Implementing Enterprise Resource Planning and its Relation to Business Process Reengineering with Special Reference to Sri Lanka

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Abstract
Implementation of Enterprise Resource Planning (ERP) systems is new in Sri Lankan context and such studies have become very important. This study was designed to analyze how organizations can lead to successful ERP implementations and to signify the extent of Business Process Reengineering (BPR) required for project success. A questionnaire survey covering 40 organizations was done in this study. The survey revealed that, Finance, Manufacturing and Distribution were the popular areas in ERP systems. Manufacturing organizations were the most interested in implementing ERP. The use of consultants in the areas of change management and BPR, was less. The survey also found Twenty Critical Success Factors, highlighting that BPR must be done parallel for a successful implementation of an ERP system. Based on the conclusions, it is recommended that managers should not change the system to suit the local processes, but should use more help from external consultants for BPR and change management. The employees must be computer literate before training them on the ERP systems.

Keywords: Enterprise resource planning, business process reengineering, best practices, critical success factors.

1. Introduction

1.1. Background

Today’s forces of change - Customer, competition and the change itself, is forcing businesses to continuously improve and to innovate in terms of speed, flexibility, quality, service, cost and so on. The speed of improvement of an organization has to match, if not exceed the forces of change to gain a strategic competitive advantage or to survive in the industry.
also breaks “kingdoms” that work at cross-purposes in many organizations [13].

Organizations would get several advantages by implementing ERP systems and following are a few of them.

Firstly, core processes of an organization across all industries are the same. Companies developing ERP software have spent huge amounts of money in understanding business processes used by thousands of corporations world-wide. All these business practices have then been successfully mapped onto ERP software packages and thus bring in world-class practices to any company that implements the ERP software.

Secondly, an ERP business solution is bundled with business processes that have evolved over the past two decades of ERP implementation in some of the well-managed corporations around the world. By adapting to those processes that have proved successful in some of the finest corporations around the world, an organization implementing ERP would get the advantage of these “best of the breed” practices. That is the reason behind the experts’ recommends changing business practices to suit the ERP software rather than customizing the software to every users’ needs.

Not only that, one of the most beneficial aspects of an ERP system is consolidation of various best practices into one location. SAP the world leading ERP system incorporates over 800 proven best practices into its R/3 package, which offers R/3 customers instant access to a deep knowledge base of Best Practices [2]. Therefore the introduction of these best business practices is claimed to have a business process reengineering (BPR) effect on an organization [1].

ERP implementation success is influenced by a large number of factors, which most of the time are difficult to measure objectively. According to literature, adequate Business Process Redesign is one of the most critical success factors in ERP implementation projects. And one of the most critical ones for their satisfactory outcome since implementation of ERP changes current business processes and practices.

Both ERP and BPR inspire transition from a function oriented to a process oriented view. Therefore to get a radical improvement and to make the projects successful, organizations need to take a critical look at their core business processes.

Commercial off-the-shelf software has been available since the 1960s [12]. Those packaged software was seen to fulfill specific functional roles in an organization. ERP systems, consisting of standard multi-functional, multi-language, and multi-legislative software modules, offer process integration across an entire organization. The reference cited [12] illustrates this important distinction between a function and process view of an organization’s structure, which is shown in Figure 1.

An ERP system is more than the use of stand-alone pre-written software. Figure 1 shows clearly ERP projects changes the way the company is organized and often acting against the prevailing company culture. It is a change management initiative, which encompasses a review of business processes across the whole organization. It requires careful management of the associated human factors.

However to do ERP right, the ways we do business will need to change and the ways people do their jobs will need to change too. And that kind of change needs a lot of attention and investments provide huge benefits but not without pain, disruption and some failures. Unless, of course, our ways of doing business are working extremely well (e.g. all orders shipped on time, productivity higher than all competitors, customers completely satisfied).

Also the cost for implementing an ERP package varies significantly from one instance to another. The actual cost depends on the nature of the industry, the size of the firm, the geographical distribution of the organizational units such as offices, plants, warehouses and distribution points, the number of user licenses and the extent of ERP implementation (the number of functional modules implemented).

The cost includes ERP software licenses, server cost, communication network cost and the cost of consultants who would do the implementation. A major component of ERP project is the cost of implementation consultancy (both internal and external). ERP software nearly costs around 25% of the overall cost [13].

Those who have implemented ERP packages agree that certain costs are more commonly overlooked or underestimated than others. Often underestimated costs are as follows [8].

- Training
- Integration and testing
- Customization

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**Figure 1. Function vs. Process View of an Enterprise Adapted from: Skok & Doringer, 2001**

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Since Sri Lanka is a developing country most of our organizations do not have enough strength to go for ERP solutions. Even if a very few companies do so, unlike in foreign countries, the amount they spend for ERP is a significant amount (very high percentage) of their total income. Undoubtedly it is a real waste if organizations have to face such a situation after spending quite a lot of amount of money and time.

This is why it is important to do it right the first time. In order to achieve this goal, a lot of resources know how and expertise is required. So it is the duty of today’s expertise and researches to analyze the situation and identify the factors, which cause for ERP failures and best practices for success.

1.2. Focus of the Research

The study of ERP systems implementation in Sri Lanka is a new area, and limited studies have been conducted in the past. But now, due to the magnitude of the ERP phenomenon, the need for such studies has become very important especially in the Sri Lankan context.

Numerous studies have been carried out world wide under various related topics. Potential impact of cultural differences on ERP projects, Successful ERP implementation the first time. Evaluating the BPR effect of a SAP R/3 implementation in a manufacturing environment were some of the studies carried out in this area.

Issues:
1. What are the primary causes of the failure of ERP implementation?
2. Why do companies fail to realize the benefits planned originally?
3. What is the extent of Business Process Reengineering required in an ERP projects.

Objectives:
1. To investigate, the reasons for success or failure of ERP projects in the Sri Lankan context through the learnings from these investigations and expert inputs as to how an ERP project could be implemented.

As mentioned earlier a huge number of organizations had ended up their ERP implementations with fewer benefits than they expected. Sri Lanka situation is no difference and there are many examples of unsuccessful implementations. As ERP systems use IT as the means to drive the business process, the garbage-in-garbage–out (GIGO) rule applies very much to ERP. So, a faulty process if automated and speeded up, would multiply the defects.

Thus, this study is an attempt to identify the primary causes of such failure and critical success factors for ERP implementations with special reference to Sri Lanka. This
study will also help future project managers to identify the do’s and don’ts for the ERP implementation projects. Identifying the primary causes of failure is important since it will help organizations to identify where the pitfalls are and learn from the mistakes of others. The attempt was to learn from others experiences and illustrate how to avoid the pain and time required by not repeating those experiences.

2. An important purpose of this research to study the use of BPR practice in Organizations implementing ERP solutions, which would provide an understanding of the amount of BPR, needed for a company to successfully implement an ERP.

Linking business process improvement and customization initiatives to the ERP software implementation had produced a bag of mixed results. There is considerable confusion today as to whether organizations should customize the software, and to what extent. Organizations are also confused whether process improvement initiatives are required and when and how they should be done.

The timing and the extent of process improvement initiatives that an organization undertakes, during ERP implementation can play a crucial role in the long term benefit realization. Large scale process initiatives could often result in lengthy implementation lead time and significant cost overrun.

But using the rapid implementation templates offered by ERP vendors could sometimes run the risk of shaping the foot to fit the shoe. It is said that, though selective implementation of certain modules improves business performance in the short run, in the long run, the bottleneck shifts elsewhere. Unless organizations quickly graduate to total implementation, the brief honeymoon period may leave behind bitter memories. Successful ERP implementation requires that this issue be resolved even before the first step is initiated.

2. Methodology

Data for this study will be drawn from primary and secondary sources.

The primary source would be covering a number of organizations in Sri Lanka from different sectors through a questionnaire survey.

The questionnaire was designed to identify the factors, which lead to success in Sri Lankan ERP projects. The goal of this study is to provide real life lessons from the experiences of project teams recently or currently involved in projects, and to evaluate the BPR effect to ERP projects in Sri Lanka. In developing the questionnaire, knowledge gathered from experts and literature were taken into account.

For data collection, at first companies who have implemented ERP systems in Sri Lanka were identified. This was done by visiting ERP software vendor companies, throughTelephone conversations, and through personal contacts. This resulted in identifying 50 companies who have implemented ERP systems. Out of the 50 companies 44 companies were contacted and it was taken as the sample for the questionnaire survey. Out of that sample, 40 companies responded.

In analysis, first descriptive methods were used. Tabular methods were used to summarize data and graphical methods such as pie charts, bar charts, etc. were used to identify patterns of data. Packages like MS Excel and statistical packages such as MINITAB and SPSS II were used. Chi square tests were used to identify the relationships between variables.

Secondary sources would be referencing books, journals (foreign and local) and literature from the Internet on varies web sites and international researches conducted by consultancy firms regarding ERP implementation, BPR, Change management, Project management, benchmark for best practices etc. and inputs from experts in the field of ERP and BPR.

It is to identify why do ERP projects fail, why is BPR important, what is the amount of resources that should be directed towards BPR and the benefits etc.

3. Limitations

As only 40 filled questionnaire reports are available, for some aspects in the use of ERP, the number of response were not sufficient to make a proper statistical analysis.

The questionnaire was kept sufficiently short as mainly IT managers were expected to respond.

4. Analysis and Discussion of findings

The findings based on the questionnaire analysis are discussed below.

4.1. General information identifying variables

Few questions were asked to obtain the general information on the companies that implemented ERP solutions in Sri Lanka and descriptive methods were used in analysis.

1. The survey results indicate that manufacturing, services and IT suppliers are among the companies who have implemented ERP solutions and the majority of them were manufacturing companies.

2. Almost all companies have more than 100 employees and half of the companies have more than 1000 employees. Figure 2.
5. The highest level of areas covered by ERP was finance, manufacturing and distribution and lowest is payroll and HR. Figure 5.

6. The majority of respondents reported hiring consultants for technical consultancy, training and education, application consultancy and project management. But very few companies used consultants for BPR and change management. Figure 6.

7. The findings suggest that over 75% of respondents indicate that they have finished their ERP implementations. ERP packages used show a more than 80% fit to their processes in over half of the companies. Also 75% of companies achieved over 75% of benefits they planned, and those were considered as successful projects.

4.2. Critical success factors for ERP projects

Several success factors were identified from the literature review and those factors were used in the questionnaire to examine the situation in Sri Lankan context. Form the feedback in questionnaires, some success factors were identified through the statistical analysis using Chi Square test and some were identified through the experiences.
Factors identified by statistical analysis: In this section the impact of different variables on the project success were analyzed by taking one variable at a time with the project success.

From the results of the statistical analysis, it can be concluded with 95% confidence, that the following factors affect ERP projects.

1. Development of the ERP business model before implementation. It is a diagrammatic representation of the business as one large system showing the interaction and sequence of the business subsystems or process that it comprises. Figure 7.

2. Development of the business case with cost benefit analysis. Figure 8.

3. Level of BPR work. Figure 9.

4. Method of the ‘change-over’ from old to new system. Figure 10.

5. Percentage fit of the ERP package. Figure 11.

Also can be concluded with 90% confidence level, that the following factors affect ERP project.

1. Readiness to the project. Figure 12.
1. Organization readiness
2. Clear understanding of business processes
3. A good project plan
4. Fit of the ERP to company's processes
5. Top management commitment
6. Training and education with clear understanding of benefit amongst all users
7. Team Work and get the constant advice from experienced working staff
8. Vendor expertise and support
9. Very effective change management process
10. Thorough testing
11. Reengineer business processes well before ERP implementation
12. Align existing processes by not modifying every aspects of ERP

4.3. ERP implementation difficulties

Some ERP projects have not been completed because of several reasons. Following are the factors that adversely affected project completions in Sri Lanka.

1. Cost overrun
2. Time overrun
3. No skilled personnel
4. Lack of top level support
5. System bugs and less quality

Following are the difficulties identified by the respondents to the survey during the change process.

1. Resistance to change/ change management
2. Deficiencies in computer skills, training and learning curve
3. Additional information requirements
4. Developing user manuals
5. BPR- Process reengineering issues
6. Initial data entry issues
7. Parallel run/ change over
8. Technical issues (H/W and S/W related)
9. Project management
10. Lack of support of the top-level management

The percentages of companies citing the first two factors were considerably higher than those for other factors. This clearly shows that most difficulties are related to skill development and change management.

Also the survey results indicate that many of the ERP packages do not support payroll and HR processes. Figure 15.

Factors identified through experiences: Some questions were to get the real life lessons from the experiences of project teams and the results of the study indicated that, following factors were significant to the level of success of the ERP projects in Sri Lanka.
4.4 Factors leading to ERP failures

Respondents confirmed through their experiences that following are the factors that must be avoided when implementing an ERP project.

1. Try to go for 100% fit of the package
2. Changing ERP system to fit local processes (try to customize too much)
3. Underestimate the importance of training and education
4. Incomplete Project Planning
5. Lack of change management
6. Lack of project monitoring and integration testing
7. Insufficient end user involvement
8. Lack of vendor expertise /support
9. Lack of readiness and Implement before getting the proper understands the system
10. Rely on external consultants
11. Not properly signing off each processes (company and vendor)
12. Selection of a negative or arrogant project manager,
13. Follow shortcuts and rush the implementation
14. Lack of top-level commitment
15. Lack of teamwork
16. Directing the projects to achieve personal goals of individuals
17. Taking inexperienced people
18. Thinking and coupling of staff reduction through ERP implementation

4.5. Effect of BPR to ERP

As mentioned earlier, through statistical analysis it has been proved that the level of BPR has an impact on the level of success of the ERP projects. Also it can be concluded with 90% confidence that the higher the amount of BPR work done greater the fit of the ERP package. Indirectly it proved again that BPR and ERP are not independent. Figure 16.

The findings suggest that most common method of doing BPR is doing it during ERP implementation. Companies who have done BPR before ERP implementation were almost half of the number in the first category. Figure 17.

But according to the statistical analysis, there is no conclusion on the best time to do BPR. However, based on experience of many people, to get the maximum benefit of the BPR/ERP, you need to do BPR before the implementation of ERP software but after having an idea what ERP offers.

Key issues during BPR: Finally, the results of the study indicate that the key issues during BPR include the following.

1. Human issues
2. System limitations
3. BPR new process issues
4. Expertise of the software vendor
5. Project Management Expertise
5. Conclusion

Manufacturing companies and companies that have more than 100 employees show a greater tendency to go for an ERP solution in Sri Lanka.

Most of the organizations select off the shelf packages with facility to modify. SAP R/3 was the commonly used package in the sample and finance, manufacturing and distribution were the commonly used modules in Sri Lanka.

The use of consultants in the areas of change management and BPR is lower than in other areas.

Main Reasons for Success of ERP projects identified in Sri Lanka.

1. Organization readiness
2. Developing the ERP business model before implementation
3. Developing the business case with cost benefit analysis
4. Having project management expertise inside the organization
5. Proper BPR
6. Project monitoring and integration testing
7. Fit of the ERP package to companies’ processes
8. Clear understanding of business processes
9. Top management commitment
10. Better training and education
11. Better project management
12. Do not modify every aspect of ERP
13. Effective change management
14. Select correct personnel
15. Sufficient end user involvement
16. Not relying too much on external consultants
17. Properly signing off each process (company and vendor)
18. Not following shortcuts and does not rush the system
19. Teamwork to achieve the objectives and milestones
20. Better communication among all levels

All the findings related to BPR suggest that to make the implementation of an ERP a success, a comprehensive BPR must be done parallel to the ERP project. In order to do this, we need to find the best practice processes that could be used in each of the areas reengineered.

One of the most beneficial aspects of an ERP system is consolidation of various best practices into one location. Having knowledge of ERP best practices as well as other best practices for operational excellence would help managers make their ERP projects a success. This will also help them to raise their organization to the level of organizations operating on par with world class standards.

6. Recommendations

Recommendations following are made towards making proper use of ERP in a Sri Lankan context.

1. Having selected a package that support business practices do not customize the package in the literal sense to suit the organization but, re-invent and re-organize the organization’s processes to the processes supported by the package.
2. Use consultants in BPR and change management teams since Sri Lankan organizations give lack of concentration of those areas.
3. Do not underestimate hidden costs for ERP to avoid cost overruns.
4. In order to make the employees understand the system, its capabilities and the benefits, ensure adequate involvement and keep communication lines open while the project is in on.
5. Measure the levels of acceptance before, during and after the implementation and take action to minimize the employee resistance.
6. Especially in Sri Lanka, train and make the employees familiar to computers before training and educating them about the ERP systems.

7. Future Directions

1. In this research only BPR factor was considered in detail and analyzed. In a future research an in-depth analysis as to the level of execution of other critical success factor for ERP projects can be undertaken.
2. ERP implemented best practices were discussed in this research, only to improve awareness of those best practices. In a future research, detail documentation can be done with the ERP packages so that the managers would compare the packages and select the best package that suits their needs.
3. Also a research can be done which would explain how to evaluate the software package before implementation.

8. Reference


This is an extract of my dissertation submitted to the Department of Mathematics, Faculty of Engineering, University of Moratuwa, Sri Lanka.