

AN APPRAISAL OF ISSUES FACED BY MANUFACTURING COMPANIES, WHEN SELECTING AN ENTERPRISE RESOURCE PLANNING (ERP) SYSTEM

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ABSTRACT

In the modern, competitive, technology driven world, manufacturing companies strive to make the best use of IT, especially the Enterprise Resource Planning (ERP) system, often facing several difficulties while doing so. An ERP system consolidates all business processes into a constant system environment by using a central database and functioning on a common computing platform. ERP selection is a critical investment which is intended to enhance an Organization's financial, strategic and profitability performance. This study elucidates the major issues faced by manufacturing companies when selecting an appropriate ERP Software. The study conducts a review of related literature and found that manufacturing companies face many issues such as management of cost, time and other resources during ERP software selection. The study concludes that ERP system selection is a challenging phase in an organization's life which can be simplified by carefully analyzing the issues involved and following the best decision-making processes for making the selection.

KEYWORDS: *Enterprise Resource Planning (ERP), ERP Software Selection, Issues in ERP Selection, Successful ERP Implementation*

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INTRODUCTION

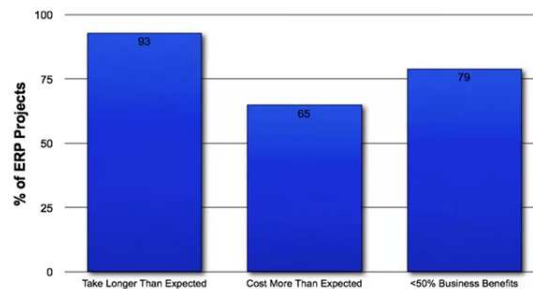
Enterprise Resource Planning (ERP) is business system that integrates and streamlines data and information throughout the company into one single system that supports and fulfils the needs of the entire enterprise. ERP systems enhance all aspects of the main operations, such as purchasing, accounting, manufacturing and sales, by considering functions and processes that were previously disjointed and supported by different legacy systems, or older, disparate business systems, and seamlessly integrating and coordinating them (Bradford, 2015). The evolution of modern ERP systems is because of three key things: '(1) The advancement of hardware and software technology (Computing power, memory and communications) needed to support the system, (2) the development of a vision of integrated communication systems, and (3) the reengineering of the companies to shift from a functional focus to business-process focus' (Monk and Wagner, 2013: 21).

Implementing a new ERP has become attractive to many manufacturing companies as it covers wide range of activities that can drive benefits to the business. Organizations implement ERP systems for various tangible and intangible benefits and tactical reasons (Kremzar & Wallace, 2001. Figure 1 illustrates ten reasons identified by Panorama Consulting Solutions (2013), for implementing ERP software. Organizations are most likely to implement an ERP system to improve business performance and day to day work and are least likely to implement because other competitors have done so.



Figure 1: Reasons for Implementing ERP (Source: Panorama Consulting’s 2013 ERP Report)

Despite the attractiveness of ERP to organisations, selecting and implementing such systems is fraught with difficulties and can often lead to failure. ERP implementers believe that inappropriate ERP software selection is the major reason behind its implementation failure (Karsak and Ozgul, 2007). Panorama’s ERP Report (2007) shows that, high percentage of ERP projects fail because of inappropriate budgeting, poor time scheduling and unfitting integration with the business (Figure 2). Essentially, an efficient ERP project selection is a key component of the successful implementation of ERP.



Source: Panorama’s 2008 ERP Report

Figure 2: Three-Year Study of 1300 ERP Implementations across the Globe

The aim of this report is to identify the primary issues facing companies when selecting an ERP system and explore how these issues change depending on the nature of the organization. We will begin in Section 2 with an overview of the software selection process, followed in Section 3 by identification of the issues faced when selecting ERP software, thereafter, in Section 4, a discussion on consequences and solutions of such issues and finally, in Section 5, the conclusion.

OVERVIEW OF ERP SOFTWARE SELECTION PROCESS

Given the relatively large financial investment and possible risks and benefits, the importance of selecting a good ERP system cannot be exaggerated as it is a decision on how to shape the organizational business (Teltumbde, 2000). ERP software selection is a multi-criteria decision-making process (Karsak and Ozogul, 2007). Because of many complications in selection process and its dependency on multiple factors, various authors have suggested different techniques to be adopted for ERP selection process. A Fuzzy multi-criteria decision-making approach is suggested for the selection among different ERP outsourcing alternatives

(Kahraman, et. al., 2010; Karsak, 2009; Efe, 2016) It allows decision-makers to represent their evaluations in linguistic expressions, crisp or fuzzy numbers (Kahraman et. al., 2010). Another methodology is to use Artificial Neural Network (ANN) based on Analytic Network Process (ANP) approach (Yazgan et. al., 2009). It considers all selection criteria, sub-criteria and their interrelations in selecting the software and helps in order to calculate the ERP software priority.

In either method, one faces many challenges and consequences while selecting ERP software. The cost of the software, its fitness with the internal system, the adjoined legal issues, continuity of the manufacturing and other organizational processes during the selection and many other aspects have to be taken under consideration in this decision-making process. It also requires various business process changes and information technology changes to enhance performance, cost, quality and responsiveness (Motwani et al., 2002).

Beginning with a project team can lessen the risks involved in approaching the best ERP. Selection of the suitable, qualified project team, and experienced project manager with good leadership skills are prerequisites for successful project outcomes (Fortune and White, 2006). After developing a suitable project team, organization can move towards further software selection process. Based on the various literature and our own experiences, Table 1 is developed to show the steps involved in ERP software selection.

Table 1: Steps for ERP System Selection

Step No.	Task	Description
1	Identify the needs or problems	Identify the needs for new ERP system implementation or the problems with the existing system (Collins, 2012; Hawksworth, 2007).
2	Create a feature/function list	With the involvement of representatives from all the business departments and IT experts, create a list of functions required by the ERP system (Umble et. al., 2003).
3	Select the type of ERP system	Using the functions/features list and the IT experts' opinions, decide whether to go for on premise ERP, which is hosted by the company and is integrated in-house or the cloud based ERP which is hosted by the vendor from outside the company and is used through some networking (Mir, 2013).
4	Create a software candidate list	Understanding the type of business, size of enterprise and the type of ERP required, select the software vendors from the market (Umble et. al., 2003).
5	Narrow the field to four to six serious candidates	After matching the functionality required with the provided features and functions, narrow down the number of vendors (Umble et. al., 2003). Also consider the features required in the future at this stage (Mir, 2013).
6	Create the request for proposal (RFP)	Ask for the proposals from the vendors containing the required functionality provided by them, terms of agreements, supplier response forms, etc. (Umble et. al., 2003).
7	Clarify the doubts in the proposal	Consider strengths and weaknesses of the vendors and ask for more clarification on any doubts. Also consider their status in the market and the reviews from their pre-existing customers (Mir, 2013)
8	Select two or three finalists	Narrow down the list to two or three after careful consideration of their proposals and their worth in the market (Umble et. al., 2003).
9	Have the final demonstrations	Contact the providers for one-to-one meeting and demonstration on the working of their product (Collins, 2012), (Umble et. al., 2003).
10	Select the winner	After a final review of the vendors and their proposals select the best one (Umble et. al., 2003)
11	Budget the project	Depending on the selected ERP system and vendor, budget the licencing, implementation and maintenance fee involved (Umble et. al. 2003). Other than that, an organization needs to budget the personnel and expertise to ensure implementation success (Hawksworth, 2007)

Step No.	Task	Description
12	Negotiate the contract	Negotiate the upfront and ongoing maintenance or upgradation costs of the software (Umble et. al., 2003). Keep the legal department knowledgeable about every part of the contract (Collins, 2012).
13	Run a pre-implementation pilot	It is a testing stage where good and bad aspects of the software are uncovered to facilitate the final implementation (Umble et al., 2003).
14	Validate the justification	Make the final decision whether to go for the final implementation or change any of the decisions made in previous steps (Umble et. al., 2003).

The first challenge that a company faces is deciding the approach which it should take to select appropriate software. An approach can either be employing the services of any consultancy company (Hossaina & Shakirb, 2001), or undergoing an internal audit or even by benchmarking a similar competing organization's approach. The ERP software selection process also focuses on the origin of the software, options range from an off the shelf package ERP suite e.g. SAP Business One, that can be put into action more quickly and has a large pool of experienced users, or a more bespoke open source solution set up and tailored to the needs of the organisation which may be more effective in the long run but would take much more effort to set up and maintain. In more specialised industry it may be appropriate to look at what the market leader has adopted and adopt their approach i.e. benchmarking (Al-Mudimigh et al., 2001).

ISSUES FACED

Once an organization has opted to adopt ERP system, it must navigate the many issues involved in selecting the right software. Table 2 below summaries the main issues involved in ERP software selection.

Table 2: Issues Faced in Selection of ERP System

Issue	Explanation	Reference
Budgeting	Costs involved as the price of purchasing both the hardware and software involved in a functional ERP system can be low or high depending on the nature of the organization and the resource available such as availability of trained staff. Maintenance poses a further consideration as once the system is in place it may take a large and well-trained IT dept. to keep the system running smoothly - further driving up costs.	(Hillam and Edwards, 2001), (Collins, 2012), (Phillips, 2012)
Time-Scheduling	Timescale is another issue as day to day business is often effected by the upheaval of the changeover, temporarily reducing effectiveness while the new system is set up and the staff get familiarize. From the beginning of selection process to the implementation of new system, everything needs to be properly scheduled. This can present a formidable opportunity cost if not managed properly.	(Carlton, 2015), (Phillips, 2012), (Shehab et al., 2004)
Functional and Technical fit	Fitness for purpose in an ERP system is essential as any shortcomings can drastically reduce the gains being pursued by the move to ERP in the first place. This is often at odds with costs since ERP needs to be a total management system to be effective, therefore lower cost options may not be applicable.	(Sciff, 2012), (Winkelmann and Kloss, 2008)
Resource Management	Resource management including the required workforce and equipment will need to take place in order to make sure that the targets and goals of the ERP implementation program are met.	(Somers and Nelson, 2001),
Vendor Selection	Vendor selection may also be a factor when multiple ERP packages are applicable and can be influenced by pre-existing relationships with vendors and how widely their package is used in industry.	(UȚĂ, A., et al., 2007)
Key Stakeholders' Involvement	Keeping the key stakeholders like senior management, project manager who oversees ERP selection, mobile users and engineers working with the system, in the loop will pave the way toward the correct selection decision.	(Miller, 2015)

Table 2 Contd.,		
Issue	Explanation	Reference
Legal Issues	From the legal perspective, any solution will be needed to be checked for legal issues and conflicts.	(Monahon, 2013)

The organization will need to come to a decision on how to analyze the issues highlighted in Table 1, the decision could be made fully internally or with the assistance of an ERP software consultant or alternatively through benchmarking. The ERP requirement specification can be set in accordance with whether the ERP system is being implemented for the first time or replacing an existing system.

In addition, it is important for organizations to carefully consider high commitment from management, reengineering of the current system, integration of the ERP with remaining business systems, selection and management of consultants and training of employees on the selected ERP system (Bingi et. al., 1999).

DISCUSSIONS OF CONSEQUENCES AND SOLUTIONS OF THE ISSUES

Doing business with organisations you have satisfactory experience of is a safe option. So, if the problem is with the current software that you are using then the best approach may be communicating the issues with your current vendor giving them the opportunity to submit a recommendation for solving your issues. It is often cheaper, easier and less disruptive.

But if the only way forward is a new ERP, then one could be relying on a consultancy company which can also be challenging as they are very expensive and usually recommend the same one or two software that they have expertise of. Sometimes they can recommend with the most common software running in the market so it may be better for the higher management and company executives to get familiarized with the knowledge of the ongoing ERP systems in the market before assigning the work to anyone else. Fuller (1999) insists that ‘Focusing on the issues, their resolution and on what impact they will have on their business must be seen initially through the collective eyes of the client, not those of the consultant’.

The consequences and possible solutions to the issues identified in this study are discussed as follows.

Budgeting

The first and often largest challenge for SMEs is to allocate the budgets for the upgrading of current software or replacement with a new ERP. Budgeting an ERP system is rarely simple as it not only includes the direct cost of new software but also the indirect costs like attached hardware cost, training cost, implementation cost and ongoing cost for product upgrade and support which is found to be 11-19% of the software cost (Collins, 2012). Issues of cost depend upon many factors such as whether you are making in or buying out the software, whether you are hiring an external consultant or using your own IT professionals or whether you are upgrading an existing software or going for a new one. However cost cannot be a deciding factor of ERP selection; the ERP functionality and its ability to meet the business needs must come first to ensure fitness for purpose. So, a project team assigned for ERP selection can prove to be helpful in costing by evaluating all the present and future factors and making a pre selection budget.

Certainly, some type of project funding request is necessary before buying software and hiring consultants. Those who must approve the funding will want to know the project schedule and cost. So this new challenge will require more research and getting further into the specifics of the project. For the project-funding request, always be conservative with

the return on investment (ROI) since there is a human tendency to overstate benefits and underestimate costs. In the end, if the project cost is significantly underestimated, the project manager will get the blame (Phillips, 2012a).

Time Scheduling

Carlton (2015) identifies that 'Defining an ERP selection timeline can be either a very basic or very complex process, but either way the effort is usually guided by the needs of the enterprise itself. Even leveraging a single-module decision can consume as much as two quarter's worth of effort in s'. Poor time scheduling can create impatience due to external pressure and business needs which ultimately result in a failure of ERP system with a huge loss of resources. Phillips (2012b) states that 'The problem is once unrealistic expectations are cast, they are not going away. Could this be why so many ERP projects fail? In fact, some argue many projects are not really failures, just a failure to manage expectations!'

So getting started with flexible dates for starting and ending of project, which usually takes 16-24 months for medium enterprises can be a good practice (Phillips, 2012c). Within these dates one should pre schedule all other important events like periodic reporting dates for project team, dates range for scheduling product demonstrations, deadline for receiving proposals from software vendors, dates for final selection and contracting, test and employee training dates and the final date by which the system will be fulfilling all the required needs.

Functional & Technical Fit

One of the most challenging steps is the careful assessment of functionally fit and technically fit ERP software. Usually the vendors have generic packages that can be customized to an extent and the specialized packages that are mostly industry specific (Anonymous, 2013). Functionality required by your company now can change in the future –these new needs could be met by an existing module included in a generic package suite however generic package can be expensive and many of its modules can be irrelevant/redundant for your company. With this process complete we can begin identifying the current problems and the actual functions required in the company. If you can't specify exact shortcomings, weakness and issues with the previous software then selecting a new one will quickly become a waste of time and money. One of the common hidden and unexpected cost can be modifying and upgrading infrastructure to handle a particular ERP software. Understanding the gaps between existing and required infrastructure, developing the technical skills for the upcoming software and quantifying costs to upgrade current servers, databases, PCs etc. are the major issues of concern at this stage.

"Too often, people select an ERP system based on factors such as price, current technology buzz or the system that is the flashiest," adds Daniele Fresca, director of Marketing, [IQMS](#), and a provider of industry-specific ERP solutions. "But without a good fit, companies are left with expensive customization and bolted together solutions." She notes the solution: "Find an ERP system that is industry-specific, with tools and features designed to solve your business requirements. The ROI and long-term benefits of a good fitting system are extensive." (Schiff, 2012).

Resourcing

Somers and Nelson (2001) stressed that the choice of the package involves important decisions related to budgets, timeframes, goals, and deliverables that will shape the entire projects. Resourcing is a challenge as it's the complete preparation to adopt the upcoming software. You need to allocate the money, people and equipment in accordance with the compatibility of desired software. Selecting suitable people in Steering Committee and Project team with some

experienced and qualified project manager who can assure the successful evaluation and implementation of the ERP software poses a large challenge indeed. Choosing the perfect consultant where required and involving your IT staff can also be difficult but is very important for ERP selection as they always have knowledge of current ERPs and are well familiar with the company needs. Executive commitment is required to allocate the essential resources, to resolve any conflicts between departments, and to keep the project a priority throughout the project's life.

Benchmarking

Learning from the success and failure of others is a cagey and often effective approach. Gross (2011) states one of the reason behind the success of Canadian manufacturing companies as 'Notwithstanding their diversity, the Best-in-Class companies shared certain common approaches or tactics to their ERP projects-ones that weren't shared by the rest of the field'.

Similar goals can often be achieved through adopting the same ERP system of the market leader or best competitor however it is rarely that simple. ERP software selection is quite dependent upon the internal structuring of the company, employees, business strategies and stakeholders which differ company to company.

Vendor Selection

A large number of ERP vendors are available in the market with variety of software. Client should check their reliability and viability when selecting supplier for ERP system. For example how long they have been in the business, how long they have been selling this type of software and how many local and international clients do they have (UṬĂ, A., et al., 2007).

Legal Issues

Legal issues can create severe problems if mismanaged, therefore it is strongly recommended to have the documentations and contracts including ongoing support agreements and maintenance costs to be gone through by the Legal department of the company. 'Waste Management began an 18 month installation process in 2005 that turned into a \$100 million dollar legal battle which has been going on since 2008. Waste Management filed suit against SAP executives who apparently participated in fraud leading to a massive ERP implementation failure' (Monahon, 2013)

Hands on Testing

Once selected, initial testing before implementation for regular work takes place. Usually the resellers assist in this phase allowing the organization to familiarize themselves with the software and its complications. The organization should stay calm and confident while discussing the issues with their consultant and reseller which will certainly help in successfully going through the phase.

All the issues discussed are equally important for successful selection of ERP system. The project team and the owners of the company are supposed to analyze these issues themselves and find the best solutions possible as ERP selection and implementation is believed to be a one-time process in the life of an organization and any mismanagement of these issues can lead to severe circumstances.

CONCLUSIONS

It is clear that selecting an ERP system is a critical phase for any Organization and it involves various challenging decision making processes. Problems can arise by underestimating the importance of any of the stated challenges or erroneous analysis of the risks involved. Whereas, effective implementation of an ERP system in any organization can be traced back to properly evaluated budgeting, realistic time scheduling, exceptional arrangement and usage of resources and/or absolute reengineering and unmitigated integration with the present systems of Organization.

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