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An Institutionalisation View of the ERP in Large Organisations

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Abstract: Enterprise resource planning (ERP) system is a highly complex information system. Contemporary information systems research on ERP technology focuses on factors influencing success of its organizational adoption. However, adoption is largely discussed in terms of technology implementation rather than its assimilation within the organization. ERP implementation, however, is not a one off endorsement of technology; instead its implementation is a continuous process of technology assimilation aimed at organisational evolution with and within the technical, organisational, and cultural context of the organisation. This process of institutionalisation maintains legitimacy, power, and social and economic fitness of the organisation on an on-going basis. This paper investigates ERP implementation challenges through various stages of ERP assimilation process considering institutional pressures, institutional change, and other technology implementation/assimilation theories. It draws out a framework to guide ERP institutionalisation research in large organisations in Australia.

Keywords: ERP technology implementation, ERP assimilation process, ERP institutionalisation, Institutional theory.

1. Introduction

Enterprise resource planning (ERP) systems are integrated large-scale application-software packages used to support processes, information flows, reporting, and business analytics within organizations (Seddon *et al.*

2010). ERP systems represent a complex technological innovation for organizations that are evolving due to the changes in technological developments and market demands (Kouki *et al.* 2006; Hesterman *et al.* 2009; Seddon *et al.* 2010). Since 1990s, business organizations around the globe have been implementing ERP systems to function in an organized fashion with smooth, continuous and coherent information flows in the entire value chain. A fully assimilated ERP technology would bring many tangible and intangible implications for all functional, managerial, strategic and organizational areas of the organization. However, previous empirical studies report high percentage of failure in achieving predetermined corporate goals and desired benefits in ERP projects (Umble *et al.* 2003; Xue *et al.* 2004; Loh and Koh 2004; Kouki *et al.* 2006; Chang *et al.* 2008; Kwahk and Ahn 2009, Maguire *et al.* 2010).

There are many causes of ERP assimilation failure owe a lot to the interactions among people, tasks, environment and technology (Kwahk and Ahn 2009; Maguire *et al.* 2010). Once the ERP technology has been introduced into the organization, it must be examined how people, ERP system and organization adapt to the broader operating environment of the business. There is significant theoretical support available at this stage in the form of diffusion of innovation (Rogers 2003), technology acceptance model (Davis 1989), task-technology fit (Goodhue and Thompson 1995), technology-organization- environment framework (Tornatzky and Fleisher 1990), and social shaping of technology (Law 2004; Latour 2005). However, the issue of continues evolution of

ERP systems in sync with the organization remains. In fact, ERP implementation in business organizations cannot be viewed as uni-dimensional objective process. It is an ongoing process that evolves with the organization, and thus contributes to organizational maturity and legitimacy. Therefore, for better understanding of organization and their evolution, it is necessary to take into account the institutional environment, internal system and structure, and the legal and cultural rules and obligations that the organization are conformed to (Powell and DiMaggio 1992; Scott 2001; Delmestri 2007; Greenwood 2008). The purpose of this research is, thus, to study how ERP technology is implemented/ assimilated/ institutionalised/ and deinstitutionalised within organizations. It presents an ERP institutionalisation framework that provides an integrated view of how ERP technology is implemented, assimilated, evolved, institutionalised, deinstitutionalised, and re-institutionalised. The suggested framework emphasizes the character, shaping, and use of ERP technology through continues interfacing with organizational, social, cultural, environmental, competitive, political, and other institutional factors.

The rest of the paper is organized as follows. The second section reviews literature on ERP implementation/assimilation, followed a discussion of the process of institutionalisation/ deinstitutionalisation of ERP technology and various dimensions of its success. ERP institutionalisation framework and research questions are then discussed, followed by the proposed research methodology. The last section discusses contributions of this research and its future road map.

2. ERP Implementation/ Assimilation- A Brief History and Overview

This section is structured into three subsections. The first subsection reviews ERP assimilation process and

its various stages. ERP implementation is a social process; therefore, the second subsection explains the social shaping of ERP technology. The third subsection provides an overview of theories relevant to ERP implementation and assimilation.

2.1 Assimilation of Complex Technologies like ERP

Traditionally, ERP systems were used mainly to handle organization's back-end processes and business transactions. However, today, organizations integrate both back-end and front-end (such as CRM, SCM) applications together to achieve more efficiency in functional and non-functional capabilities of the organization (Seddon *et al.* 2010). This makes ERP as a complex technology, which encounters more assimilation challenges. Meyer and Goes (1988) conceptualize assimilation of technological innovations as a nine-step organizational decision process i.e., knowledge-awareness stage (apprehension, consideration, and discussion), evaluation-choice stage (acquisition proposal, technical-fiscal evaluation, and political-strategic evaluation), and adoption-implementation stage (trial, acceptance, and expansion). Cooper and Zmud (1990) define assimilation as the diffusion of technology usage across organizational business processes and routinization of activities within these processes. Initiation, adoption, adaptation, acceptance, routinization and infusion constitute the six stages of their proposed IT implementation model. Later, Gallivan (2001) divide these six stages into two categories, initiation and adoption as the early stages of assimilation and the rest as the later stages. It is clear that various authors have explained the same process in different ways. However, this research concurs with Zhu *et al.* (2006a) whom suggest initiation, adoption, and routinization as the core elements of technology assimilation process. These three steps embody the pre-implementation, implementation, and post-implementation phases of

ERP assimilation, and thus, provide a more comprehensive foundation for ERP assimilation.

2.2 The Concept of Social Shaping of ERP Technology

ERP systems are embedded in the complex social contexts, which heavily influence ERP assimilation. The use of ERP systems is shaped, designed, constructed, and modified by the interests, values, and assumptions of a wide variety of communities of developers, investors, users, and other actors involved in it (Xue *et al.* 2004). The theory of social shaping of technology explores the effects of social, organizational, and cultural factors on the content of technology and the processes involved in the introduction of technology to an organization. The technological and social contexts of ERP implementation, thus, cannot be treated as separate phenomena; rather the definition of ERP technology must become embedded within the social arrangements (Kwahk and Ahn 2009).

2.3 ERP Implementation/ Assimilation Challenges: Theoretical Support

There is significant theoretical support for factors influencing ERP assimilation success/ failure. Diffusion of innovation (Rogers 2003) is a process in which an innovation is communicated through certain channels over time and within a particular social system. The proportion of the population adopting ERP technology is approximately distributed normally over time as individuals possess various degrees of willingness to adopt technologies. Rogers (2003) argues that people judge a technological innovation based on their perceptions of five attributes, i.e., relative advantage, complexity, compatibility, trialability, and observability.

Task–technology fit theory (TTF) and technology acceptance model (TAM) are two main models of

information technology utilization behaviour which provide theoretical basis for exploring the factors affecting technology utilization and its link with user performance. Although these two models have overlapping perspectives on utilization behaviour, they offer two various views on technology implementation (Pagani 2006). TTF (Premkumar *et al.* 2005; Ziguers and Khazanchi 2008) explains how technology leads to performance, if the capabilities of the technology match the tasks performed by user. Some researchers conceptualize this fitness as functional fit in ERP projects that is the extent to which the functional capabilities embedded and configured within an ERP system matches the functionality that an organization needs in order to operate in an effective and efficient way (Seddon *et al.* 2010). On the other hand, TAM, theory of reasoned action, and Unified Theory of Acceptance and Use of Technology (UTAUT), all study behavioural elements affecting individual's intention to use a system, and actual system use (Venkatesh *et al.* 2003; Legris *et al.* 2003; Wixom and Todd 2005). User attitude towards the ERP technology (beliefs, habits, affect), along with social norms, and other situational factors lead to increased utilization and performance of system usage (Cohen 2010). External variables like system quality, information quality, service quality, and organizational factors affect user satisfaction with technology, and consequently influence beliefs about the consequences of using it (Wixom and Todd 2005).

The technology-organization-environment (TOE) framework explores how assimilation process is influenced by the technological, organizational, and environmental context and explains the determinants of ERP assimilation (Zhu *et al.* 2006b; Abu-Khadra and Ziadat 2011). The technological context consists of both internal/external attributes of technology such as ERP attributes and IT expertise. The organizational context embodies characteristics and resources of the

organization, like top management championship, absorptive capacity, strategic alignment, user involvement, and reward system. The environmental context is the arena in which the firm conducts its business and concerns the size and structure of the industry, such as vendor support, consultant effectiveness, the macroeconomic context, the firm's competitors, and the regulatory environment. In summary, the way an organization sees the need for, searches for, and adopts ERP technology is influenced by these three elements (Pan and Jang 2008).

3. Organizational Institutional Theory

The use of ERP systems become a critical asset for organizations that give them the power to adapt to the environmental changes (Kouki *et al.* 2006). Here, the institutional theory will be used for better understanding the ERP assimilation process. Institutional theory is one of the prevailing theories utilized in organizational analysis. It mostly focused on the environmental factors, and offers explanation for social actions, social structure, and cultural persistence through a process by which social schemas, rules, norms, routines, and typifications (cultural beliefs and scripts) become established as authoritative guidelines for organizational behaviour (Powel and DiMaggio 1992; Greenwood 2008; Abrutyn and Turner 2011). Institutions are social structures composed of cultural-cognitive, normative, and regulative elements that, together with resources and associated activities, bring stability, legitimacy, and meaning to social life (Scott 2001). The organizational legitimacy, thus, achieved through social acceptability, credibility, and cultural support, derives the institution (Delmestri 2007; Weerakkody *et al.* 2009).

3.1 Institutional Isomorphic Pressures

Institutional isomorphism is a process in which organizations try to excel in their practice of social

rules, ideals, and practices by fitting themselves with the environmental conditions. This process is an essential part of institutional theory and neoinstitutional perspective (Powel and DiMaggio 1992; Greenwood 2008). Coercive (constraining), normative (learning), and mimetic (cloning) are three isomorphic mechanisms which influence organizations in gaining increasing similarity in structure. The coercive isomorphism occurs by organizational desire to conform to laws, rules, and sanctions established by institutional actors or sources. This similarity results in gaining legitimacy and external validation that improves the organization's access to resources. The normative mechanism mostly concerns the moral and pragmatic aspect of legitimacy by assessing whether the organization plays its role correctly and in a desirable way. Compliance with norms with respect to environmental concerns can lead to profitability, e.g., reducing organizational cost by conforming to an environmental norm such as reduction in wastage of efforts, time, and resources. Finally, the mimetic isomorphism is a cause of organizational tendency to look similar to other peers in order to get a positive evaluation from the organizational environment. This mechanism results in reducing uncertainty, improving predictability, and benchmarking other organizations who are performing at or near optimum level. Noncompliance with each of these mechanisms comes with a risk of costly penalties, or in the worst case with the death of organization (Scott 2001; Teo *et al.* 2003; Bjorck 2004; Baptista 2009).

3.2 Institutional Change and Technology Deinstitutionalisation

Existing research has mostly studied the process of institutionalisation, and little attention has been given to effects of institutional change and deinstitutionalisation. Deinstitutionalisation has only recently begun to attract attention as it is increasingly recog-

nised to be equally central to institutional process (Greenwood *et al.* 2002; Clegg and Bailey 2008). When institutional isomorphic pressures [explained in 3.1] increase, the institutionalisation process emerges. On the other hand, when they decrease, deinstitutionalisation process starts. Deinstitutionalisation is, therefore, a result of institutional change, erosion of existing institutions and creation of new ones (Seal 2003). Deinstitutionalisation also facilitates unlearning in the organization to learn new facts, realities, and concepts. Through the deinstitutionalisation, institutions weaken and disappear because of new beliefs and practices (Scott 2001). The process of institutional change is usually evolutionary and path dependent which is shaped by existing institutions (Siti-Nabiha and Scapens 2005).

Oliver (1992) introduces three main sources of pressure that can lead to the erosion of legitimacy or the taken-for-grantedness which characterizes institutions. These major antecedents are political, functional, and social pressures. These institutional pressures will not automatically lead to a breakdown in institutional norms. They should be interpreted, given meaning, and responded to by actors within organizations (Scott 2001; Dacin *et al.* 2002).

In the research done by Siti-Nabiha and Scapens (2005), it is shown that deinstitutionalisation is not just an organizational response to external (institutional) pressures and demands; rather it can occur through the working out of resistance to embrace change. The effect of resistance to change is also studied in many ERP implementation studies as the failure dimension of ERP post-implementation (Lapointe and Rivard 2005; Kwahk and Ahn 2009). The evolutionary process of change constitutes both stability and change simultaneously that states they are not necessarily contradictory or opposing forces (Siti-Nabiha and Scapens 2005).

3.3 Dimensions of ERP Assimilation/ Institutionalisation Success

In this section, an overview of ERP institutionalisation success factors through various stages of ERP assimilation process is discussed. According to the Zhu *et al.* (2006a), the pre-implementation stage of ERP assimilation constitutes initiation and adoption of ERP technology, and the implementation and post-implementation is defined through routinization stage.

Several recent studies address the issue of critical success factors (CSFs) influencing ERP adoption. These studies have reported different subsets of CSFs rather than a comprehensive set of similar factors because cultures, government regulations, and economic environments differ among various organizations (Sheu *et al.* 2004). Appropriate business and IT legacy systems, change management culture and program, communication patterns, data management method and protocols, ERP strategy and implementation methodology, ERP teamwork and composition, ERP vendor, monitoring and evaluation performance, organizational characteristics, project champion, project management, top management support, fit between ERP and business processes, national culture, and country-related functional requirements are some important CSFs in the adoption and implementation of ERP system (Nah *et al.* 2003; Ngai *et al.* 2008).

The organizational environment (such as economic reform and price), culture (such as partnership, BPR, human resource, reporting system, and language), and technical issues (such as system quality and information quality) are some other key factors for ERP implementation success (Motwani *et al.* 2002; Zhang *et al.* 2003; Xue *et al.* 2004; Boersma and Kingma 2005). Furthermore, the norms, values, and culture of the developers of ERP systems interact with the local norms, values, and cultures of the location where they are implemented and used which

bring about some technical issues.

Most of the prior studies on ERP adoption/ implementation are focused on organizational level criteria. However, it is difficult to adopt ERP systems successfully without users or employees’ participation (Chang *et al.* 2008; Kwahk and Ahn 2009). Outside consultants and detailed plans for training users are, thus, important variables for successful ERP implementation (Mabert *et al.* 2003). In line with these studies, Legare (2002) categorises factors influencing the success of ERP implementation in three groups consisting organizational characteristics (strategy, resources, rewards, culture, and structure), individual characteristics (knowledge, cognitive abilities, and motivation), and group characteristics (goals, roles, norms, diversity, and problem solving).

Overcoming organizational inertia (OOI) has positive effect on routinization stage. It defines as the degree to which the individuals of the organization are interested and motivated to learn, use, and accept the new system which will overcome resistance to the

system (Lapointe and Rivard 2005; Kwahk and Ahn 2009; Seddon *et al.* 2010). Lack of commitment, acceptance and readiness of the users to deploy the system, lack of appropriate training, limited knowledge of users about system’s advantage and different functionalities of it, lack of support documentation, software and data inconsistency, unreliable hardware, lack of documentation about system configuration to support evolving business needs are some challenges of post-implementation phase of ERP assimilation (Kumar *et al.* 2003; Peng and Nunes 2009).

4. ERP Institutionalisation Framework and Research Questions

The main question of this research is ‘How ERP technology should be assimilated, legitimized, maintained, improved, and retired within organizations?’ In the rest of this section, the research framework (Figure 1) and its fundamental elements are elaborated, and the sub-questions arise from each layer are also discussed.

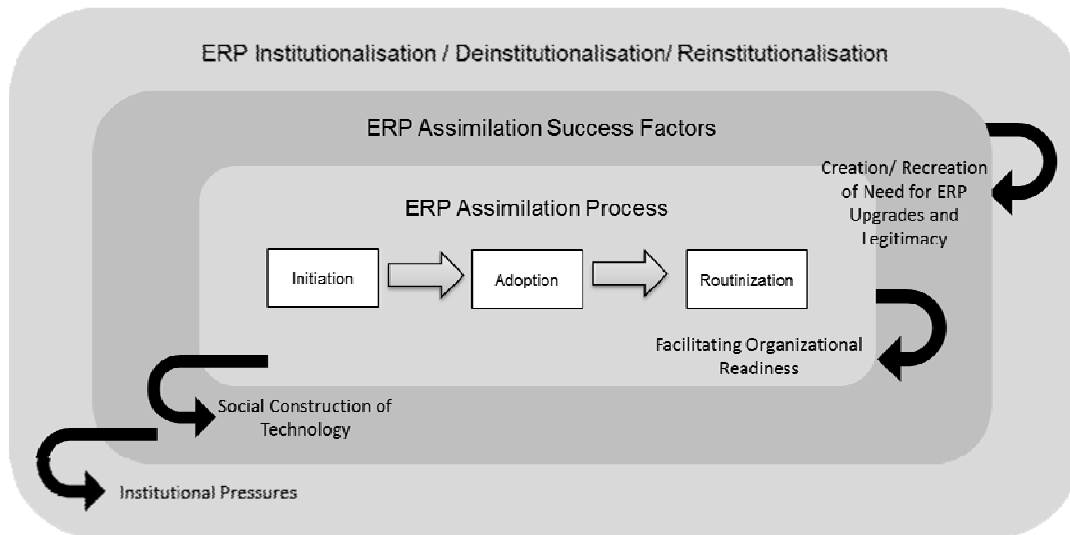


Figure 1 ERP Institutionalisation framework

The most inner layer of this framework is ERP assimilation process. As explained in section 2.1, the three-stage innovation assimilation process (initiation,

adoption, and routinization) proposed by Zhu *et al.* (2006a) is used here. In the initiation stage of this process, the ERP technological needs and problems

are identified and prioritized. The organizational inclination to change evolves through various pressures: organizational need (pull), technological pressures (push) or a mixture of them. Then the organization's environment is searched for the suitable ERP solution that addresses the problem. At this stage, the focus of introducing ERP technology to organization is on improving organizational performance (Rogers 2003; Zhu *et al.* 2006a). The second stage of assimilation process is adoption wherein the decision to use the ERP technology is made (Rogers 2003), and the resources required for general deployment of this technology are allocated based on the level and scope of adoption decision. This facilitates the widespread usage of ERP systems. After ERP implemented, it required to be accepted, adapted, and routinized within the organization (Cooper and Zmud 1990). Fichman and Kemerer (1999) introduce a new concept, i.e., 'assimilation gap' as the lag between widespread usage of ERP technology and the adoption decision. This lag occurs because of the insufficient knowledge of the organization and its members to leverage the system. As a result, the implemented ERP systems not aligned with the user's environment, so it fails to be deployed completely throughout the organization. As a way to bridge up this gap, routinization emerges as the last stage of this process by which ERP technology is widely used as the integral part of the organization (Zhu *et al.* 2006a). The fundamental question at this stage is 'How ERP systems are assimilated within organizations?'

The second layer of the suggested framework is ERP assimilation success factors. At this stage, organization needs to ascertain how ERP is shaped with the social, organizational, and technical contexts of the organization. Technological and social contexts of ERP assimilation cannot be treated as separate phenomena; rather the definition of ERP technology must become embedded within the social arrangements

[section 2.2] (Kwahk and Ahn 2009). ERP assimilation is not an isolated process; rather it is embedded in the social and organizational context, and is dependent on the perceptions of the ERP stockholders of the organization. Hence, the success and failure of ERP assimilation process is interpreted and evaluated by objectives, goals and intentions of those social groups who socially construct it through the ERP assimilation process (Chang *et al.* 2008). Therefore, CSFs as key areas where 'things must go right' for the ERP implementation to be successful should not only considers technical aspects but also contextual issues including social and cultural impact on the interaction between people and the ERP technology (Xue *et al.* 2004). At this stage, the interactions between technical, organizational, social, cultural, and competitive aspects become institutionalised within the organization environment provide for the success factors of ERP assimilation process. Here the question arise is 'what are CSFs in various stages of ERP assimilation process?'

ERP institutionalisation/ deinstitutionalisation/ reinstitutionalisation is the third layer of suggested research framework. When ERP is institutionalised, it is taken for granted by actors of social system and they even may not recognize that their behaviour is controlled by an institution. At this stage, acting in compliance with the institution is viewed as logical by those who share the institution (Baptista 2009; Maheshwari *et al.* 2010). Coercive, normative, and mimetic mechanisms [described in section 3.1] make ERP systems to be legally sanctioned, morally governed, and culturally supported (Scott 2001). These mechanisms need to work in concert with each other in order to bring higher degrees of isomorphism. Moreover, when these institutional isomorphic pressures increase, the institutionalisation process emerges, reversely when they decrease, deinstitutionalisation process originates.

Deinstitutionalisation [described in section 3.2] is a departure from institutionalisation as a result of institutional change, erosion of existing institutions and creation of new ones (Seal 2003; Siti-Nabiha and Scapens 2005). There is yet another state, i.e., reinstitutionalisation, which refers to departing from one institutionalisation and arriving into another institutional form and practices which are organized around different principle and rules (Currie 2011). Hence, considering institutional pressures provides new insights into how the behaviours of individuals within an organization are influenced by organizational norms, values, regulations, and culture. On the contrary, how they may result in deinstitutionalization and reinstitutionalisation of organizational forms and practices. The sub-question at this stage is, therefore, 'How ERP technology becomes institutionalised/deinstitutionalised / and reinstitutionalised in the organisation?'

In response to institutional pressures, the need for ERP technology will be created/ or recreated, which affects various stages of ERP assimilation and its success (Maheshwari et al. 2010). Finally, considering all these influencing factors and their effects, an organization could facilitates its readiness over various stages of ERP assimilation, i.e., when an ERP technology introduces, starts to use, becomes dominant, and then erodes or deinstitutionalise from organization.

5. Research Methodology

This research follows a qualitative interpretive approach with an exploratory case study method. Case study research is an appropriate strategy for answering to 'how' and 'why' questions which investigates a contemporary phenomenon within its real-life context especially when the boundaries between these two concepts are not clearly evident (Yin 2011). The characteristics of ERP implementation, thus, legitimize

our selection of a case research method. It triangulates data from various sources, such as semi-structured interviews, personal observations, surveys, and organizational documents. Hesse-Biber (2010) suggests a number of other advantages of using this methodology after having analysed several case studies. These include increasing the representativity and generalizability of research, locating a target population or defining a population of interest to study in depth, enhancing the validity and reliability of research findings, addressing inconsistent results, testing the validity of qualitative results, enhancing the understanding of the research problem and research findings, providing convergence in findings, and promoting social transformation.

The data collected will be analysed using data analysis software, i.e., NVivo. This software is useful in organizing data according to different themes emerging from the data collected, which allows testing theories or in directing the study to generate new theories. Furthermore, it could be used to form relationships between different themes to bring about cause and effect analysis, tree maps, and cluster analysis, which would help with the within-case analysis as well as cross-case analysis.

6. Discussion, Conclusions, and Future Work

In this day and age, organizations tend to master an institutionalised practice for ERP implementation and assimilation. Adoption is just one part of assimilation process which cannot make sure that ERP can be full-scale deployed in an organization, thus, there is a strong need to develop sufficient understanding of how and why some organizations achieve more business profits than others through the post-implementation phase/routinization stage of ERP assimilation/institutionalisation. Furthermore, business organisations are shaped by the interactions of

the environment that they operate in, rules and norms imposed on them, behaviours of their internal systems, and cognitive patterns of their stockholders. An organization as an institution, thus, evolves through the mutual interactions of various organizational sub-institutions. Technologies in general and ERP systems in particular work as the binding factor that shape organizations and gives them their existing form and legitimacy by integrating together these sub-institutions. The form and legitimacy define how organisations evolve their structures, culture, and systems.

This research enriches insight into ERP implementation by considering institutional theory and external forces which would encourage (or hinder) ERP assimilation. The suggested ERP institutionalisation framework offers a pragmatic and comprehensive view on organizational evolution through institutionalisation of ERP technology which is useful for both managers adopting an ERP system and vendors undertaking its development and implementation. This research contributes to the ERP system use literature by applying a stage-based model which take into account the pre-implementation, implementation and post-implementation stages of ERP assimilation in an integrated structure; an area has sparsely been covered by the extent literature.

Towards the next stage of this research, the authors will engage different Australian organizations who used ERP systems in their organizations. These organizations represent different types of ERP implementation and assimilation arrangements, where these organizations either buy customized ERP solutions from a foreign vendor, developed it themselves, or the mixture of them. In addition, organizations with various levels of ERP implementation would be selected, for example, ERP with merely integrated back-end processes and/ or seamless back-end and front-end packages. The authors also try to investi-

gate organizations with different years of experience in ERP implementation such as less than 2 years, between 2-5 years, and more than 5 years. In this way, more granular understanding and assessment of ERP assimilation according to characteristics of ERP project would be discovered.

To conclude, as suggestions for future work, the emerging IS research discuss different ERP adopting patterns between large-scale organizations and SMEs (Yusuf et al. 2006; Kwahk and Ahn 2009). The authors, thus, believe there is valuable research streams to find the effect of organizational size on ERP implementation/ assimilation. Moreover, it would also be interesting to explore the deinstitutionalisation and reinstitutionalisation of ERP technology in organizations.

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