QUALITATIVE STUDY ON COMPLEMENTARY RESOURCE INTEGRATION: A CASE OF ERP IMPLEMENTATION

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Abstract

Digital transformation of firms needs to be brought in harmony with the pace at which technology is disrupting the industry. The initiative for technology adoption can better be taken with a commitment to develop the capability of reshaping the organizational resources. This competency is likely to influence successful conversion of such innovative technologies (InT) into business value. In developing countries, Enterprise Resource Planning (ERP) adoption is on rise; organizations are confronting technological, cultural and social factors which affect their capacity to succeed or fail in ERP adoption. The said factors are likely to influence organizational capability of integrating their resources into complementary relationships. To understand this, present study reports a qualitatively investigation of the cascading effect of these contextual factors which impacts the effectiveness of ERP implementation (hereafter ERPi) across its life cycle in two service organizations from private sector of Pakistan. Researchers took a grounded theory approach following critical realist paradigm to perform this study and found that resources, if integrated in complementary relationships, interact as a transformative measure and facilitate the intermediary outcomes to function as a part of the value chain of technology adoption. The explored CSFs were found influencing some important intermediary outcomes – functional alignment of ERP with business processes, users' motivation to use ERP - which can reduce technical, analytical and operational risk factors at ERP post implementation stage.

Keywords: Key words: ERP life cycle; cascading effect, resources, complementary, interactive, intermediary outcomes

1. INTRODUCTION

Organizations in developing countries are under coercive and normative pressures to adopt ERP in view of current advances in ICT and the prospects of enhanced 'information processing capacity'. Digital transformation of firms needs to be brought in harmony with the pace at which technology is disrupting the industry. The initiative for technology adoption can better be taken as a commitment to develop the capability of reshaping the organizational resources (Helfat, Mitchell, Peteraf, H. Singh, & S. Winter, 2016). In developing countries, Enterprise Resource Planning (ERP) adoption is on rise; organizations are confronting technological, cultural and social factors which affect their capacity to succeed or fail in ERP adoption.

The firms in Pakistan are under coercive and normative pressures to adopt ERP in view of current advances

in ICT and prospects of enhanced information processing capacity development. This study has extended the knowledge on cascading effect of complementary resource integration and capability development required to control the failure risks during and after the implementation. It demonstrated that "firms' choices about capability investments shape competitive 'outcomes' (Pisano, n.d.) and extend their capacity beyond adaptation to transformation in the respective context. The better the choices of the firms about capability building and expertise at it, the more differential performance they would show at leveraging innovative and complex (ICT) technologies like ERP. This paper may assist the management of public and private sector organizations of Pakistan who have initiated ERPi and those who tend to adopt it in near future. It would also provide useful information to vendors about their current practices and their influence on clients' adoption of ERP.

Theoretically, this study underpinned the interconnection among social capital theory, contingency theory, resource based view, change management, theory of reasoned action and attribution theory. This study may serve as a groundwork on which further empirical studies can be conducted.

2. LITERATURE REVIEW

Enterprise Resource Planning (ERP) is evolved from traditional manufacturing resource planning (MRP) systems (Al-Mashari, Al-Mudimigh, & Zairi, 2003). This software is being adopted in view of its capability to integrate all business information management processes (Ranjan, Jha, & Pal, 2016) and facilitate strategic decision making on the basis of data encompassing core business processes. Being highly "socio-technical" and "technical" factors dependent, the implementation of ERP is an exigent task (Shah et al., 2011). Besides, ERPi management is knowledge intensive in nature which further adds to this complexity. In the early period of 1990s this complexity led to plentiful publications on different phases of life cycle of ERPi (e.g.,Tarhini, Ammar, Tarhini, & Masa'deh, 2015).

ERP system adoption being complex in nature entails sweeping 'cultural, human and organizational changes' as well as customization cost or reengineering business processes for standardized applications. It calls for a cautious ERPi planning and execution (Ranjan et al., 2016).

IT capabilities are 'routines' which are context specific (Wang, Liang, Zhong, Xue, & Xiao, 2012). The development of these routines is process dependent which ultimately converts these routines into capabilities and enhances firm's adaptability to technological change (Aggarwal, Posen, & Workiewicz, 2016b). They are evident from the application of knowledge and expertise of IT and management people, its mutual integration with other participants, and their relations with them (Peppard & Ward, 2004). It indicates the presence of inherent element of learning which takes place during the process of capability building and combine existing IT resources into distinctive IT capabilities (Montealegre, 2002). It is assumed that this process is consistent with value chain perspective (Porter, 1985 in Hallahan, Holtzhausen, van Ruler, Verčič, & Sriramesh, 2007) where organizations carefully plan such initiative of innovative technology adoption and execute activities in such a way that create value for its internal customers (users) and thereon for improved performance. Hence, it is viable to qualitatively evaluate the resource integration practices of the selected organizations, nature of interactions of these resources, the emerging routines and resultant capabilities and the effect of these capabilities on ERP implementation and post implementation phases. The conceptual underpinning of resources orchestration and capabilities has been used for interpreting the data collected to articulate how the selection of choices of resource picking and capability building can affect ERPi lifecycle.

3. METHODOLOGY

The phenomena explored in this research focuses on employees' perceptions about social, technical and organizational factors influencing ERP implementation in their workplace. Following an Interpretive research paradigm, semi-structured focus groups were used to explore the employee's interpretation of their observation and experience of ERP system. Focus group method of data collection was employed in order to extract the detailed information about the phenomenon understudy.

This research has been conducted with a series of six focus groups in two randomly selected higher education institutes . Two different organizations were selected in order to get generalized interpretation of participants' perceptions about ERP system implementation. Focus groups were comprised of participants belonging to different departments with different field of expertise. The case-wise composition of focus group participants is mentioned in following section.

4. RESULTS AND DISCUSSION

Groups	Coding	Justifications and Association emerged Showing Consensus	Pattern emerged (Performance Indicators)
A	Shared Vision Project Management Quality Training	**Unaware** about the rationale and objectives behind ERP implementation. Project was **managed** improperly by mangers. Top management didn't **involve** exhaustive users in project development phase. Project managers didn't deliver **quality trainings**.	The objectives of ERP implementation were not communicated effectively. Project was not managed properly by concerned authorities User involvement was not sufficient to affect the quality of ERP implementation process across its life cycle Internal and external trainers failed to transfer technical knowledge of the system effectively
B	Shared Vision Project Management Quality Training	**No understanding** about the **purpose** and implications behind ERP implementation which affected **staff motivation to adopt ERP** for better performance. Management issues by the ERP team. **Ineffective training** sessions. Ineffective **monitoring** of the training sessions	Poor communication about the purpose of ERP adoption negatively affected user motivation. Project team members were unable to manage the project successfully Trainer could not build technical expertise of users Iterative evaluation were not conducted
C	Shared vision	Batch advisors (faculty members) **did not understand** what they were **getting into** and what would be the **advantages** of new system.	ERP users' training was not effective User involvement in decision making was not sufficient in decision making The advantage of new system were not clear

Table1: Organizational Factors

Group	Coding	Justifications and Association emerged Showing Consensus	Pattern emerged (Performance Indicators)
A	System Quality Employee persistence	System **lacks robustness**. Customization issues. **Time delays** due to **long processing** of routine tasks. System generated **reports are not reliable**. However technical **issues improving gradually.**	System Quality was not satisfactory Task could not be performed efficiently Continuous improvement facilitated gradual switching to new system due to management support
B	Functional alignment	Flaws in reports of routine tasks. Ineffective error prevention mechanism.	System quality was not satisfactory. Operational alignment of system with routine tasks was not satisfactory

C	Time effectiveness User dissatisfaction	**Time consuming** processing. Customers have to process online query/request twice for a single issue. **Unnecessary burden** on users.	Customers were not provided an efficient service The system was complex to use and resulted in techno-stress for advisors

Table2: Technical Factors

	Coding	Justifications and Association emerged Showing Consensus	Pattern emerged (Performance Indicators)
A	Employees' technical knowledge Complex system/ user resistance	Staff is qualified enough to understand the system dynamics, however **lack of training** created **issues**. They showed **resistance in using the system** as the system was not user friendly initially and they were **used to working in old system** efficiently and easily.	Trainers were unable to transfer technical knowledge effectively The early perceptions about ERP usage were negative due to initial problems faced by users and temporarily affected their motivation to use ERP
B	System complexity	Staff showed lack of interest due to general perceptions about the faulty functionality of system	Early ERP usage experience affected user motivation
C	System complexity / inadequate training	Middle level users **lost their interest** in using system **due to system complexities** and **lack** of adequate **training.**However, they are **highly qualified to learn** such systems easily if **guided properly**.	Perception about ERP usage complexities was aggravated by the low quality of training. This perception undermined expected influence of users' technical efficacy

Table 3 : Individual Factors

Groups	Codes	Justifications and Association emerged Showing Consensus	Pattern emerged (Performance Indicators)
A	Conflict of opinion	**Conflict among departments** observed. Some were pro system and others were highly against. **Bad word of mouth** compelled users to **think negatively** about the **system capabilities**.	Conflict among the departments of the deploying institution about the adoption of ERP affected ERP implementation decisions Senior management has conflict among them about the usefulness of ERP; it negatively impacted users perception about the capability of ERP system
B	Conflict of opinion Change management	**Interdepartmental conflict and politics** created issues. Vague perception about ERP system further deteriorated the situation.	Interdepartmental conflict and politics impacted the quality of project management across ERP project lifecycle Interdepartmental conflicts created ambiguity among users about the adoption decision
C	Negative perception / de-motivation	**Bad word of mouth** travelled speedily. Lack of internal marketing of project.	Shared goals and objective for adopting this innovative technology were not effectively communicated

	Leadership	The l**eadership was determined** to adopt the software at all costs.	Leadership was committed to implement ERP without required internal expertise of project management

Table 4 : Socail Factor

Case B

Group	Coding	Justifications and Association emerged Showing Consensus	Pattern emerged (Performance Indicators)
A	Shared vision Project management	Coordinators were not informed about the purpose of ERP implementation but felt a push to use ERP and learn new things. Project Team selection was not effective; it seemed nobody knew respective roles and responsibilities. Project managers didn't maintain a record of mistakes done by the team members and took a late action. Heavy users of system were not consulted at the system development stage.	Effectiveness of communication about the purpose of ERP adoption was lacking; Quality of project team selection was below requirement Roles and responsibilities were not clearly defined Performance monitoring was not conducted diligently Heavy users were not involvement across project life cycle
B	Users' expectations Training quality Monitoring	Users were excited to try a new technology. They believed that its usage would enhance their skill level and positively impact their performance. They remained committed to learn it though faced really tough time during training. Training sessions were not well managed. The trainers didn't have enough knowledge about the system to guide the new users. No feedback was taken from users to identify gaps in trainings.	Users' enthusiasm to learn new technology and prospective capacity enhancement was not utilized Users were initially committed to face challenges for acquiring new technology External and internal trainers were not well prepared Performance monitoring of the progress of project was lacking
C	Effective training resources	Batch advisors didn't comprehend the system manual provided to them due to difficult SOPs. The performance of the trainers was not monitored. Trainings were not given as per the requirements of different levels. The trainings were focusing more on the working of program coordinators. More training should have been conducted for batch advisors.	The software manual was not easily understandable; it has difficult terminology Trainer's performance was not monitored Different level of users as per their technical efficiency background, required different level of attention by the trainers

Table 5: Organizational Factors

Focus Group	Coding	Justifications and Association emerged Showing Consensus	Pattern emerged (Performance Indicators)
A	System Quality	System crashed many times. We could not perform assigned task within expected time period initially. System didn't perform well as expected and promised initially by the top management. Too many procedural steps to conduct routine activities.	System crashed frequently and led to delays in performing assigned tasks. The promise of system efficiency was not kept Routine activities became more complex and time consuming
B	Functional alignment / Employees' expectation	We were not provided emergency maintenance assistance. It delayed the processes in crucial times of student registration. ERP did not fulfill the requirement for which this system was implemented. Department heads had no knowledge of the system and they were unable to represent the operational users' needs at the time of system development.	There was no technical support on emergency basis Delayed execution of routine tasks System was not aligned with operation as per requirements of operational tasks Department heads lacked system knowledge which affected the representation of organizational requirement from system across the ERP life cycle
C	User satisfaction/	Advisors were doing well with the previous system. The project team was only consisted of management heads. They should have consulted the heavy users of system during system development. ERP caused a lot of trouble for customer related processes.	Majority of users were satisfied with legacy system Project team was consisted of management heads only ERP system could not enhance the effectiveness of services for customers

Table 6 Technical Factors

Group	Coding	Justifications and Association emerged Showing Consensus	Pattern emerged (Performance Indicators)
A	Employees technical knowledge	Due to inadequate trainings, staff was unable to understand the dynamics of systems properly. Although the coordinators are well qualified and experienced members. But due to difficult/lengthy SOPs and poor trainings, they were not able to use the new system efficiently.	Trainings were inadequate to transfer technical knowhow of the system Even highly qualified users were not able to use the system efficiently due to poor transfer of technical knowledge of working with system
	Employee zeal	Staff was keen to learn the new system initially but	Operational difficulties de-motivated staff to continue using ERP

B		after the implementation, they faced operational difficulties which de-motivated them to great extent. The old system was user friendly and staff had good command over that.	Software was not user friendly
C	Continuous support	Advisory team comprised of well-educated faculty members. However, they rejected to work on new system initially due to system glitches. In later stages, the concerned department provided them enough support to understand the system, which eventually resolved the conflict.	System quality restrained initially the highly qualified staff from using ERP Continued support was provided by ERP helpdesk which helped users to overcome aversion to ERP usage

Table 7: Individual Factors

Group	Coding	Justifications and Association emerged Showing Consensus	Pattern emerged (Performance Indicators)
A	Employees technical knowledge	Due to inadequate trainings, staff was unable to understand the dynamics of systems properly. Although the coordinators are well qualified and experienced members. But due to difficult/lengthy SOPs and poor trainings, they were not able to use the new system efficiently.	Trainings were inadequate to transfer technical knowhow of the system Even highly qualified users were not able to use the system efficiently due to poor transfer of technical knowledge of working with system
B	Employee zeal	Staff was keen to learn the new system initially but after the implementation, they faced operational difficulties which de-motivated them to great extent. The old system was user friendly and staff had good command over that.	Operational difficulties de-motivated staff to continue using ERP Software was not user friendly
	Continuous support	Advisory team comprised of well-educated faculty	System quality restrained initially the highly qualified staff from using ERP

C		members. However, they rejected to work on new system initially due to system glitches. In later stages, the concerned department provided them enough support to understand the system, which eventually resolved the conflict.	Continued support was provided by ERP helpdesk which helped users to overcome aversion to ERP usage

Table 8: Social Factors

The interpretation of qualitative data led to conclude that knowing the appropriate strategies, skills of complementary resource integration and the cycle of action plan can, when integrated together, translate technology adoption into reduced post implementation risks which further lead to benefit realization for organizations (Remenyi and Sherwood-Smith, 1998 in Badewi, 2015). It is identified as an approach that converge the efforts of all stakeholders at the effective project execution (Chen, Law, & Yang, 2009). In this stream, complementary integration of these critical success factors appears relevant when viewed from Active Benefit Realization (ABR) perspective for continuous benefit management. A shift in the perspective of benefit realization in the case of such technologies, from benefit management to 'organizational capabilities' (Ashurst and Doherty, 2003 in Badewi, 2016) further implies the significance of complementary integration of resources; it would help organizations to build required capabilities for continuously aligning human, financial and material resources as per the 'task demand', overcoming 'situational and contextual factors' (Shea, Jacobs, Esserman, Bruce, & Weiner, 2014) and ensuring the effectiveness of intermediary outcomes of this value chain. Further problem might arise when the influence of ineffective resource integration travels faster than the pace of change implementation and affects the effectiveness not only of the change readiness but also the quality of intermediary outcomes at multiple levels.

5. CONCLUSION

Research findings have helped to identify the interactive role of knowledge and relational resources in implementation process. It also demonstrates that capability of synergic management of resources facilitates new capability building process. This capability is the pre-requisite for brining resources and capabilities into complementary interaction and cast a ripple effect across ERP project life cycle. The study also demonstrates that knowledge resources and relational resources impact conflict management, user motivation and acceptance and functional alignment of ERP with business process. These intermediary outcomes can impede ERP value delivery at the post implementation stage as the ultimate target of the deploying firms.

ACKNOWLEDGEMENT

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