

Sociotechnical Change Perspective for Enterprise Resource Planning System Implementation

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INTRODUCTION

Successful implementation of an Information System (IS) is vital for sustaining and enhancing the competitive position of an organization (Gunasekaran, 2005; Jing & Qiu, 2007). Management thinking and practice reflected the trend of implementing IS by relating Information Technology (IT) based development to the strategic needs of the business to develop a competitive advantage (Galliers & Baets, 1998; Al-Mudimigh, Zairi & Al-Mashari, 2001). As computing concepts and technology advanced with time, the scope of the business systems widened to comprise Enterprise Resource Planning (ERP) systems. ERP enables today's fiercely competitive business environment that requires deeper interaction between customers and organization which means coordinating the entire value-chain of the organization. Hence disjointed functional departments are integrated to process-oriented cross functional departments, generically known as a value chain system. From a technological perspective, ERP evolved from legacy systems to more flexible tiered client-server architecture and a software product that represents the final stage of an evolution towards integration, originating from IT supported manufacturing (Klaus, Rosemann & Gable, 2000). ERP facilitates in achieving greater benefits from the databases and ensures that the system environment is built following an open system approach (Al-Mashari, 2003) enabling companies to standardize business processes with ERP system and more easily endorse best practices. By creating more efficient processes, companies can concentrate their

efforts on serving their customers (Gunasekaran, 2005; Laframboise, & Reyes, 2005), maximizing profits (Laframboise, & Reyes, 2005) and reducing costs (Gunasekaran, 2005) for the organization. As ERP continues to evolve into a real-time planning tool, it will play a more strategic role in helping companies achieve their business objectives. ERP has grown from coordination of manufacturing processes to integration of enterprise-wide back-end processes and in the Internet era it evolves to become the database backbone for an organization's Web based front-end technology to stay connected to customers.

Organizations have not achieved the efficiencies and cost-savings as originally planned. Most organizations that are implementing ERP do not find success and struggle with ERP implementations. Meta Group reports 70 per cent failure rate of ERP implementation projects. However, adopters have not been intimidated by risks of implementation which is indicative of the boom in the ERP market fueled by globalization, mid-market growth and other factors. The ERP software market reached \$47.7 billion by 2011, a compound annual growth rate of almost 11% according to AMR Research Inc. The technical system (Lee, 2000; Lee, 1999; Bostrom & Heinen, 1977) of the organization comprising of ERP and its required infrastructure and business processes acts as an enabler in achieving the organization's strategic goals with successful implementation of ERP. ERP implementation is not only a technical system imperative but has to synergize with the social system of the organization. Lee (2004) states that as social systems seek information from techni-

DOI: 10.4018/978-1-4666-5888-2.ch088

cal systems, the technical systems too pose their own organization requirements on the social system. From this standpoint, ERP implementation research can be classified into two major groups where ERP deployment corresponds to a technical system and ERP organizational intervention corresponds to a social system. Though ERP implementation is highly researched, a framework illustrating all its dimensions to enable the organizational decision makers to configure the most suitable combination of variables for a research theme is lacking. The objective of this article is to develop a General Morphological Analysis (GMA) framework to identify and illustrate research dimensions for ERP implementation research. GMA framework is a highly structured and illustrative method to identify all possible combinations of dimensions and variables for creating models of systems and processes, which are usually non-quantifiable. Extensive literature review is carried out to categorize the dimensions and its variables of ERP implementation using GMA framework. The framework serves as a map to choose research themes on ERP implementation and a suitable configuration is formulated from the map with socio-technical change as a research theme.

The following section describes ERP as the backbone of an organization's technology infrastructure by detailing the ERP evolution. In this section ERP evolution is reviewed comprehensively by drawing out the significance of a unified enterprise essential for the present competitive business environment. The definitions of ERP are then collated through literature review to detail the evolution of ERP. The section describes the means by which ERP concept has undergone a change from technical to socio-technical perspective. The next section describes a morphological field that maps out various research themes for ERP implementation. Then a particular configuration of ERP dimensions is chosen as an example of how the framework can be used by decision makers to identify themes around ERP organizational intervention. Finally, we discuss implications for future research and draw conclusions.

BACKGROUND: UNDERSTANDING THE NEED FOR A UNIFIED ENTERPRISE VIEW THROUGH ERP

Earliest legacy systems in organizations were developed to manage the transactions on a daily basis and came to be known as Transaction Processing Systems (TPS),

specifically used in organization's tactical operations. The period of 1960s saw organizations centralizing their computing systems and used software packages like inventory control (IC) to automate their inventory control systems (Rashid, Hossain & Patrick, 2001). The manufacturing area focused on traditional process of management of large stocks of inventory, hence IS were specifically developed to cater to this demand. Material Requirements Planning (MRP) an earliest form of computerized IS business application is a production planning and control system for managing inventory in organizations. During 1970, MRP packages were extended with further applications in order to offer complete support for the entire production planning and control cycle (Klaus, Rosemann & Gable, 2000). The augmented version of MRP resulted in Manufacturing Requirement Planning (MRP) II which integrated traditional core functions of an organization (Yusuf & Little, 1998).

With the evolution of technology, applications were added to suit the needs of organizations which are moving away from functional view to a process view (Al-Mashari, 2003). In the process view, organizations reorganize their structures, standardize the processes and facilitate seamless flow of information to the stakeholders by integrating the information and processes of distinct subsets of the organization (Gattiker & Goodhue, 2000). ERP emerged towards end of 1980's as a derivative of MRP and is a technology system that enables standardizing an organization's processes by integration (Shehab, Sharp, Supramaniam & Spedding, 2004). ERP includes functionalities such as human resources planning, decision support applications, regulatory control, quality, elements of supply chain management and maintenance support and the like. ERP advocates believe that it could combine business process optimization in an organization and IT solutions into one integrated solution (Chung & Snyder, 1999) and support the backend functions of the organization.

Capital intensive industries were first movers in using core modules of ERP software. With globalization, the service sectors too have realized its significance as organizations are increasingly finding it vital to keep in touch with stakeholders like suppliers, customers and partners and hence have started adding extensions to ERP in the domain of Supply Chain Management (SCM) and Customer Relationship Management (CRM). Hence ERP vendors are more focused in providing ERP systems by way of analytical applications

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