

Research Article

Evaluation of Use of ERP in E-commerce: Methods and Strategies

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Abstract: Irrespective of whether the company is a multi-national, multi-million dollar organization or a small company with single digit million turnover, the goal of system selection is to source a system that can provide functionality for all of the business processes; that will get complete user acceptance; management approval and, most importantly, can provide significant return on investment for the shareholders. Accordingly, a significant number of packages purporting to be ERP systems have entered into the marketplace since 1990. There are packages at the upper end of the market and a vast quantity of other packages that vendors claim to be ERP Systems. There are also packages that claim to be best of breed for certain processes [such as planning] and sold merely as an add-on to an ERP System. The options are many and this, in reality, creates a problem for the company who has to make a decision. In the last decade, companies have also become interested in enhanced functionality such as customer relationship management and electronic commerce capability. In this study we want to study methods and strategies that have been used in ERP for E-commerce.

Keywords: Business-to-business, business process reengineering, ERP, E-commerce, strategies

INTRODUCTION

Poor system selection: Companies seldom use a fully objective selection methodology when choosing an ERP System (Thomas and Michael, 2009) some common mistakes include:

Incomplete requirements: Because implementation of a new ERP system "requires people to do their job differently" (Martin, 1998) it is very important to understand user requirements, not only for current processes, but also future processes (i.e., before and after the new system is installed). Without detailed user requirements, review of systems for functional best-fit rarely succeeds. The requirements must go into sufficient detail for complex processes, or processes that may be unique to a particular business.

Reliance on vendor demos: Vendor demonstrations tend to focus on very simplistic processes. A typical demonstration shows an ideal order to cash process where a customer orders a quantity of product that is in stock. The reality in most businesses is that most customers have varying and more complex commercial arrangements and products are not always in stock.

Failure to use objective professional services: One of the main reasons for failure in system selection is the understandable lack of knowledge within the company (Paul and Servant, 1987). Experienced consultants can provide information on all of the packages that are available in the marketplace; the latest functionality

available in the most common packages and, most importantly, can assist the user in deciding whether a specific requirement would provide added value to the user and to the business (Paul and Servant, 1987). However, it is worth noting that the professional help must be provided by objective consultants who have no affiliation with ERP system vendors. "If a consultancy has built up an expertise in the use of a particular package then it is in its interest to recommend that package to its client (Oyku, 2005).

Inability to understand offering by ERP vendor: "It is estimated that approximately 90% of enterprise system implementations are late or over budget (Oyku, 2005). A plausible explanation for implementations being late and over budget is that the company did not understand the offering by the vendor before the contract was signed. A typical example of this would be the scenario where a vendor may offer 5 days of services for the purpose of data migration. The reality is that there is a huge amount of work required to input data onto a new system. The vendor will import the data into the new system but expects the company to put the data into a file that is easy to import into the system. The company is also expected to extract the data from the old system; clean the data and add new data that is required by the new system. "ERP, to be successful, requires levels of data integrity far higher than most companies have ever achieved-or even considered. Inventory records, Bill of Materials (BOM), formulas, recipes, routings and other data need to become highly accurate, complete and properly

structured" (Martin, 1998). This typical scenario is one of many issues that cause implementations to be delayed and invariably lead to requests for more resources.

E-COMMERCE AND ERP INTEGRATION

Integration enables items, inventory, orders, customers and other pertinent sales data to pass between independent systems to communicate with each other. A web store can operate without connections to accounting, financial systems, ERP etc., but the cost of manually managing and administrating sales data often costs companies more than they think. Without existing retail business systems sharing data retailers could see a loss in sales, delivery delays, poor customer satisfaction and most important-reduced cash flow.

Some E-Commerce and ERP integrations allow necessary data to be automatically exchanged in both directions. For example, an order created in the online store is immediately pushed to the system used to fulfill the order. Not only does this save time but eliminates human error and gets product, inventory, item billing and sales information into a shared information system.

In order to be successful online and keep up with increased demand, your E-Commerce strategy should include integration to ERP, accounting and inventory software (or other systems you use in your multi-channel environment, like POS). Having this integration will ensure that products shown on the web store are actually in stock.

Additionally, your business will become more flexible. Integrating your web store with ERP will enable you to see all new orders and customers in your business system. Products and pricing can be managed from one place which makes the whole process much simpler. Integration provides a much more accurate exchange of data that scales as you grow (Escalle *et al.*, 1999).

BUSINESS RENOVATION

Business Process Re-engineering (BPR) is an organizational method which demands the radical redesign of business processes in order to achieve higher efficiency, better quality and more competitive production. It is also a method of improving the operation and therefore the outputs of organizations. This means analyzing and altering the business processes of the organization as a whole. BPR was first introduced in a research program at MIT (Massachusetts Institute of Technology) in the early nineties. They found that the implementation of modern information technology in organizations means not only the automation of managerial and production tasks, but also has an enormous and direct effect on the means and quality of the work done.

The evolution of BPR: BPR has become one of the most popular topics in organizational management, creating new ways of doing business. Many leading organizations have conducted BPR in order to improve productivity and gain competitive advantage. However, regardless of the number of companies involved in re-engineering, the rate of success of re-engineering projects is less than 50%. Some of the frequently mentioned problems related to BPR include the inability to accurately predict the outcome of radical change, the difficulty in capturing existing processes in a structured way, the lack of creativity in process redesign, the level of costs incurred in implementing the new process and the inability to recognize the dynamic nature of the processes (Frédéric and David, 2004).

On the other hand, CPI integrates methods such as industrial engineering, systems analysis and design, socio-technical design and total quality management. Continuous improvement refers to programs and initiatives that emphasize incremental improvement in work processes and outputs over an open-ended period of time. Several researchers suggest that using CPI techniques dramatically increases competitive advantage. Furthermore, it is particularly suggested that TQM be integrated with BPR.

In the 90s, BPR focused on internal benefits such as cost reduction, the downsizing of a company and operational efficiency, which are more tactical than strategically focused. Nowadays, e-business renovation strategies focus on the processes between business partners and the applications supporting these processes. These strategies are designed to address different types of processes with the emphasis on different aspects customer relationship management, supply chain management, selling-chain management and enterprise resource planning. Recent BR research papers demonstrate the critical role of information technology in business process restructuring.

BUSINESS PROCESS MODELING USING THE IGRAFX

The iGrafx Process (Micrografx) software is a powerful and suitable tool for process mapping and simulation modeling in BPR projects. It provides powerful graphical process modeling and simulation, as well as comprehensive diagramming capabilities.

Figure 1 shows the basic modeling elements of the process map technique used by the iGrafx Process. An activity is an individual step of a process map presented as a symbol in a flowchart. Each activity can set or determine the following information:

Inputs: an activity can have one or many inputs that arrive by way of incoming connection lines.

Resources: a resource is a person, machine, or other asset that may perform the activity. An activity can use

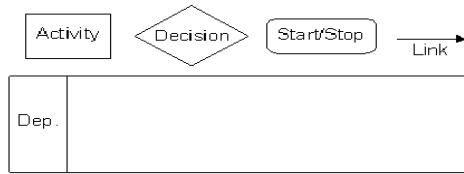


Fig. 1: Basic modeling elements of the process map technique

several resources or more than one kind of resource simultaneously.

Task: the task information covers the duration that the activity takes, its associated costs, activity base and schedule.

Outputs: the outgoing connection lines from an activity attach to other activities for further processing.

Modeling elements are connected with links which describe the process flow. Each activity is placed in one or more departments that represent an organizational unit which performs these activities. A transaction can be split in order to be processed simultaneously by different departments or resources and batched again in a single transaction. Each activity can be defined in detail by several attributes, such as: types and number of resources performing the activity, duration of the activities (constant or stochastic) and different types of costs (value added, non value added, or business value added). The costs of the resources utilization can be defined according to the hourly rates, rates per use and overtime rates. Schedules for resources and event generators are fully customizable.

All the above-mentioned and other possibilities offer a detailed cost and time analysis of business processes. One of the main advantages of this modeling technique is its simplicity; even people unskilled in business process modeling can easily understand and use this technique. The reports generated by the iGrafx Process software allow the re-engineering effects to be anticipated and show the results in quantitative parameters, such as the number of transactions in queue, the cost and time of the utilization of the resources and the time of the process cycle. The tool also offers the possibility to visually trace the process execution; different colors are attached to activities in order to observe bottlenecks, idle activities etc.

iGrafx IDEF0 is a powerful modeling solution integrated into the iGrafx process management platform that enables companies to quickly build consistent and comprehensive IDEF0 business models. IDEF diagrams are used widely, especially for business process analysis and modelling. They represent the standard modeling and analysis method for enterprise engineering and support particular reengineering activities such as simulation modelling and information system modeling. They cannot represent all the elements important for simulation modeling, such as

queues, random behavior and process dynamics, but could provide the basic elements for simulation model development.

Due to their simplicity and understandability, it seems appropriate to develop IDEF diagrams during preliminary phases of business process modelling project in order to develop "AS IS" models. In later phases, when "TO BE" models are developed, IDEF diagrams could be simply transformed into the iGrafx Process simulation model. Simulating the effects of redesigned processes before implementation improves the chances of getting the processes right at the first attempt. The advantages of simulation modelling were demonstrated on the example of the procurement process model using the iGrafx Process software.

SIMULATION MODELING OF THE B2B PROCUREMENT PROCESS

This study refers to the indirect procurement process of a real Slovene company. Several interviews had to be performed because knowledge about the business process was not documented and moreover not well defined. The main difficulty in business process modeling was to find out the time required for each activity as the employees usually overestimate it. The experiences of one of our team members who had participated in more than twenty BPR project by now helped a lot in this phase of the modeling. The data to construct the model was taken from IS reports and interviews with subject-matter experts. The model was refined continually during the analysis phase as new information and data were added.

The study emphasizes the assessment of savings in terms of time and cost for the execution of one purchase transaction. During the first phase of the research, an AS-IS model was developed. The indirect procurement process starts in any department where a need is identified and is performed in three departments: Purchasing, Warehouse and Finance/Accounting. There are seven employees working on this process.

The simulation of a two-year performance was carried out, with the assumption that the process starts every 1 to 5 h during working time. The report shows that an average indirect procurement process lasts for about 20 days and the average cost is \$50. However, the quantitative results of the simulation experiment presented in the simulation report, no matter how precise and deep the simulation is, are only one aspect of the business process analysis. Business process maps themselves can frequently show many problems that have not been observed before. In this research two main (and very common) problems have been discovered.

The communication between the insiders of the business process and the communication between the company's employees and its suppliers is slow and

ineffective; consequently, many time gaps occur in the process execution.

Very often during the process execution, the same data are inserted (e.g., purchase order and acceptance slip) and therefore problems of data inconsistency, integrity and accuracy occur (Thomas *et al.*, 2005).

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