Integrating ERP and Enterprise Social Software

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Abstract

Purpose: This study explores the use of a hybrid ERP system, combining an ERP system with enterprise social software (ESS). The study will provide a critical assessment of the implementation of this process technology.

Design/methodology/approach: Multiple case studies of organisations based in China were conducted to understand the use of ERP systems in different contexts. Following an evaluation of the context of each ERP implementation (within-case analysis) the research draws a cross-case conclusion that defines the nature of a hybrid ERP system and then synthesises the propositions related to the benefits and challenges of implementation.

Findings We find that a hybrid ERP system is able to support efficiency in business process management and also provide a flexible response to changes in business requirements. It does this by allowing for the continued use of informal processes that cannot be incorporated into the ERP system.

Practical implications: This research indicates how ERP systems in conjunction with ESS can provide a flexible response to changing business requirements and increase collaboration within the organisation. Key lessons include the need to perform informal activities under the guidance of managers and provide clear boundaries for the implementation of informal activities.

Originality/Value: This study has found that the use of case studies can provide a valuable insight into the use of a hybrid ERP system from the perspective of its use within the organisation as a work system that requires an assessment of the context within which organisational members perform their work

Keywords:
enterprise resource planning (ERP), enterprise social software, China

Paper type: Case Study

Introduction

Enterprise Resource Planning (ERP) research can be classified into two stages. The first stage considers the ERP system as an implementation of a standard software package that entails gaining knowledge of best business practice and applying this to improving existing performance or replacing legacy practices. During this stage, most of the ERP systems were off-the-shelf software packages that dealt with the complexity of implementing the system, such as the technical and managerial choices and challenges(Markus et al., 2000; Wu and Wang, 2007). Research emphasised the selection of software vendors and system implementation (Ahn and Choi, 2008). For instance, business process redesign is commonly involved in the implementation of an ERP to redefine a firm's business processes to fit the standard model of the software (Kraemmerand et al., 2003). The second stage of ERP research considers a customised ERP system with a continuous improvement effort designed to mitigate the misalignment problem (Wei et al., 2005; Sia and Soh, 2007). The aim was to provide a dynamic, configurable system to fulfil specific needs and tasks within an organisation. Nonetheless, developing a customised ERP system and then undertaking continuous system improvements can involve high costs and long delays in using the system. In addition, customer demands continue to change ever more rapidly, and the system finds itself unable to respond flexibly to these changes (Akkermans et al., 2003).

This study examines the use of ERP in combination with enterprise social software (ESS) also termed social technology and Enterprise 2.0. The term "Enterprise 2.0" was coined by McAfee (2006), as the software application is based on web 2.0 technologies such as blogs inside the corporation's Intranet (Levy, 2009). In general ESS provides a way of incorporating informal communication in firms, connecting people from different areas and solving business problems based on people's practical knowledge.

There follows a literature review which discusses the relationship between ERP and ESS. A case study analysis of ERP implementations in four companies based in China is presented and from that analysis the elements of what is termed a hybrid ERP system containing both ERP and ESS components is defined. The benefits and challenges of adopting a hybrid ERP system are then explored.

Literature review

Although some research investigates the impact of the implementation process on ERP performance from a user perspective (De Toni et al, 2015) generally research in the area of ERP implementation focuses on how to increase production performance, rather than the issue of its effect on social interactions. However, there is evidence that companies suffer from rigidly

designed ERP systems. For example these systems generate production plans through a Manufacturing Requirements Planning (MRP) system, with a fixed lead time to plan for purchasing orders and production orders. This means that the company may not be able to respond flexibly to changes in lead time (Moon and Phatak, 2005) which can result in material shortage, over-ordering or over-production (Chen, 2001). On a general level every business relationship is unique with its own coordination possibilities and adaptation requirements. Given that the ERP system core is far from flexible, the extended utilization in an interorganisational setting requires that added applications deal with this rigidity (Ekman and Windahl, 2014).

Recently, the importance of social technologies in providing better communication and knowledge management in an organisation has been identified, which can enhance knowledge-based service/product activities (Bruno et al. 2011). Unlike existing enterprise systems which contain pre-defined formal descriptions of working procedures, social technologies can enable open and unstructured online communication that motivates spontaneous interactions between social participants to filter and refine information more effectively and precisely (McAfee, 2006). ESS enables individual-level interactions, such as discussion forums and blogs, through which people can ask questions and get responses from others. Thus, front-line employees participate in modifying the work procedures and their ideas can influence the design of working methods. Thus, social technologies improve business innovation and link with interpretive flexibility (Cadili and Whitely, 2005), in that people interpret, experience and contribute to the final form of business practice. In short, social technology-supported business activities are driven by the knowledge of employees to construct an innovative operational mode, which will be complex and contingent on context; culture-based, rather than pre-determined and standardised.

Methodology

Due to the exploratory nature of this research, the case study method is used as it provides a rich understanding of the context of research and the processes being enacted (Eisenhardt and Graebner, 2007). The method particularly fits a study that asks ‘how’ and ‘why’ questions (Yin, 2009). The research investigates the context of companies in order to understand ‘how’ multiple cases use the enterprise system differently, and ‘why’ they need a hybrid system of an ERP and social technologies. To compare the different challenges and responses in multiple firms when they used an ERP system, we have developed a multi-site study (Creswell, 1998) of companies based in China. This country was chosen as the authors could gain access to companies here and the country represents a context in which the

implementation of a market economy has led to an increasingly complex and turbulent business environment (Huang et al., 2012). Also the business culture of Chinese firms is shaped by personal and high-context communications, non-systemic decision-making and unstructured business processes (Yeh and OuYang, 2010; Choi et al., 2013) suggesting that embedding informal processes in the ERP system may be of relevance to these firms. The study aims to compare the companies in different industries with the different working patterns they adopted when using ERP systems. Two companies used a single ERP and the other companies used a social technology in parallel with an ERP system. Table 1 summarises the company profiles consisting of the firms' background, ERP system usage, and their management characteristics.

Company	*A*	*B*	*C*	D
Company background				
Production type	Food (meat processing)	Electronic equipment (e.g. televisions, projectors, LCD televisions)	Display Technologies applied in digital communication devices	Commercial mall operator (focus on home-furnishing products)
Year of creation	1993	1996	2002	1995
No. of employees	3000+	1000+	1000+	1000+
Capital structure	Local Chinese manufacturer	Sole corporation, subsidiary in the South-east of China	Sole corporation, subsidiary in the South-east of China	Local Chinese shopping mall
The usage of the information systems				
Start of ERP adoption year	1996 2006 (2nd implementation)	1996	2002 2011 updated software	2009
ERP Adoption method	SAP standard software	SAP (standard software from headquarters)	Customized system based on Oracle by the sub-company	Digital China
Functional	Production,	Production ,	Procurement,	Leasing service,

coverage of the ERPs	purchase, plan, sale, finance, logistics	purchase, planning, EDI	material mgt. , production, finance	point-of-sales in mall, finance & accounting, business
The usage of enterprise social system (ESS)	none	none	Intranet including blogs and a BBS communication forum	Office Assistant (OA) website, including sharing business reports, publishing business notices, document approval, and a communication forum
Management characteristics				
Organizational structure	Hierarchical	Team work	Team work & loose structured with informal groups	Flat structure (4 management regions)
Communication method	Top down	Top down	Bottom up	Bottom up
Leadership approach	Formal, rigorous	Formal, rigorous	Empowerment	Empowerment

Table 1. The characteristics of the four case study companies

Data Collection

This research primarily adopted semi-structured interviews for multiple case data collection. The interviews focused on a specific topic, and the data collection technique was flexible enough for researchers to ask questions that were interesting for interviewees. The result of this approach is that interviewees feel comfortable in an open and flexible conversational environment (Easterby-Smith et al., 2008, p. 143), Therefore the interviews in this study followed a ‘topic guide‘ that was designed before the interviews were conducted. The interview topics concerned the company background, operating conditions and the information systems used in the firm. Some of the interviews were conducted across a group of employees and the interviewees who participated in the study had either used the ERP system or were involved in its implementation. The research also collected data from other

sources to ensure validity, including company ERP system implementation documents, websites, presentations and organisation charts.

Data Analysis

According to Eisenhardt (1989), multiple case study data analyses consists of two stages: 1) 'within-case analysis' deals with the data required to become familiar with each case; and 2) 'cross-case analysis' which looks for patterns that categorise the sample cases into groups based on within-group similarities coupled with intergroup differences. Therefore, the first stage of data analysis involved preparing case study outlines to describe each company's use of the ERP system. The second data analysis stage is a synthesis process that aggregates the key findings across all cases (Yin, 2009). This research first drew a cross-case conclusion that defines the nature of a hybrid ERP system and then synthesises the propositions related to the benefits and challenges of the hybrid ERP system.

Case studies and analyses

Company A

Company A was founded in 1993 as a meat processing manufacturer and seller in Southeast China. The case presents an example of the use of 'standard' sales and production modules of an ERP system. As Strong and Volkoff (2010) state, although there are standard processes defined in an ERP based on production activities, the actual work undertaken in companies is not always that standard. For example this company has various delivery methods owing to the different storage methods of its products. However the firm uses the set standardised procedures in the ERP system in order to coordinate enterprise-wide operations and streamline operations in the business that require real-time links across all activities of the company: from order capture to procurement to resource planning to production scheduling to delivery and finally to finance and accounting management.

In terms of company A since the system did not embed the intelligence of frontline employees, the firm endured delivery mistakes for a long time, and even lost orders. When ERP systems are used, the knowledge of system participators is valuable and contributes to aligning system performance and the understanding of the changes. In this case study, the protracted delivery problems that occurred could have been eliminated if the company had focused sooner on the opinions of the carriers. Also delivery errors that they encountered could have been reduced if the firm had not merely relied on predictions based on forecasts but also on the knowledge of people in the sales office.

Company B

Company B was founded in 1996 and is a subsidiary of a global manufacturing company producing goods such as televisions, projectors, and LCD televisions. As a branch of a world-leading TV manufacturer, its ERP is well-designed by its Head Office. For example, the branches use an EDI-based procurement system module within the ERP. However, even if company B uses an EDI platform to interact with suppliers effectively, the risks due to the inflexibility of the ERP are not always reduced. The firm's orders, assigned by Head Office (HQ), are unpredictable and changeable. When HQ amends orders, even if it has already sent out the orders to company B the standard approach enabled by an ERP system cannot cope with unexpected changes. For example if there is a sudden fall in planned production, personnel cannot alter the content of purchase orders that have already been submitted to the system. Also if the firm is faced with increased inventory, the factory needs to store surplus materials leading to an over-stock problem. HQ defines the amount of stock that is allowed in the ERP system, so in order to follow the inventory standards in the ERP personnel cannot input the real stock information into the system. Eventually, the planning and calculation module in the ERP system cannot be used, since the information does not synchronise with reality.

In terms of company B this case illustrates that while ERP control can serve to streamline the operations of a company this can also decrease the resilience of the company to respond to changes. The advanced systems of EDI-supported supply chain management in ERP benefit a firm in interacting with suppliers with real-time information in order to reduce the impact of urgent orders. Yet the system did not work in the context of a Chinese factory, given that suppliers could not cooperate with the system without sufficient technology support. Due to this particular operating environment and the resistance of suppliers to join the new technical platform, the factory was not able to enjoy the full benefit of the ERP system. Also maintaining a safety stock was the only solution that could be used by the firm to solve the variability in orders but senior management exercised strict control of material management so that over-stock was not permitted. Due to this rigorous control and the subsequent misalignment between the ERP and company practices, the organisation experienced a drift away from managerial direction as the system did not synchronize with reality. Even worse, turbulent operations occurred because of inconsistent information in the system to support day-to-day activities. It is suggested that by incorporating social technology in an ERP might affect the management of business processes, making them less rigorously planned and more able to flexibly adapt to change. This could be achieved by using the knowledge of local experts, who have contextual knowledge about how operations can be organised in a subsidiary of a large company with multiple sites.

Company C

Company C implemented a customized ERP system to integrate production processes with financial-based models. It also has a type of ESS (a social communication system called 'collaboration') based on a website containing Bulletin Board System (BBS) discussion forums and blogs to support communications within the company via an intranet. Similar to company B, company C faces problems of unanticipated production tasks: for example if the firm has low quality goods, or loses or damages goods due to delivery because its goods are fragile. As a subsidiary of a large company, the firm also has to deal with frequent changes of orders from HQ. What is more, HQ requires the company to implement a "zero inventory" management approach, which means the firm cannot have any additional stock for production materials.

In terms of company C, ESS plays an important role in collaborative work as it enables work-relevant information to be shared among employees and for them to coordinate across functional groups. This allows a flexible response to unexpected production problems. It is suggested that this is because the communication network supported by the ESS is informal and consists of unplanned conversations and social and personal relationships between employees (Zhao and Rosson, 2009; Cross and Prusak, 2002). When the firm encounters production problems the ESS is able to collect the tacit and uncodified knowledge embedded within the minds of employees. Thus the ESS overcomes the limitation of the formal ERP which only focuses on the collection of formal knowledge (documented knowledge) in the system database.

Company D

Company D is a Chinese company founded in 1995, and is a leading specialised commercial mall operator in the east of China. It manages a tenant mix of furniture shopping centres, and its main service is to let out retail space to furniture retailers. An ERP system was in a pilot site, and was mainly used for tenancy management, including initiating and renewing tenancy contracts. However, it had problems in dealing with frequent changes in both tenants and the external market. First, the requests of tenants for retail space change frequently, such as the number, size and the location of the outlets. To fulfil these requests the firm needs to be flexible in adjusting the retail space. Secondly unpredictable changes in market conditions also lead to the adjustment of the shop layout in the firm. These events include changes in the preferences of shop customers, changes in government policy and the seasonal variability in demand for retail space.

It has been found that ERP systems often lack flexibility to deal with variability without the involvement of human practice (Boudreau and Robey, 2005). This perception was confirmed by our interview with company D. For example when tenants requested changes to

their rental space in the mall it was the Leasing Department employees who always adjusted the configuration of the space to satisfy these requests immediately. They would also use their knowledge of tenants to modify the terms of a tenancy contract in order to attract more valuable tenants to the mall whose products were popular in the local market. As a result, the store's revenue could be increased as the tenants' sales increase, and their products were able to fulfil the requests of the shoppers in the market.

Eventually, Head Office decided to implement ERP and an ESS in the form of office assistant (OA) software to improve the flexibility of the ERP system. The OA application is part of the corporate Intranet and supports interactions between experts/senior managers and employees, including sharing business reports, publishing business notices, document approval and a communication forum. On this platform reports such as documentation regarding tenancy contracts may be viewed. The OA system is mainly used to support system users and for expert groups to hold discussions on this platform.

Results and discussion

We now present a cross-case analysis which will put forward a definition of a hybrid ERP system and provide an assessment of the benefits and challenges of a hybrid ERP implementation.

Defining the elements of a hybrid ERP system

According to Slack and Lewis (2011) no technology operates continually and completely in isolation, without ever needing some degree of human intervention. Here, we mean that the information system (IS) involves interactions between technologies (e.g. ERP, enterprise social system) and employees. As Alter (2008) states an information system is a work system in which human beings or machines performing work using information, technology or other resources to produce specific products or services for specific customers. We define a hybrid system as being made up of organisational members, technologies (e.g. ERP, enterprise social system), work tasks undertaken by members, work processes, and human behaviours related to work with the technologies, as well as interactions between human beings. A hybrid system is thus a work system that is beyond simply a technical tool, but which highlights the context within which organisational members perform their assigned work. Therefore in order to distinguish a traditional ERP implementation from one that incorporates elements of an enterprise social system we use the term hybrid ERP. Rather than the limited offering of the first two generations of ERP, which emphasised power, speed and general physical abilities

(e.g. automation, integration), the hybrid system also includes the flexible, intuitive and analytical abilities of people. Slack and Lewis (2011) and Newell et al., (2003) support this point, namely, that it is necessary for ERP implementations to embrace human intelligence, so as to mitigate the inflexibility of the ERP system. Thus a hybrid ERP system is one the combines the formal system that is an ERP and the informal system that is the ESS.

Using this definition of a hybrid system the systems at both company C and company D can be considered examples of hybrid ERP systems. Company C, for example, uses a formal system that is an ERP and an informal system that is an ESS represented as an internal communication website, containing discussion forums and blogs. At company C low-level personnel use both of these to deal with production uncertainties, but they are indeed two discrete systems in the company. However we define the enterprise system at company C a hybrid system, since the company emphasises the need to develop an organisational environment to combine both systems. The environment is based on the idea that managers trust low-level employees to use their knowledge to solve unanticipated problems and motivate them to communicate with their peers to generate new ways of solving these problems.

By contrast company D implements a hybrid system that connects formal and informal systems via one integrated system platform. The formal system at company D is a service ERP that mainly supports lease management, while the informal system is an online expert help system called ‘OA’. These two systems are based on one central database. As illustrated in Figure 1 at company D the hybrid system contains a formal system with the core business processes and essential functional modules of a firm, and an enterprise social system that allows users to execute activities based on their tacit knowledge which can be called upon when the firm encounters unforeseen circumstances. To take the example of company D, the ESS allows frontline employees to work informally, based on their experience, although these transactions are not valid in the ERP unless they have been authorized by experts. The hybrid system makes data transparent and visible to everyone within the organisation, since the ERP and ESS are interconnected via one central database.

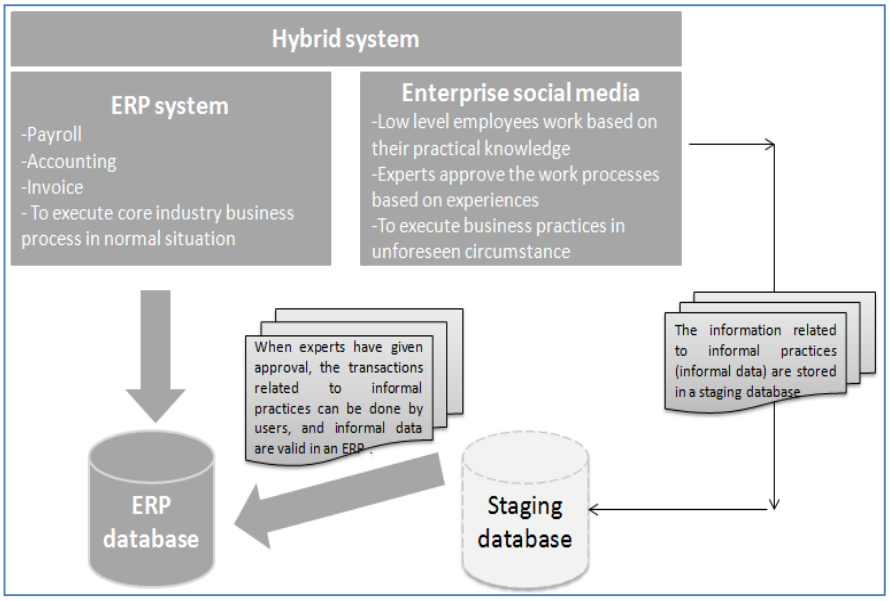

Figure 1 The Hybrid ERP system at company D

The benefits of adopting a hybrid ERP system

- *The hybrid ERP system supports process efficiency in conjunction with flexibility in response to changes in business requirements*

Our multiple case studies indicate that by adopting the hybrid system, a firm can achieve improved efficiency in process operation in conjunction with increased flexibility in meeting changes in business requirements. One comparison is between company A and company D which both having different degrees of informal activities related to frequent adjustments of their business practices in different situations. By implementing the hybrid system, company D can lease out stalls in the mall efficiently, and at the same time, the firm can flexibly react to different levels of demand by customising the property leasing services for different tenants. By contrast, company A operates rigidly in each field of an ERP, including sales, production and delivery. The structured sales price, fixed production and delivery plan and inaccurate forecast lead to inflexibility in how company A reacts to change. Thus practices such as changing sales price in different sales conditions, adjusting the delivery plan when mistakes occur in the system, and reducing production as soon as errors are found in the demand forecast are not undertaken promptly.

Furthermore a comparison can be made between firms with multiple locations in China such as company B and company C which both require efficiency in business transaction management and flexibility in production uncertainty management. They are both manufacturing plants and have to deal with a high volume of unforeseen production tasks.

Also the products of company C are fragile during delivery, so the firm needs to cope with potential emergencies as well. The need for informal processes comes as they both require a certain amount of local support to react to production uncertainties, as this support cannot come from a planned ERP system. A standard ERP system is promoted by each company's Head Office to streamline daily operations and to integrate performance across the plants in different locations. Company B implements local policies such as the use of safety stock to react to urgent tasks; however, the safety stocks are not formally recorded in the ERP system. Thus, operating with an ERP is difficult for the plant. However company C motivates all employees to be involved in providing solutions to production emergencies through an online communication website containing discussion forums and blogs for supporting interactions between employees. Thus it supports the gathering of employee knowledge across diverse fields and allows a certain amount of change in conjunction with the ERP system to solve production problems. For instance, to undertake additional production tasks, employees will work overtime, which means the production plans in the ERP needs to be adjusted in accordance with new working hours. After being approved by the general manager staff will adjust the ERP production plan as soon as any production emergencies occur. Hence, by using the informal system, a company can cope with uncertainties using the collective knowledge of employees across functions. Unlike company B, where implementation of local practices is not allowed, company C motivates shop-floor employees to participate in solving production problems through its informal system, and the firm allows the implementation of local practices in parallel with the formal practices in the ERP. As a result the hybrid ERP supports company C through operational efficiency in general conditions, while under production emergencies, the informal system provides support by implementing local practices to provide a flexible reaction to different situations. Thus a key benefit of the hybrid ERP system is that it can support efficiency in business process management and provide a flexible response to changes in business requirements.

- *The hybrid ERP system enables the continued use of informal processes that cannot be incorporated into the ERP system*

The practices of what people are engaged with and what people actually do are both important in an organisation. However, systems cannot represent all those practices and circumstances in detail (Suchman, 2007). Thus, a company needs informal activities related to the intelligence of humans to respond to different working situations. Examples of this are that the personnel of company A are required to solve delivery problems as soon as they recognise

mistakes in the system design, situated actions are important to respond to unpredictable orders/emergencies in both company B and company C and the customised service activities at company D are essential to sustain its differentiation strategy.

Unlike existing ERPs, which emphasise embedding the best practices‘ of an organisation, or aligning the changes in system configuration with the best practices in the organisation (Pollock et al., 2003; Wei et al., 2005), the hybrid system promotes the fact that there is no best practice for achieving all business tasks. Different situations require different practices. For instance, company D trusts people, rather than systems and motivates low-level employees to react to different situations (such as unpredictable demands or special customer requirements) with different services activities. Company C promotes the use of people's judgment in reacting to production emergencies, even if this means taking practices beyond its ERP system. Thus the informal system is still an essential platform that serves to enable more interactions between employees, and to foster a better empowering environment for achieving such freedom. For example, the collective intelligence of processing urgent production tasks is achieved via company C's informal communication system. At company D, knowledge-based and situation-oriented activities cannot be documented in an ERP, so the informal system at company D serves as a platform to motivate experts and senior managers from different fields of company D to contribute towards performing these activities properly. Although an ERP with standardised practices tends to replace a customer centre and a flexible factory with rigid bureaucracy (Teittinen et al., 2012), the freedom to perform business tasks can still be achieved through the informal system when implemented in parallel with the ERP. Furthermore, the prerequisite of implementing the hybrid system is under the guidance of managers. Firms (such as company C and company D) with the hybrid system containing both types of formal and informal activities can avoid misalignment between system performance and real-world activities. The misalignment derives from changes in formal practice in an ERP that lead to the loss of important information required to run the ERP properly (Sia and Soh, 2007). This is not because of making such changes, but rather due to the fact that there is no record of information related to changes in an ERP, and no formal guidance from managers. If informal activities are implemented under managerial guidance, a firm is able to follow the data related to these activities to avoid misalignment. For instance, company C's general manager approves changes in the ERP production plans before they are executed. Company D has developed an expert panel of eight individuals to work alongside the ERP in order to approve customer service actions. The panel may be assisted on some occasions by a senior manager based at headquarters. After being authorised, informal activities can be implemented, and the information related to the informal activities are transferred to the ERP central database. What is more, by adopting the hybrid system, company D does not face misalignment between formal practices and informal activities, but

rather benefits from the system by embracing real-world practices in the ERP. Senior managers at company D benefit from a complete understanding of the performances of formal and informal activities, and they trace the problems of poorly performing activities, so as to guide low-level employees in terms of how to perform an informal activity properly. Under the guidance of senior managers, both the formal and informal activities are performed via one integrated platform, and both activities are understandable and traceable. Thus the misalignment between system-based practices and practical activities are eliminated and the hybrid system benefits from embracing real-world practice in the system. Therefore, a hybrid system is based on an ERP with well-organised business procedures for general conditions, while staff are encouraged to respond to different situations with different actions. However, the prerequisite to implementing this successfully is to undertake informal activities under the guidance of managers.

- *The hybrid ERP system facilitates increased collaboration within the organisation*

Our definition of an hybrid ERP system provides both a physical connection (e.g. common system platform) between personnel across departmental systems (Lengnick-Hall et al., 2004) and an informal system that enables psychological connections between personnel with social ties (e.g. personal relationships, common interests) (McAfee, 2006; Bonabeau, 2009). Our research provides more detailed findings on the collaboration efforts of a hybrid system. Collaboration contains two facets that are coordination and cooperation (Gulati et al., 2012). Coordination is related to the mechanisms within an organisation and enatils how and when personnel must act, while cooperation is related to the organic part of an organisation to increase socialisation, rather than promoting high performance (Denise, 1999).

For example company B only uses an ERP to coordinate production activities, whereas the firm lacks the socialised norms that persuade low-level employees to work together when they confront urgent production issues. Company D, before implementing the ERP, only encouraged socialisation through its informal system so that low-level employees co-work based on their personal relationships. However although the goals of different subsidiaries are compatible, the informal systems led to different branches performing in quite different ways, resulting in a lack of cooperative practices. Therefore, organisational collaboration cannot be achieved either by solely an ERP system platform designed to align business activities and information flows, nor solely an informal system to tie people through social relationships.

However rather than pushing task-based connections at work for employees through an existing ERP system (Hald and Mouritsen, 2013), the hybrid system strengthens

collaboration by promoting working together with a common value creation (Camarinha-Matos et al., 2009). For instance, by using the informal system in parallel with an ERP system, company C is able to gather the knowledge of personnel from different fields to achieve a common goal, such as tackling an urgent production task. In addition, by using the hybrid system, an organisation promotes a participative working environment by which senior management encourages employees to work together, and develop social communities within the organisation. Social communities enhance social connectedness because of favour, trust and friendship on the network. Rather than promoting task-based connections, social connectedness enables individuals to break organisational boundaries, to communicate with people with whom they are familiar and to exchange knowledge with peers, thereby developing shared interests and purposes at work. Thus an additional benefit of a hybrid system is its ability to increase collaboration within an organisation since it provides opportunities for employees to interact with one another and enhance social relationships.

The challenge of adopting a hybrid ERP system

- *The hybrid ERP system may increase the costs and the workload of performing informal activities*

A challenge of using the hybrid system is that it can cause a heavy workload for performing informal activities in practice. The high cost of performing informal activities occurs because of the amount of time needed by staff involved in accommodating the varied needs of customers. There is also an increase in workload because of approval procedures for informal activities which can be quite long and complex and involve senior executives. For example to some extent the hybrid system increases the workload at company D, and a set of complicated reporting procedures in the system reduces frontline employees‘ enthusiasm for providing tailored services for tenants. It seems that an ERP that enables formal processes and control contradicts with an informal system that allows informality and highlights participation and empowerment (Schneckenberg, 2009; Lowe and Locke, 2008). Nonetheless, we did not find that employees at company D complained about the workload generated by the approval procedures but the potential remains for increased costs in both undertaking informal activities and providing managerial oversight of these activities.

- *The hybrid ERP system may limit the use of the full functionality of the ERP system*

One of the issues at company D was the limited exploration of the functionalities of the ERP system. This may be a problem because many firms wish to fully implement ERP because for example they intend to imitate best practices in the industry by embedding the system. An example is Industry ERP (IERP) - an explicated industry oriented and customised ERP that contains both best practices within a specific industry and customisation to meet the needs of an individual company (Wu et al., 2009). However the informal processes undertaken with the ESS highlight the social interactions that a firm is encouraging in order to gain value from employees. Thus at company D employees have little enthusiasm in using the extended capabilities of an ERP but would rather rely on their experience. The ERP of company D is more like a huge database for gathering data and producing useful reports to senior management, yet the more extensive functions have not been explored. Nevertheless, this problem does not arise at company C. Although company C uses an informal system to motivate employees to solve urgent production problems, the firm still relies on ERP to support day-to-day operations. Thus the firm clarifies the scope of implementing informal activities. It needs to do this because as a large multinational enterprise it requires a highly integrated ERP system to align its operational performance across its individual plants.

Conclusion

This study has explored ERP implementations at four Chinese companies. The case study methodology has provided insightful details into the nature of hybrid ERP systems and provided an assessment of their potential benefits and challenges. We define a hybrid system as being made up of organisational members, technologies (e.g. ERP, enterprise social system), work tasks undertaken by members, work processes, and human behaviours related to work with the technologies, as well as interactions between human beings. Thus a hybrid system is thus a work system that is beyond simply a technical tool, but which highlights the context within which organisational members perform their assigned work. However in terms of the technical elements of a hybrid system these are defined as an ERP system which contains formal practices to perform regular business tasks in conjunction with an enterprise social system (ESS) that maintains informal processes with a view to providing a flexible response to business uncertainties based on human intelligence. We go on discuss the benefits and challenges of a hybrid ERP implementation and find that a hybrid ERP system:

- is able to support efficiency in business process management and also provide a flexible response to changes in business requirements.

- allows for the continued use of informal processes that cannot be incorporated into the

ERP system. However it was seen that within the case study companies that to implement the hybrid ERP system successfully required that informal activities were undertaken under the guidance of managers.

- is able to increase collaboration within an organisation since it provides opportunities for employees to interact with others and enhance social relationships.

- presents a challenge in that it can cause a heavy workload for performing informal activities in practice. These costs can be generated both in undertaking informal activities and in the approval and guidance provided by senior managers to staff undertaking these processes.

- may prevent the full benefit from the functionality of the ERP system being realised. It was found that this problem could be mitigated by clarifying the scope of the implementation of informal activities.

In terms of the limitations of this qualitative research which might constrain the generalizability or validity of findings the research was conducted across four Chinese firms and so results might not be generalizable to other types of firms or firms in other countries. In this regard studies have indicated that country differences might influence aspects of ERP implementation and usage (Sheu et al., 2004) and performance (Ragowsky et al., 2000). Thus, there is an opportunity for replicating this study across different types of companies in different countries or regions.

In summary the primary research implication is that a hybrid ERP system, beyond its technical elements of a combination of ERP and ESS systems, is a work system that requires an assessment of the context within which organisational members perform their work. This study has found that the use of case studies can provide valuable insight into this wider perspective and further studies may seek to examine the performance of the hybrid ERP system in different types of organisations and different country settings as more companies move towards using ERP and ESS together.

For practitioners, our study indicates how ERP systems in conjunction with ESS can provide a flexible response to changing business requirements and increase collaboration within the organisation. Key lessons include the need to perform informal activities under the guidance of managers and provide clear boundaries for the implementation of informal activities.

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