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Towards a Deeper Understanding of IT-Enabled Transformation

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Abstract

The ability to successfully manage organizational transformation has become a competitive necessity for modern organizations. Information technology (IT) can help organizations to change and innovate, yet the presence of IT investment, by itself, is not a good predictor of transformation success. Why do some companies achieve successful transformation while others do not? Through the comparative analysis of five high transforming cases and five low transforming cases, supplemented by large-scale survey data, we identified some characteristics and transformational practices of companies that are more likely to engage in innovation and transformation with IT. The results indicate that successful 'transformers' tend to achieve additional value from IT beyond productivity improvement, and this ability depends on the organizations' innovative culture, leadership, structure, and investment strategy as well as the implementation of transformational and learning practices. The paper suggests how organizations can improve their ability to transform with IT.

Keywords

IT enabled transformation, innovation, transformational practices, value from information technology

INTRODUCTION

A number of studies have found evidence of a positive relationship between IT investments and firms' productivity levels and show that IT is associated with substantial increases in output and productivity (Black et al. 2001; Dedrick et al. 2003; Hitt et al. 1996; Lichtenberg 1995). However, when organizations implement new IT, significant transformations in the ways of work, in organizational business processes, and in organizational performance outcomes do not always occur without careful managerial practices (Markus 2004). Seventy five percent of organizational change efforts involving IT fail (Majchrzak 1991). Firm-level econometric studies have highlighted that the variations in observable IT productivity among different organizations can be explained by the differences in the ability of organizations to implement complementary changes (Brynjolfsson et al. 2000; Dedrick et al. 2003).

The motivation for this paper arose from the findings that organizations differ in terms of their ability and their willingness to transform. According to Brynfolfsson and Hitt (2000), organizational transformation is not caused only by IT; rather, it seem to be triggered by organizational characteristics and conditions. Large scale statistical studies suggest important interactions between complementary asset investments and understanding IT investments payoff (Black et al. 2001; Brynjolfsson et al. 2000; Davern et al. 2000; Dedrick et al. 2003; Sherer et al. 2003). A review of research at the firm level presented in Dedrick et al. (2003) provides strong evidence that investments in complementary inputs and organizational capital through management practices have a major impact on achieving value from IT investments; furthermore, the study indicates that firms that implement IT without any transformational efforts can incur significant productivity losses.

Although such statistical evidence supports the need for complementary investment in organizational capital, the *value from IT* literature in information system research has not devoted much attention to the issue. Melville et al (2004) mention complementary investment and changes but do not say much about what these complementarities are. In economic studies, organizational transformation is described as referring to a state of having new or improved business processes, new skills and new organizational structures (Brynjolfsson et al. 2000). Dedrick et al.(2003), Hughes and Morton (2006) and Sherer et al.(2003) called for further analysis of the relevant transformational efforts in organizations and the managerial practices that produce the patterns of failure and success. The incomplete state of knowledge of the mechanisms by which particular firms are more likely to achieve innovative organizational transformation from IT provides the motivation for the current research, which began with the following questions:

What is the nature of IT-enabled organizational transformation?
RQ1: What conditions *in organizations are associated with IT enabled transformation?*
RQ2: What practices are implicated in IT-enabled transformation?
RQ3: What are outcomes of IT-enabled transformation?

In this paper, we investigate the internal conditions and management practices that can either help or hinder IT-enabled transformation processes, and identify key strategies to deal with the achievement of optimal value from IT. The aim of this paper is to elucidate the lessons learned from a comparison of 'successful transforming firms' and 'unsuccessful transforming firms'.

NATURE OF IT ENABLED ORGANIZATIONAL TRANSFORMATION

In a continuously changing competitive environment, organizations are becoming more interested in new ways of doing business. Organizational transformation can be valuable to an organization as it provides increased capacity and capabilities for future business benefits (NOIE, 2003). However, implementation of IT for transforming organization is challenging because it requires appropriate managerial innovation in organizational business process, work practices, job roles and structures (Constantinides et al. 2006; Volkoff et al. 2007). The literature on IT enabled organizational transformation has developed different views of how IT enabled change occurs and how change can be managed in today's world. These perspectives have different understandings of how causes are related to outcomes and how outcomes occur over time.

Recent studies in organizational transformation focus on processual aspects of IT enabled transformation. The value of this perspective in understanding the complex unfolding nature of IT enabled change is promoted in recent organizational science literature (Pettigrew et al. 2001; Poole et al. 2004) and by IS scholars (Schultze et al. 2004). The organizational science scholars have argued that a better understanding of the change process and a better planning implementation of change would enable more successful transformation to occur (Cummings et al. 2005). Moreover, there has been a growing interest in the role of organizational innovativeness and organizational adaptiveness and their interaction with IT (Constantinides et al. 2006; Piotti et al. 2006). However, there is room for further work on the nature of the transformation with IT that enables value to be realized at the firm level.

TOWARD A DEEPER UNDERSTANDING OF IT ENABLED TRANSFORMATION

For this study, we developed a high-level framework as an initial guide for understanding IT enabled transformation (see Figure 1). This research framework suggests that relevant phenomena are connected in a continuous cycle of learning and change. For example, specific organizational characteristics have an impact on transformational practices and outcomes over time. Further, transformational practices such as the redesign of processes, developing new business plans, expanding learning capabilities can directly influence both organizational characteristics and outcomes. Finally, successful transformational outcomes such as increased market share or significant new business can increase confidence and foster an innovative culture, thus changing existing organizational characteristics and practices. All elements contributing to IT-enabled transformation evolve over time through learning and direct experience with innovation.

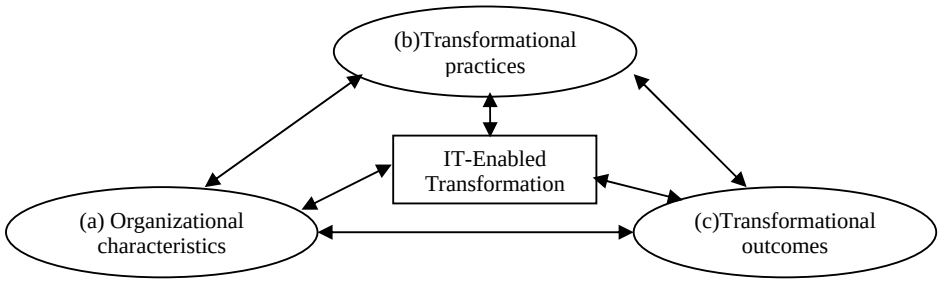

Figure1. Initial research framework for IT enabled transformation

To our knowledge, no previous studies have addressed the complete process of IT enabled transformation systematically. We elaborate on each element of Figure 1 in the following subsections.

Organizational Characteristics: What are firms like?

In the IS literature, scant work concerns the firm's characteristics that shape its power to achieve transformation with IT. However, it has been suggested that transforming organizations tend to have the capacity to find new

innovative process and absorb innovation into their work practices, structure, culture and change processes (Sherer et al. 2003). In Miles and Snow's (1978) typology of strategic types, prospectors' characteristics seem to be matched with the firms that are more likely to achieve organizational transformation with IT. According to Miles and Snow, organizations involved in prospector strategic activities tend to be the leading innovators in the development of new products, continually searching for market opportunities and thus, they often are the creators of change (Miles et al. 1978). Such organizations tend to deploy effectively their IT and have more capabilities in finding new ideas, and are more open to taking risks (Croteau et al. 2001).

IT payoff has also been associated with the emergence of more flexible organizational arrangements, such as virtual structures and decentralised structures (Dedrick et al. 2003). The flexible structures characterised by decentralisation and shared decision making are more suitable for organizations with changing environment (Bresnahan et al. 2000; Brynjolfsson et al. 2000). The traditional hierarchical structure appears not well suited to learning and transforming organizations, as these organizations need to develop know-how and expertise at all organizational levels, usually through sharing of knowledge across functional divisions (NOIE, 2003).

Organizational culture is also commonly viewed by organizational science researchers as a moderating factor in accepting and adopting IT (Abul et al. 2004; Fey et al. 2003). The establishment of a culture of innovation that is more open, flexible, coordinative and encourages learning is a necessary condition for the success of IT-enabled transformation because it affects everyday activities at all levels of change processes.

Finally, IT-enabled transformation is difficult to achieve without positive sponsorship from senior management because it requires careful and significant transformational efforts (Sherer et al. 2003). It has been argued the vision and leadership abilities of the top manager leading the transformation efforts can dramatically change the worldview of the entire organization (Dedrick et al. 2003). The quality of leadership and its awareness of IT are also important, as these characteristics enhance the contribution of IT investment (Weill 1992).

Transformational practices: What practices do successful transforming organizations engage in?

The outcomes in successful transforming organizations are realized through their transformational efforts, rather than from their investment in IT alone. The organizational change literature suggests that effective communications to manage the change process and change management strategies that overcome resistance to change, led to the smooth implementation of IT that contributed to the IT investment payoff. Castle et al. (2001) proposed that change management is the process of overcoming resistance to the change—whether that be a change in process, structure, technology, management practices or culture. As resistance to change is a normal behaviour, transforming organizations must implement appropriate management practices to enable the required changes; such as, strong management support, clear expectations, user involvement, and internal education processes to raise skill levels (Sherer et al. 2003).

While the evidence in the organizational change literature shows the value of management practices, the IS literature provides a very limited number of studies identifying managerial practices that facilitate IT-enabled transformation. Markus (2004) proposed techno-change management practices to ensure adequate resources to assist in accomplishing organizational change with IT (e.g., changes in business process and workflow, new job designs, new skills training, restructuring business units, changing HR policies, reallocated resources and new incentives). However, these ideas have not been subjected to empirical testing. The Australian Government's National Office of the Information Economy (NOIE) studied 18 IT project in Australia that had optimised their IT investment and proposed a number of practices that can be sources of transformation improvement, namely: changes in the business model, development of innovative work culture, improved skill levels and (NOIE, 2003).

Although these work practices have the potential to facilitate IT-enabled organizational transformation, they are not likely to result in successful transformation unless they are combined with workable technology; i.e., if the underpinning transformation processes are coupled with poor or inflexible technology, the outcomes are likely to be disappointing. Flexible technology features that allows individuals to adapt and improvise the technology as part of ongoing development are critical in IT enabled transformation (Wagner et al. 2006). In this regard, customisable features, the ability to create new applications and the ability to use the technology in different ways are important attributes of adaptive technology (Orlikowski et al. 1997). Thus, good organizational practices require the adoption of appropriate technology to enable positive transformational outcomes.

Transformational outcomes: What are outcomes?

The outcomes of IT-enabled transformation are not just a matter of increased productivity or efficiency. They are more related with new ways of doing business and achieving organizational learning that feeds back to further changes to practices and future application of IT. Mirani and Lederer (1998) distinguished between using IT to reduce operating costs (transactional), providing better information (informational) and creating competitive advantage (strategic). An additional transformational aspect of IT value was identified by Gregor et al. (2006). Transformational outcomes have the potential to enable further significant productivity

improvements and to allow organizations to increase output quality, along with offering new products and markets and improved customer service.

The outcomes of organizational transformation with IT include forms of tangible value like cost savings, but also intangible value such as increased flexibility and quality improvement (Melville et al. 2004), which are more difficult to capture and analyse. The difficulty in assessing the outcomes arises from the fact that organizational changes occur over time and that it can take time for users to learn to use an innovation to its full potential (Peffers et al. 1996). Value from IT investment also needs a time to be fully realised as firms engage in on-going learning processes to apply IT capital more productively and innovatively and to develop new organizational structure and culture that suit their new ways of operating. (Brynjolfsson et al. 2000; Dedrick et al. 2003; Melville et al. 2004).

METHOD

This study follows a multi-method approach, using qualitative and quantitative data to increase the validity of it results and conclusions (Fernández et al. 2006; Gable 1994). First, we conducted a survey with 705 Australian organizations of varying sizes across a number of industries to gather top management's perceptions of (a) IT business value, (b) transformational management practices and (c) IT investment strategies. Second, the survey was analysed and followed with structured interviews of 50 of the organizations that participated in the survey, covering a wide range of firms and industries. The interview questions focused on how companies transformed as they implemented IT solutions and which particular management practices they performed. Third, 10 cases were selected from the 50 interviewed organizations. This purposeful sampling selected the five top-ranked cases and the five lowest-ranked cases in terms of responses to the large-scale survey questions that asked about transformational-type activities. The remainder of this study focuses on these 10 cases.

DATA ANALSYSIS

The unit of analysis was the respondent's perception of the organization's experience with IT over the previous 18 months. Interview data were analysed using coding techniques borrowed from the grounded theory method to facilitate the emergence of patterns from the empirical data (Glaser et al. 1967).[1] The objective of this analysis was to give a fuller understanding of the significant constructs that had emerged; we needed to identify, classify and compare practices and the attributes related to those practices and to that end we used *open coding*, *sorting* and *constant comparison* techniques. Tables 1 and 2 give an overview the 10 organizations studied.

Table1. Summary of the five top transforming cases.

	A	**B**	**C**	**D**	**E**
Type of business	Manufacturer of medical products	E-automotive service	Wholesale outlets engineering tools	Timber furniture manufacturing	Medical product Manufacturer
Industry	Health / community service	Communication Service	Retail Trade	Manufacturing	Health / community service
Org size	Large	Medium	Medium	Medium	Medium
Interviewee	Supply chain director	CEO	Office administrator	Managing director	IT manger
IT business value	8.07(High)	7.75(High)	7.89(High)	8.18(High)	9.32(High)
Level of transform -ational mgt *	4	4.33	4.67	4	4.33
IT project	Enterprise Resource system	Telematics Services Hub	Inventory mgt system	Inventory/ invoice system	IPAQ (personal PDA system)

* Scale that measure level of transformational management practices from 1(low) to 5(high)

Table 3 gives some summary data for the 10 cases taken from the large-scale survey. The IT business value refer to multiple dimensions of intermediate IT benefits, including strategic, informational, transactional and transformational benefits (Gregor et al., 2006). The questions about IT investment strategies were drawn from Miles and Snow's (1978) typology of strategies associated with the organizational types of "prospectors", "analysers", "defender" and reactors", modified to related to IT investment strategy. We did not attempt to

[1] While we borrowed analysis techniques from the grounded theory methodology, we do not claim this to be a grounded theory study, as we did not follow a theoretical sampling strategy.

classify organizations as one of the four archetypes, but rather realised that a single organization was likely to engage in more than one IT investment strategy type over a period of time, and possibly in combination at the same time.

Table 2. Summary of the five low transforming cases.

	F	G	H	I	J
Type of business	Gas install specialist	Motor sport organization	Mushroom farm	Hotel	Pilot training
Industry	Construction	Cultural service	Agriculture, Forestry	Accommodation, and Restaurants	Education
Org size	Medium	Medium	Medium	Medium	Medium
Interviewee	General Manager	IS manager	Admin Manager	General Manager	IT manager
IT business value	6.28(Med-Low)	5.57(Low)	6.11(Med-Low)	4.42(Low)	5.76(med-low)
Level of transfor -mational mgt.	3	3	2.33	2.33	2
IT project	Online invoice & supply chain mgt	Licence processing system	Performance monitoring bonus system	Hotel management system	Intranet

Table3. Survey response data for case studies

	Five low transforming cases	Five top transforming cases
Level of transformational management	2.533(low)	4.267(high)
IT Business Value	5.628(low)	8.244(high)
Level of strategic management	2.467(low-med)	4.267(high)
Level of prospectors type IT investment strategy	0.766(med)	0.842(high)
Note: Means scores are given .“High” means the case was in the top quartile for that variable, “medium” means it was in the middle 50%, and “low” means it was in the bottom quartile. Overall average IT business value was 6.62 based on a 10 point scale (n=705).		

DISCUSSION

An aim of this study was to identify enabling conditions and practices that led to successful transformation with IT. In this section, we analyse the commonalities and differences among the various conditions and practices found in high transforming cases compared with low transforming cases.

Organizational characteristics comparison

To answer the first research question, we extracted descriptions relating to the organizations as a whole and compared the low transforming cases (LTC) with high transforming cases (HTC). Table 4 summarises the results,

Organisational Culture

The interviews showed that the high transforming organizations tended to describe their cultures as ‘open’, ‘vibrant’ and ‘changing’ more than did other organizations. Furthermore, participants from HTC tended to use words like “innovative”, “flexible”, “learning” and “leading” to describe their culture more than did others. Overall, HTC tended to have positive attitudes toward change and were more interested in doing and learning something new.

Case A is good example of a learning culture in action. To increase acceptance of change, they initially modified new software to function the way they had always done their business, rather than changing their business processes to match with those of the software. The manager recognised *ex-post* that in doing so they missed an opportunity to streamline processes leading to significant productivity increases. The manager stated that they learnt a lot from this experience and that the lessons learned would facilitate future transforming efforts. Thus, the “big mistakes” made during change processes were positively accepted as important learning for future development. Learning from mistakes and not being afraid to experiment was part of their culture.

The type of organizational culture that can be source of transforming power also tended to be related to innovative thinking and flexibility. For example, in case B, after the firm provided employees more flexibility in doing business, the company experienced a significant performance growth enabled by workflow redesign.

Organisational Structure

We observed that some organizations benefited from improved information flows and knowledge sharing so that they were able to make more timely decisions. Both the technology deployed and their organizational structure reduced delays due to inefficient decision-making processes. A decentralised power structure and distributed responsibility throughout the organization was found to be effective for transforming organizations.

Other Conditions

Evidence from case A revealed that a high level of understanding of what IT could do for the company across the organization helped to reduce reluctance to changes amongst employees. In contrast, in Case G, a lack of understanding of the potential of IT for business processes resulted in achieving very limited business IT value.

In Case G, there was evidence of time overruns and lack of resources, sometimes serious, and often as a result of inadequate dedicated project management and lack of support from management. In contrast, Case A had a project manager who had an IT background. He was able to effectively coordinate and motivate resources that resulted in real success. HTC tended to have a manager who was *IT aware* and had the necessary expertise or ability to recognise and manage opportunities emerging from new IT capabilities. Such managers provided the necessary leadership and support to transform their companies. The literature supports this finding: ongoing support from management in the form of sufficient resources and transformational leadership is critical for change processes (Orlikowski et al. 1997; Watts 2001).

Table 4. Organizational characteristics comparison

	Five low transforming cases	**Five high transforming cases**
Organizational culture	**Enabling conditions**: • Family type of culture • Open culture **Inhibiting conditions:** • Performance oriented culture • Frustrated culture (no career path, no promotion, no motivation) • Resistance to change	**Enabling conditions:** • 'Open' to change • 'changing' and 'Vibrant' culture • Learning culture • Flexible culture • Open door leadership • Coordinative culture **Inhibiting conditions:** • Resistance to change
Organizational structure	**Enabling conditions:** • Decentralised decision making **Inhibiting conditions:** • Centralised structure • Hierarchical structure • Ad hocracy structure	**Enabling conditions:** • Decentralised decision making • Cross-functional teams • Flat structure **Inhibiting conditions:** N/A
Other conditions	**Enabling conditions:** • Willing to change • Previous implementation experiences • Detailed checklist from contractors • Appropriate software package **Inhibiting Conditions;** • Lack of IT awareness and knowledge • Fear of competitive environment • No leadership, support from management • Changes in management structure • Lack of resources • Job dissatisfaction/work presser • No user involvement and commitment • No communication and trust	**Enabling conditions:** • Shared IT understanding • Support from mgt steering team and senior management • IT awareness from leadership • Flexibility of IT itself • Enough resource • Willingness to change **Inhibiting conditions:** N/A

Transformational practices comparison

The outcomes in most HTC were realized through innovative transformational practices, rather than from the investment in IT alone. To answer the second research question, the main management practices that appeared to be sources for IT enabled transformation were identified (see Table 5).

A differentiating feature of the technology in the two groups was the degree of flexible and adaptiveness that allowed individuals to adapt and improvise with the technology as part of ongoing change. For example, in case C, their inventory system had the ability to continue to expand with a changing business — in this case, change was perceived as a continuous process, demanding flexible IT and ongoing development.

Most HTC tended to have a greater emphasis on individual decision making and also on training programs to raise skill levels. All five HTC focused on upgrading IT skill levels using various training programs.

The case study organizations often commented on the need to ensure that effective control of IT project implementation was retained within their organizations. Their main concern was to keep project control within the organization; stating that while vendors need to be assigned specific tasks, the overall control of IT projects should not reside with contractors or vendors. Rather, outsourcing clients need to have a nominated point of responsibility and overall control resides within the firm. Case B shows the earlier appointment of a dedicated project management team within the company to manage the overall processes of the project this decision resulted in an earlier flow of benefits in terms of productivity and successful transformation. The insourcing of project management also facilitated dealing efficiently and effectively with aspects of the project requiring detailed knowledge of the firm's operation.

Table 5.Transformational practices comparison

	Five low transforming cases	**Five high transforming cases**
IT in use	• Unconnected individual systems • No continuous upgrade for the system	• Flexible nature of technology itself • Integrated IT into business processes • Continuously upgrading the system
Transformational management practices	• Outsourced training to increase IT skills • Using commercial software • Pre-preparations to increase staff involvement	• Internal project management • Integrate business process to new IT • Upgrading IT skill level, internal training • Steering team for change management • Staff reward system • Virtual team for knowledge sharing • Pre implementation review • Continuously seeking opportunities • Comprehensive review of work processes • Substantial user participation at various implementing stages

Transforming cases tended to have new communication mechanisms. Case A organization developed a huge knowledge transfer network of people in country branches to obtain knowledge and share information relevant to change efforts, which led to significant gains in expertise. The virtual network team was able to compensate for limited resources and cover multiple implementations.

Prior research shows that successful IT-enabled changes occurs when the importance of overcoming resistance to change is recognized (Sherer et al. 2003). Although the HTC encountered significant organizational resistance to change, they invested more in organizational capital such as training initiatives and deployed management steering teams to reduce resistance. For example, Case A used in-depth training to make employees familiar with new software programs. They also had a steering team formed with key function owners and business process owners, empowered to drive change and to make decisions. They learned that it is very important to have competent people who are able to make decisions and changes to the actual processes during the transforming effort, which helped to increase support and reduce resistance to change.

Outcomes comparison

Most cases initially deployed IT to directly assist them in improving productivity and to handle expected workload growth. The major difference among the two studied groups was that the HTC achieved additional non-productivity benefits that were emergent and unexpected, rather than planned beforehand, in the form of intangible assets such as improved internal communication, improved level of confidence, improved skill levels and extra flexibility. For example, in Case B, the internet based "Telematics Services Hub" changed the way of

doing business and changed the relationship with customers. Similarly, the new inventory system in Case C enabled the organization do business interactively with customers. In Case D, the new inventory system not only changed the capacity to produce more products but also changed the way management made decisions about overall production processes. Such transformational outcomes equip the firm with increased capabilities to succeed in future change efforts, and these can be referred to as organizational transformation (see also NOIE, 2003).

Most of the HTC considered IT to be a means of achieving goals beyond productivity. They recognised the possibilities of achieving transformational benefits such as extended range of service and market, capacity for future development, improved service quality, increased capability skill level and improved communication as well as increased efficiency and effectiveness. IT has the power to increase a firm's performance but it also has power to transform the opportunities and challenges facing established manufacturing and service firms. In case of organization D, the firm was able to extend their service delivery into other states (NSW, VIC) beyond its original market (Qld) as a result of the IT investment.

Table 6 Outcomes comparison

	Low five transforming cases	**Top five transforming cases**
Organisational changes from IT	• Increased efficiency • Reduced cycle time • Reduced administration costs • Increased customer satisfaction • Increased profit	• Work process re-engineering • Improved confidence in doing business • New management structure • Improved communications • Increased capacity to continue to develop • Increased efficiency(process improvement) • Increased product quality/new product • Better relationship with customer • New market development • Provided firm's extra flexibility • Increased level of skill • Improved team working • New decision making process • Increased knowledge capital • Enhanced innovative culture • Readiness to seek further innovation with IT

CONCLUSION

The cases studied suggest that there is a range of potential sources of benefits to organizations resulting from successful transformation with IT, subject to the organizations themselves establishing the basic preconditions and then implementing the technology in ways that best capture transformational benefits. The central lesson is that successful IT-enabled change should be accompanied by continuous managerial innovation in business processes, skills and organizational structure and culture.

To summarize, in response to the first research question, we found that it is important to create a set of organizational conditions that can leverage IT to bring about innovation and transformation in the organization:

- Adopt a decentralised decision making structure
- Adopt prospector's strategies in IT investment decisions
- Establish a culture of innovation that is open, flexible and tolerant and encourages learning
- Increase shared IT understanding
- Strong leadership (support from senior management, support enough resource)
- Ensure that new IT is flexible in nature

Due to the growing complexity and unpredictability of the environment and ongoing nature of change processes (Brown et al. 1997), we acknowledge the difficulties in predicting all of the factors that could impact on the transforming process. However, in response to the second research question, we were able to identify the following set of innovative and transformational practices behind successful transformation:

- Redesign of business processes and workflow
- Training programs to increase skill level
- Internal project management program

- Regular pre implementation reviews
- Substantial user participation at various implementation stages
- Learning through mistakes
- Taking advantage of unanticipated opportunities

A firm with a combination of these sound learning practices and conditions will be able to achieve a more successful transformation and to continuously innovate to remain ahead of its competition. More importantly a better understanding of the role of organizational learning should be deeply embedded in the midst of technological changes to ensure that the organization survives over the long term with continually changing environment. Our study suggests that substantial organizational learning must occur before the benefits of organizational transformation with IT can be fully realised. Most organizations in our case study recognised that they did not know *ex-ante* all of the issues associated with implementation of IT. However, they learnt how to adapt and achieve value from IT throughout the whole transforming processes. The positive outcomes of IT-enabled transformation occur as a result of people learning better how to use technology, improvise processes, and capture transformational benefits during change processes.

The study has theoretical significance in that it is an initial step towards the development of a mid-range theory of enabling conditions and work practices for 'successful' organizational transformation with IT, an area in which such theory is lacking. There are practical implications, as the comparative analysis of HTC and LTC provides useful information for managers in understanding the appropriate conditions, transformational practices and outcomes of IT enabled transformation.

It is clear that companies who have experienced fundamental transformation from new IT implementation have done so by heavy investment in a wide range of complementary assets in a dynamic and balanced ways that recognises their essential complementarities. Although other companies can copy a technology, they cannot copy successful firm's unique blend of complementary assets such as embedded know-how, work process innovation, unique culture and transformational practices. The unique ability to manage the dynamic interplay among complementary assets will continue to separate successful from unsuccessful competitors.

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