ERP Initiation - A Historical Perspective

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Abstract

In a competitive environment, firms continually need to find better business solutions with flexible and marketing-oriented structures. They need to establish new business objectives to fulfill their corporate visions. A whole organization should be aligned to achieve these objectives. Information technology (IT) needs to be aligned to the organization's mission. IT professionals have provided systems to the organization and in most cases, these systems consist of individual functions, which should be used in an integrated manner.

Enterprise Resource Planning (ERP) software has emerged to offer an integrated solution. It is suggested that ERP could facilitate the compatibility between task characteristics and technology characteristics, a long overdue IT solution. Some useful information about ERP can be found by examining the evolution of ERP from MRP.

Introduction

Enterprise Resource Planning (ERP) systems have become one of the largest IT investments in the 1990's. IT people, who used to identify their organizations as IBM or Digital shops, refer to their organizations as SAP or PeopleSoft shops [15]. It is suggested that ERP is an extension of MRPII with enhanced and added functionality [5, 19]. From the IT literature and references on MRP and MRPII, two historical events can be found for this ERP study. The first of these is the MRP system, initially defined [10] in 1975 by Orlicky, who is regarded as the father of modern MRP [18]. The second is that the definitive version of MRPII was promoted in the 1980's by the evangelists of MRPII in support of the American Production and Inventory Control Society (APICS) MRP crusade [14]. Since the promulgation of these definitions, MRP and MRPII systems have lasted for decades in the manufacturing environment. It could be inferred that the concept of ERP has evolved from simple inventory management systems of the 1960's [10], MRP systems in the 1970's and MRPII systems in the 1980's.

ERP advocates believe that ERP could combine both business processes in the organization and IT into one integrated solution, which MRP and MRPII had been lacking.

A Theoretical Framework

For this study, a typology was developed from two established studies by answering a major question: Why do we need to initiate ERP?

The first is that Kwon and Zmud [8] identified five major contextual factors which impact both processes and products associated with IT implementation. These factors encompass characteristics of the user community (job tenure, education, resistance to change), characteristics of the organization (specialization, centralization, formalization), characteristics of the technology being adopted (complexity), characteristics of the task to which the technology is being applied (task uncertainty, autonomy, and responsibility of person performing the task, task variety), and characteristics of the organizational environment (uncertainty, interorganizational dependence). For the purpose of this research, the characteristics of task and technology of the model are selected to investigate MRP, MRPII and ERP. The common task characteristic of MRP, MRPII and ERP technologies is to handle production planning and control for uncertain customer demand. This task characterization can be used to identify a firm’s manufacturing methods and marketing strategy. It is suggested that the task-technology compatibility is a major factor in IT initiation [1].

The second is Damanpour's definition of a two stage innovation adoption model, which comprises initiation and implementation [3]. The initiation stage was selected for this study. Using the typology, the task and technology characteristics of MRP/MRPII and ERP are conceptually examined for adoption within an organization.

MRP/MRPII

Studying MRP is the first logical step toward understanding MRPII. In task characteristics, MRP was introduced as a high level scheduling, priority, and capacity management system for the use of plant managers and their supervisory staff. While providing significant improvements in customer service compared to what old inventory management systems offered, MRP is built around a bill-of-material (BOM) process in manufacturing. Yet, MRP is not the system of a customer-focused manufacturer. No relationship between either manufacturing method or marketing strategy and process interdependence could be found [17, 18] in the MRP system. This created technological complexity, which is a significant factor inhibiting adoption success [16]. In technology characteristics, MRP lacks technical capabilities in integration, flexibility, and accessibility [9]. First, integration is defined as the extent of coordination and interdependence of the various parts of the organization [16], Second, MRP needs the flexibility to allow the company to change incrementally or radically from traditional manufacturing to "world class." Third,
MRP needs to be designed for open systems. Fourth, the information contained within the database should be easily accessible to all authorized users.

MRPII is manufacturing resource planning [12]. Since 1975, the MRP system has been extended from a simple material requirement planning tool to become the standard MRPII [4]. MRPII has evolved to be the application of information and manufacturing technology, plans and resources to improve the efficiency of a manufacturing enterprise through integration. In task characteristics, the manufacturing environment from which MRPII originated can be best summarized as follows [14]: 1) Demand-driven environment 2) Batch production 3) Relatively complex feature-dependent original equipment manufacture (OEM) products 4) Product-oriented plant layout 5) A high degree of process decoupling, and 6) Push philosophy.

It is suggested that the MRPII standard system is not a business blueprint for an integrated management information system [12]. The system combines planning and scheduling with the assumption of infinite capacity [5]. MRPII follows a simple backward scheduling logic while exploding the bill-of-materials. While maintaining this simplicity of the system for decades, no changes have been made in the basic calculation procedure. The MRPII system can currently be initiated on a variety of IT platforms [10]. MRPII is most likely to operate within a multi-user network, and is considered a 2-tier architecture. It is recommended that MRPII be enhanced in three ways [19]. The first way is the improvement in existing MRPII functions by means of better software capable of resolving problems that could previously be done only manually. The second is the hybrid use of MRPII and other manufacturing control systems to gain the combined advantages of more than one system. The third is integrating other functions with MRPII modules to bridge the islands of automation existing in finance and management. However, as long as all the functional divisions are not integrated in the organization, MRPII cannot be considered as an enterprise wide system.

Based on this investigation of the task and technology characteristics of MRPII, it is inferred that task-technology compatibility has not likely occurred in most firms adopting MRPII systems.

**ERP**

The IT industry forecasts strong demand for ERP and supply chain management applications over the next several years [13]. Although there are some differences in their marketing strategies and products, they have similar offerings and shortcomings. Most ERP vendors still use the same basic model as MRPII for the manufacturing planning portion of their systems [5]. In the task characteristics, all tasks along the firm’s value chain from production planning to capital asset management are planned, controlled, and coordinated across business areas [2]. For example, SAP’s business blueprint guides firms from the beginning phase of engineering, including evaluation and analysis, to the final stages of implementation. In the technology characteristics, most ERP systems have three distinct features in their architecture. The first is their data dictionary. For example, SAP’s dictionary specifies over 7,000 domains that are associated with over 80,000 fields arranged in over 4,000 tables. This data dictionary can be used across all functional areas within an organization. The second is middleware [15] which makes distributed systems possible by allowing users to set up application modules and databases at different locations. Data are exchanged from a central system to a remote system, permitting applications to exchange information. The third is the repository [2], which is the foundation of the business framework, because the repository captures all semantics in the business processes, business objects, and the organization model. It has been reported that ERP has a list of shortcomings. Notoriously high costs and long initiation times are directly linked to the complexity of the ERP applications. Initiation times typically run from a few months for firms accepting all default settings, to years for firms needing to make major modifications. Although most ERP systems have business practice processes or scenarios in their repositories, all of them are not necessarily best in class applications for a specific firm. The firm still needs to select those applications available for its specific requirements, and to integrate both the applications and ERP system into the firm's IT backbone.

The task-technology compatibility of ERP has been considered one of major inducements for firms to initiate these technologies. It could be inferred that the task-technology compatibility [1] likely occurs in firms initiating an ERP system, especially for manufacturing.

**Conclusion and Directions for Further Research**

Since the introduction of MRP in the 1970’s, compatibility has been considered one of the major inducements for firms to initiate these three systems. It is inferred that the compatibility most likely occur in firms initiating an ERP system especially for manufacturing, because of the high degree of potential integration between task and technology.

Corporations worldwide are paying attention to ERP software. Although the software has progressed, this technology is still immature. Both IT practitioners and researchers need to understand ERP systems better. ERP has a direct impact on IT and business managers. The current business objectives are customer service and lower costs for organizations. ERP could be a solution for IT managers. Further research is recommended to find answers to questions on ERP impact. Some of the topics
will be ERP’s impact on organizational alignment, organizational learning, infrastructure, outsourcing, mass customization, competitive advantage, and organizational structure.

Study of applications in the context of our model should help in the assessment of the value of these systems. The ERP topic presents MIS researchers with several challenges. These challenges are more important as convergence of enterprise applications accelerates.

References