledge sharing and may be thought of as knowledge resource because it provides the context within which organizational members create, acquire, share, and manage knowledge. Because the organization's culture influences member's attitudes towards tacit knowledge sharing and because tacit knowledge sharing is critical to successful ERP implementation (Vandaie, 2008). An Organisation has to make its work culture flexible, more encouraging towards knowledge sharing and creating trusts among its workers. Organizational culture is the shared value and beliefs and shapes the practice of organizational members in the organizations. Culture effectively influences the knowledge sharing process in an organization through the development of a knowledge friendly organizational culture. To ensure the success of such various policies and strategies are required to be adopted for encouraging effective knowledge sharing through reducing or eliminating the negative influence of cultural differences on knowledge sharing (Kuppusamy *et al.*, 2009). The influence of organizational culture on knowledge sharing is often manifested in the organizational values for knowledge sharing. Values are manifested in organizational norms that, in turn influence individual employees behaviours (De Long and Fahey 2000). McDermott and O'Dell (2001) emphasize the importance of integrating knowledge sharing into existing values in order to enhance and improve the effectiveness of organizational knowledge sharing. Knowledge sharing culture is usually embedded in organizational routines, processes, practices, and norms (Davenport and Prusak 1998). In such a culture, employees are being encouraged for adopting particular forms of behaviour in knowledge sharing (Sedera and Gable, 2010). The development of organizational culture supporting knowledge sharing involves changing organization culture. The development of an organizational culture involves adjusting values and changing attitudes of individuals in an organization (Crosby 1986). As a result, changing organizational culture is a long-term process which takes time and effort. In the short and medium term, the efforts of knowledge managers need to be focused on ways to promote knowledge sharing behaviour, as behaviour is the most superficial aspects of culture (Xiong and Deng, 2008).

4, Communication: ERP implementation needs communication and support from various people involved in the implementation process (Ramkumar Muralidharan, 2010). Good communication will lead to accurate sharing of knowledge, bad communication would lead to misunderstanding or false knowledge sharing. In addition to the group knowledge sharing, the enterprise system team

also has a great deal of communications and interactions with end users and user managers to both become aware of their expectations of the new systems and keep them informed about the changes that might occur after the implementation. Line of knowledge sharing is between the ERP implementation team and the consulting firms hired to convey their professional knowledge of the selected enterprise system package into the organization. The knowledge that team members seek from the sharing partner is not restricted to the manuals and the documented information about the package. Thus, it is important for the consulting staff to work side by side with enterprise system team members so that they can learn what is hard to document as instructions and manuals. Facilitating knowledge sharing requires adopting knowledge management initiatives along with the ERP implementation projects. KM and enterprise system initiatives in place at the same time of tacit enterprise system knowledge sharing is partly due to the fact that the process knowledge is by and large routinized so that employees may be subconscious about the separate steps which are gone through in the process and have difficulty expressing it explicitly. When any of these employees are selected as the enterprise system team member, the need for communicating this type of knowledge is surfaced. Sharing the experiences gained during enterprise system project from and to the members who transition on and off the enterprise system team, sharing of expertise from external consultants to the enterprise system team members, and sharing the contextual knowledge of enterprise system which could help users to better understand the underlying assumptions of the enterprise system are among other challenges posed by the tacitness of ERP specific knowledge. Organizations must have the capability of knowledge sharing during ERP implementation involves more than just communicating how different procedures and modules of the enterprise system operate. It requires that organizational members, especially those who are in the core implementation team, have a clear understanding of the underpinning assumptions of the system as well as the environment of the adopting organization. Only when this kind of tacit knowledge is integrated into the implementation effort, the organizational members will start to appreciate the value of enterprise system and this sharing is one of the most difficult phases in every ERP implementation. The challenge of tacit knowledge sharing is partly due to the fact that the knowledge needed to make processes work may have become so routinized that the performing employees may not be conscious about the separate steps which are gone through in the process and have difficulty expressing it explicitly. When any of these employees are selected as the enterprise system team member, the need for communicating this type of knowledge is surfaced. The knowledge that team members need for enterprise system project is more diverse than the knowledge required for their jobs and is mainly in the form of know-how and individual experiences. Therefore, facilitating the sharing of tacit knowledge exhausts a great part of the implementation team. Tacit knowledge sharing can be classified into different categories. First category concerns the knowledge

sharing within the ERP team and among team members. The team must also interact with other organizational members to gather information about processes across the enterprise and also to keep them informed about the progress of the project and its effects on their jobs. External consultants are also an inseparable part of every ERP implementation project and therefore, knowledge sharing, especially in tacit form, exists between the members of the enterprise system team and the external consultants as well. This is especially important since normally the consulting team leaves the firm after a while and it is up to the ERP team to salvage the knowledge sharing by them into the organization. Retaining the knowledge after the transition of the knowledge owner is also an important issue when members of the enterprise system team leaves for whatever reason at various phases of the enterprise system project. New members cannot catch up with what the former member left just by reading the manuals and documents of the project since a major part of the enterprise system knowledge gained by the former member was in tacit format.

5, Hierarchy: Hierarchy established between team members, can influence the communication capacity of team members, the established structure of team interaction in general depending on the organizational strategies, firms may choose to emphasize one of the two tacit knowledge facilitators for tacit knowledge sharing in enterprise system teams. In practice project managers can't eliminate ranks among team members in order to establish an atmosphere of communication and to stimulate sharing ideas. In this way the tacit knowledge is surfaced and the process of transforming it in explicit knowledge and internalization can begin. Also, structure of team interactions refers to factors that determine and structure the interactions between team members. Hierarchy of the team membership is another structure factors that influences the tacit knowledge sharing. Deemphasizing ranks and seniorities and providing equal bonus to all team members may also enhanced tacit knowledge sharing. They may also made knowledge sharing part of the contract with the external consultant. Such a structure that governs team interactions facilitates sharing of tacit knowledge during the enterprise system project.

6, Trust is important in the ERP team, because it could create a necessary atmosphere that makes interaction with others more open and rules out the undesired and opportunistic behaviours, reduce ERP team complexity, and create a comprehensive ERP team for interpersonal interactions (Sackmann and Friesl, 2007). Furthermore, with trust, ERP team could form their collective characteristics, such as predict ability, reliability, and fairness (Jiacheng *et al.*, 2010). Nonaka (1994) observes that trusting relationships eliminate deception, cheating, and the tendency among ERP team members to blame others for team failures (Chen *et al.*, 2010). Trust is an essential ingredient for establishing a solid knowledge base in work ERP teams that enables interaction and knowledge sharing (Mayer, 1995). Trust is characterized as the main attribute for fostering a successful knowledge sharing practice (Chai and Kim, 2010). According to Blau (1964) cited in (Engelmann and Hesse, 2011) trust shapes and maintains social exchange relationships, which may lead to

knowledge sharing activities afterwards. The level of trust affects the extent of knowledge sharing. High levels of trust between the teams are considered essential for effective communication to improve the quality of discussion between teams and to facilitate knowledge sharing (Lucas, 2005). When trust is high, the individuals are more prone to participate in knowledge exchange, resulting in knowledge creation gain (Saeed *et al.*, 2010).

7, Competence: Knowledge exchange is more effective when the knowledge recipient viewed the knowledge source as being competent (Baiden, 2006). Without building a sense of competence between the knowledge seekers and sources, team will find it difficult to take advantage of perhaps their most valuable resource their ERP teams know how. Knowledge acquirers who trust knowledge providers are more likely to listen to, absorb, and act on the information provided by the latter to support knowledge shared (Lucas, 2005). If an individual does not trust the information or knowledge they are receiving they are obviously unlikely to make full use of it. Conversely, if an individual does not trust the person to whom they are imparting knowledge to use it wisely or keep company secrets they will resist sharing (Barson *et al.*, 2000). When it comes to knowledge sharing, trusting ERP team members' competence is even more important when the knowledge is difficult to codify (Castelfranchi, 2004). For individuals to take advantage of experiential or tacit knowledge, they must believe that the knowledge source is both willing to help and is well versed in the particular discipline (Baiden, 2006).

Environment: In the process of knowledge sharing, the environment plays a key role in facilitating or impeding knowledge shared among team members (Bell DeTienne *et al.*, 2004). Successful cooperation requires the existence of a climate in which ERP team members feels safe in displaying behaviour that can enhanced knowledge sharing (Campbell, 2009). Atmosphere of the team considers the factors that are less tangible and define the behavioural norms within the team. This atmosphere might make team members feel inhibited from openly sharing their opinions or inversely, foster open communication of ideas. More on providing an atmosphere where team members felt free to express ideas and others were willing to listen. There may be also off-site meetings arranged for team members to provide more intimate knowledge sharing atmospheres which could help preserve knowledge while people transitioned on and off the team.

8, Leadership: Leaders are the ERP team members who are in the position to instill the appropriate values in the ERP team that will foster the values that is necessary for knowledge sharing to flourish (Holste and Fields, 2010). ERP team leader that lay the foundation of values, like knowledge sharing, that may filter down to the staff in the institution are necessary for programs such as knowledge management to be successful. Team leader can influence the model and recognition of knowledge sharing -building behaviours, such as receptivity and discretion (Liu and Phillips, 2011). Employing active listening skills and encouraging ERP team members to voice their concerns in an atmosphere where their issues will not be improperly

disclosed can build trust between team leader and ERP team members (Liu and Porter, 2010).

V. CONCLUSIONS

ERP implementation of tacit knowledge management into ERP project management is strategic, critical and correlated with the overall success of the ERP system implementation. It provides several guidelines for practitioners that can use in their own ERP implementations. Finally, the study provides directions for avenues of future research, and suggests research questions arising out of these findings that might be explored. Therefore, a possible future research, could investigate the dynamic of tacit knowledge during ERP implementation.

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