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Business Issues in Enterprise Resource Planning (ERP) Implementation

¹ **John Rudolph Raj,** ² **A.Seetharaman**

¹ First Author & Corresponding Author Lecturer, Faculty of Management, Multimedia University, Jalan Multimedia 63100 Cyberjaya Selangor Darul Ehsan, Malaysia. E-mail : john.rudolph@mmu.edu.my

² Dean, Academic Affairs, Global MBA Unit, S.P.Jain School of Global Management, 10, Hyderabad Road, Singapore. Tel : +65-6270-4748. E-mail : seetha.raman@spjain.org

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Abstract

The successful implementation of various Enterprise Resource Planning (ERP) systems has provoked considerable interest in this subject over the last few years. The senior management, especially in large corporations have been attracted to look at new information technology and how to leverage it for corporate survival and to gain competitive advantage in volatile business environment. Although there is no shortage of positive reports on the success of ERP installations, many companies have invested millions of dollars in this direction with little to show for its success. Since many of the ERP failures today can be attributed to inadequate planning and poor execution in the implementation and closure of projects. The aim of this article is to offer some solutions to avert potential pitfalls in ERP implementation..

Keywords: Enterprise Resource Planning, Supply Chain Management, Customer Relationship Management, Cost Benefit Analysis.

1. Introduction

The business environment is dramatically changing. Companies today face the challenge of increasing competition, expanding markets, and rising customer expectation. This increases the pressure on companies to lower total costs in the entire supply chain, shorten throughput times, drastically reduce inventories, expand product choice, provide more reliable delivery dates and better customer service, improve quality, and efficiently coordinate global demand, supply, and production (S. Shankarnarayanan, 2000). As the business world moves ever closer to a completely collaborative model and competitors upgrade their capabilities, to remain competitive, organizations must improve their own business practices and procedures. Companies must also increasingly share with their suppliers, distributors, and customers the critical in-house information they once aggressively protected (C. Loizos, 1998) and the management functions within the company must upgrade their capability to generate and communicate timely and accurate information. To accomplish these objectives, companies are increasingly turning to enterprise resource planning (ERP) systems.

ERP provides two major benefits that do not exist in non-integrated departmental systems: (1) a unified enterprise view of the business that encompasses all functions and departments; and (2) an enterprise database where all business transactions are entered, recorded, processed, monitored, and reported. This unified view increases the requirement for, and the extent of, interdepartmental cooperation and coordination but it enables companies to achieve their objective of increased communication and responsiveness to all stakeholders (C. Dillion, 1999).

Enterprise systems appear to be a dream come true. The commercially available software packages promise seamless integration of all information flows in the company : financial and accounting information, human resource information, supply chain information, and customer information. For managers who have struggled, at great expense and with great frustration, with incompatible information systems and inconsistent operating practices, the promise of a quasi “off-the-shelf” solution to the problem of business integration is enticing. Table1 illustrates the scope of an enterprise system.

<Table 1> The scope of an enterprise system.

Financials	Human Resources	Operations and Logistics	Sales & Marketing
Accounts receivable and payable	Human-resource time accounting	Inventory management	Order management
Asset accounting	Payroll	Materials management	Pricing
Cash management and forecasting	Personnel planning	Plant maintenance	Sales management
Cost-element and cost-center accounting	Travel expenses	Production planning	Sales planning
Executive information system		Project management	
Financial consolidation		Purchasing	
General ledger		Quality management	
Product-cost accounting		Routing management	
Profitability analysis		Shipping	
Profit-center accounting		Vendor evaluation	
Standard and period-related costing			

A successful ERP project can cut the fat off the operating costs, generate more accurate demand forecasts, speed production cycles, and greatly enhance customer service- all of which can save a company millions of dollars over the long run. But the price of securing the benefits of ERP may be high. Not only do ERP systems take a lot of time and money to implement, they can disrupt a company’s culture, create extensive training requirements, and even lead to productivity dips and mishandled customer orders that, at least in the short term, can damage the bottom line.

Moreover, according to Standish Group research, 90% of ERP implementations end up late or over budget. Although it has been estimated that the payback period for an ERP system typically ranges from one to three years, the evidence is mixed. Based on Meta Group survey data the average implementation cost \$10.6 million and took 23 months to complete. In addition, an average of \$2.1 million was spent on maintenance over a two-year period. Ultimately, their research indicated that companies showed an average ROI loss of \$1.5 million over a six-year period (Stein, 1999).

2. Materials and Methods

This survey has been divided into three categories; pre-implementation, implementation and post-implementation of ERP systems. The main organizational preparedness for embarking on ERP are as follow:

1. **Infrastructure Resources Planning:** The objective is to ensure that adequate infrastructure is planned for in a way that it becomes reliably available well in time (both for the pre-implementation and the post-implementation stages). Hardware and networking infrastructure is something quite basic and required even for non-ERP applications. Moreover, network standards are generic, common for all ERPs and therefore could be planned and put in place in advance. As far as ERP is concerned, a reliable Local Area Network (LAN), with adequate bandwidth, must be in place well in time because ERP implementation is technically cumbersome and it should not have to contend with the teething problems of networking.
2. **Local Area Network:** The network trend today is for a centralized server location. A structured cabling with fibre optic with switched Ethernet or fast Ethernet would be adequate for any ERP and would also support other applications.
3. **Servers:** These would depend on the ERP and could be ordered only after the ERP has been selected. However, it is better to plan for a lower end server that would be available for training and modeling. This could be made available from the time the decision for the ERP is made, because most organizations take a long time in deciding about which ERP package to deploy. An adequate server/network, even during the training/modeling phase, must be available.
4. **Personal Computers:** If the computers purchased were the latest configuration, they would be quite adequate for most ERPs.
5. **Training Facilities:** An adequate training center must be planned for. Temporary centers with makeshift facilities could be counter productive.
6. **Human Resources Planning:** What makes ERP difficult to implement is that it could succeed only through teamwork and the team size spans across the entire organization.
7. **Education about ERP:** If staff have the right attitude, they must understand what ERP is and also what it is not. Across the organization, ERP education should be carried out. This could be about ERP principles in generic items and case studies to point out what attitudes and principles have succeeded at other places and what have been the stumbling blocks.
8. **Commitment:** If ERP is recognized as a difficult but necessary project, then the best people must be released for it on a full-time basis. Those who could not be spared are the ones who would be required on

the ERP team. Adequate advance planning is often necessary to be able to release the best people. There must be commitment for this at all levels of management, be it operational or tactical.

9. **Top Management's Commitment:** At the strategic level, top management must also have the willingness to allow for a mindset change by accepting that a lot of learning has to be done at all levels, including themselves. This attitude would open up forums, like the exchange of ideas with people who have already done it and videos of successful implementation.
10. **Greenfield Site:** Implementing an ERP on a Greenfield site is always much easier than an existing site, because at an existing site, unlearning and retraining are major steps. Also, migration of past data into the new system is not required. Coupled with this, is the fact that it is not easy to spare people from their current jobs to take on the new task. However, if a company is willing to consider an ongoing site, almost as a Greenfield site, and focus on learning and implementing only the new procedures, the implementation could be rapid. In the interest of speed, even migration of old data can be kept to the minimum to begin with.
11. **Manual Systems :** A reasonably working manual system for materials management like stores procedures, and the discipline of doing work through documentation is also a necessary prerequisite. An audit should be carried out to find the current status and corrective action taken , and training carried out to make the current systems give an acceptable tally between the physical stock and book stock.
12. **Centralized Vs Decentralized Systems :** Most organizations have more than one manufacturing location and all organizations have branch offices. The broad decision one needs to make is whether each location would have servers or would they be only centrally located. It would be worthwhile to go for centralization of IT resources. (Siriginidi Subba Rao, 2000)

Organizations implementing enterprise resource planning packages (or any other large-scale software packages) will find gaps between organizational requirements and package features. These gaps require the organization to decide whether to customize the package or to change organizational practices to fit the package. ERP vendors and consultants strongly advocate adoption of the package with minimal customization for a variety of reasons (Brehm, Heinzl, and Markus, 2000): to minimize implementation risk, reduce implementation cost, avoid negative impacts on system performance, facilitate adoption of future package upgrades, reduce maintenance costs, and foster adoption of process-oriented “best practices.” Organizational users, however, often demand to have the ERP package customized to meet their operational needs, minimize disruption to established ways of doing things, and meet regulatory requirements and customer needs.

In technology implementation, misalignments occur when features of the technology do not fulfill the requirements of the organization. Robey and Boudreau (1999) suggested that it was advantageous to take a dialectic perspective of information technology (IT) implementation, because explicit recognition of the opposing forces underlying the implementation often leads to creative ways to manage the tensions. If we view technology as a material artifact , Orlikowski, (1992) noted that, a software package with its embedded features and functionality is the product of

human action, reflecting developers' assumptions about business rules, norms, and values. These assumptions, norms, and rules (or structures) are built into the technology. These structures embedded in the technology have the potential to shape the organization in various ways, as demonstrated in studies by Barley (1986), DeSanctis and Poole (1994), and Orlikowski (1996). For example, Orlikowski (1996) showed organizational users who appropriated the new Lotus Notes technology into their work practices, resulting in changes to the nature of work, workload, patterns of interaction and coordination, performance evaluation, and accountability. Clearly, the technology exerts forces that can influence the organization in a variety of ways. The impact is not deterministic, as much depends on decisions made during implementation, as well as appropriations made subsequently in use.

Most of the studies that recognize the structures embedded in technology focus on the use phase (Volkoff, 1999, is a notable exception). However, these forces surface and begin to impinge on the consciousness of organizational participants as early as the implementation phase. Organizational participants in the technology implementation project begin to understand the potential implications for how work will be done for organizational structure, controls, and decision making. As a result, misalignments are identified during implementation and important decisions are made regarding the misalignments that affect how the technology will impact the organization when it is subsequently deployed. Just as one set of forces arise from structures (reflecting developers' assumptions, norms, and values) embedded in the technology, another set of forces arise from structures in the implementing organization. These structures reflect the assumptions, norms, and values of the organization's members. Misalignments arise when the organizational structures are in opposition to the structures embedded in the technology. Therefore, when an organization decides to implement an ERP package, it is necessary for it to first understand the structures that are built into the package (C. Soh et al., 2003). These opposing forces are as follow:

Integration-differentiation conflicts arise from the tension between the embedded ERP structure that promotes integration and the localized need for differentiation. One such misalignment involved the areas of materials management and finance. This misalignment revolved around issues of common data structure, data ownership, responsibility for data entry, and related changes in workflow.

Another source of misalignment springs from the opposing process versus functional orientation. In fact, the structures within the ERP package tend to support a process view, in contrast to the functional setup of the organization. Among other things, the ERP package required data about a transaction be captured as it is moved through the organization. This meant that data capture could not be relegated to back-office, administrative staff, but often had to be performed by front-line, operational staff. Moreover, process orientation requires changes in workflow, as handling of transactions is no longer limited by functional boundaries.

In attempting to meet the diverse needs of many organizations, ERP packages have built in a high degree of flexibility. For example, flexibility is promoted through offering users a large number of screen options and many possible paths in navigating among the screens. The underlying assumptions are that users are sophisticated and the variety of tasks performed requires flexibility. Project team members voiced concerns about the likelihood of

incomplete and inaccurate data input (both in the project meeting minutes and in interviews). Many of these concerns surfaced as requests for certain fields were made compulsory; that is, project team members wanted to make the system more restrictive so that users could not leave the current input screen unless certain data fields were completed.

The last set of dialectic forces springs from the processing rules embedded in ERP that reflect the environment of the countries and sectors that the developers based their reference models on. Country-specific factors include national culture, the regulatory environment, level of national wealth, the degree of government involvement in the economy, and the level of education. Sector-specific factors would include revenue generation (different for public vs. private sector), and cost allocation metrics (different for manufacturing vs. service sectors). (C. Soh et al., 2003).

<Table 2> Overview of opposing forces

Opposing Forces		Examples	Misalignment	Impact
Integration	Differentiation	Materials management group and finance now have to share a common database.	Data ownership workflow	Created different views of the data so that materials management enters certain data and finance enters other data.
Process orientation	Functional orientation	Nurses expanded job scope to include capturing patient data at transfers.	Workflow job scope	Errors in billing, and resource (e.g., beds) planning.
Flexibility	Restrictiveness	Some fields to be made mandatory for input.	Data entry	Screens customized so that some fields are mandatory.
Package domain specific	Organization domain specifics	Revenue computation and collection	Processing/Billing	Customization by creating an add-on module that handles the local revenue computation rules, and counter-collection functionality.

In addition, other common pitfalls in ERP implementation could be presented as follows:

It is a mistake to cut corners on training. Successful ERP implementations depend on successful training. Training may include: classroom instruction supplied by your ERP vendor; or from Web, interactive and other distance learning courses. Ask referral ERP users what training tools proved most important for them. Evaluation committees should consider what kinds of training are available from prospective vendors, and what percentage of the total ERP system cost should be budgeted for training. Many vendors recommend at least 10 per cent to 15 per cent. Some recommend an estimate of 120 hours per person. It is likely that your training investment will help drive your rollout plan; that is, the more you spend on training, the faster your rollout may be accomplished. Training should be synchronized with your overall implementation project. Keep in mind that formal training of all users is not

normally deployed at the beginning of the implementation. If you train too early, users may forget how to perform their new tasks by the time the system goes live. Training can take place as late as two weeks before the beginning of the implementation cycle.

Usually the training of the users is done by the training staff who first learned how to use the ERP system during the Pilot. User training is ideally performed on the customers' premises, using the organization's line-of-business data and the new ERP system. Be aware, however, that it is often difficult to get trainees to sit all day through on-site training. They may be inclined to run in and out of the training sessions, answering telephone calls and responding to everyday problems within their departments. This should not be permitted.

Many costs associated with a large IT or ERP implementation are obvious. For example, software licenses, implementation services, and data conversion are all direct costs that make it into most business cases. However, there are others that are not so obvious, such as internal resources required to support the project team, costs to backfill the day-to-day work of project team members, process improvement, hardware upgrades, training, and organizational change management. All of these costs should be included to accurately reflect the true total cost of ownership of your project (Erik Kimberling, 2006)

Implementing an ERP Solution takes time and cannot be rushed. Once due dates start to slip, you cannot simply throw bodies at the problem and expect to meet the now unrealistic deadlines. In layman's terms, "You cannot put nine women who are one-month pregnant in a room for a month to get a baby." ERP project managers need to have the means to accurately ascertain progress. Too often, especially on large complex engagements, there are not enough objective deliverables or milestones set early on, so that the consulting team is able to coast along for months. By adopting a phased approach, and insisting on short term milestones and deliverables that demonstrate tangible progress, project management can reduce risks and identify weak or underperforming team members early (Ren Bellu Anexinet, 2006).

During the late 1990's, in the rush to get on the web, companies hired design firms to create web sites. Many of these sites allowed customers to browse items and place orders. Only after the sites were designed and built did companies realize they had no way to process the web orders. Too many managers underestimated the difficulty of electronically linking the web site to sales order processing, inventory control, accounts receivable, and general ledger systems. The web site did not talk to the back office. Worse yet, they did not even speak the same language- inventory items on the web site used different codes than those in the order entry system, and different yet again from those in the purchasing department. Lessons learned are to implement ERP first, then extend it to include an e-commerce enabled web site (Ren Bellu Anexinet, 2006).

From experience, companies embarking on massive re-engineering in their core processes, subject the company enterprise implementation to higher risk with greater probability of failure. It is our recommendation that companies

should implement less re-engineering effort and more process enhancement. This will expedite the implementation and will have less disruption on a company's culture. We recommend an approach where there is an upfront analysis of such business issues as company competitiveness, the long-term business objectives, a detailing of the functional business processes, a listing of the business issues at an operational level, and a listing of the company initiatives.

Enterprise resource planning, when successfully implemented, links all areas of a company including order management, manufacturing, human resources, financial systems, and distribution with external suppliers and customers into a tightly integrated system with shared data and visibility (Escalle et al., 1999).

Concurrently, while many business processes, including finance/accounting and human resource management, are well supported by most installed ERP systems, these systems currently provide weak support in less data-intensive areas such as supply chain planning, customer management, and marketing and sales. Fortunately, enterprise system developers have begun to provide solutions that overcome such weaknesses. They have recently developed supply chain optimization (SCO) and customer relationship management (CRM) strategies and systems in an attempt to seamlessly link front office (e.g. sales, marketing, customer services) and back office (e.g. operations, logistics, financials, human resources) application to enhance competitive advantages. Figure 1 depicts the future trend in this direction.

The majority of existing ERP systems are still transaction-oriented, enabling transaction-oriented business processes such as order entry and collection of transactional data. Thus, they offer very limited planning and decision support capabilities. Advanced planning systems (APS) employ sophisticated mathematical algorithms to model and analyze supply chain constraints to develop plans that provide optimal or near-optimal solutions. Due to the application of optimization or heuristics techniques, these cutting-edge systems are also referred to as SCO by such leading vendors as i2 Technologies and Manugistics Inc. Since APS do not generate their own data, they can be integrated with ERP systems to draw upon massive amounts of transactional data, though the data can be drawn from other data repositories as well. Thus, for companies that already have their ERP up and running well, APS can bring additional and substantial benefits and thus allow them to better utilize the investment in their ERP systems. Companies that have implemented APS have reported staggering benefits such as an improved fill rate and on-time delivery (30 percent), reduced order cycle time (50 percent), and reduced inventory (50 percent) (Kilpatrick, 1999). A recent study by AMR Research also confirmed that many companies have achieved payback on their investment in SCO in one year – some by as much as 300 percent (Latamore, 2000). Nevertheless, the implementation of APS or SCO, especially when integrated with ERP systems, cannot be successful without significant changes to business processes and organization. In addition, top management must fully understand the degree of the changes and supports needed for the new project and be comfortable with the fact that the decisions their planners make will have a profound impact on the entire supply chain. Companies must be prepared to realign their internal supply chain processes and, if necessary, adjust their relationships with suppliers.

The integration of APS or SCO with ERP also requires a higher level of mutual trust and openness among trading partners. Equally importantly, top management needs to change traditional performance measures such as units produced or unit costs to encourage a more balanced and global perspective that recognizes the contribution of all supply chain partners involved.



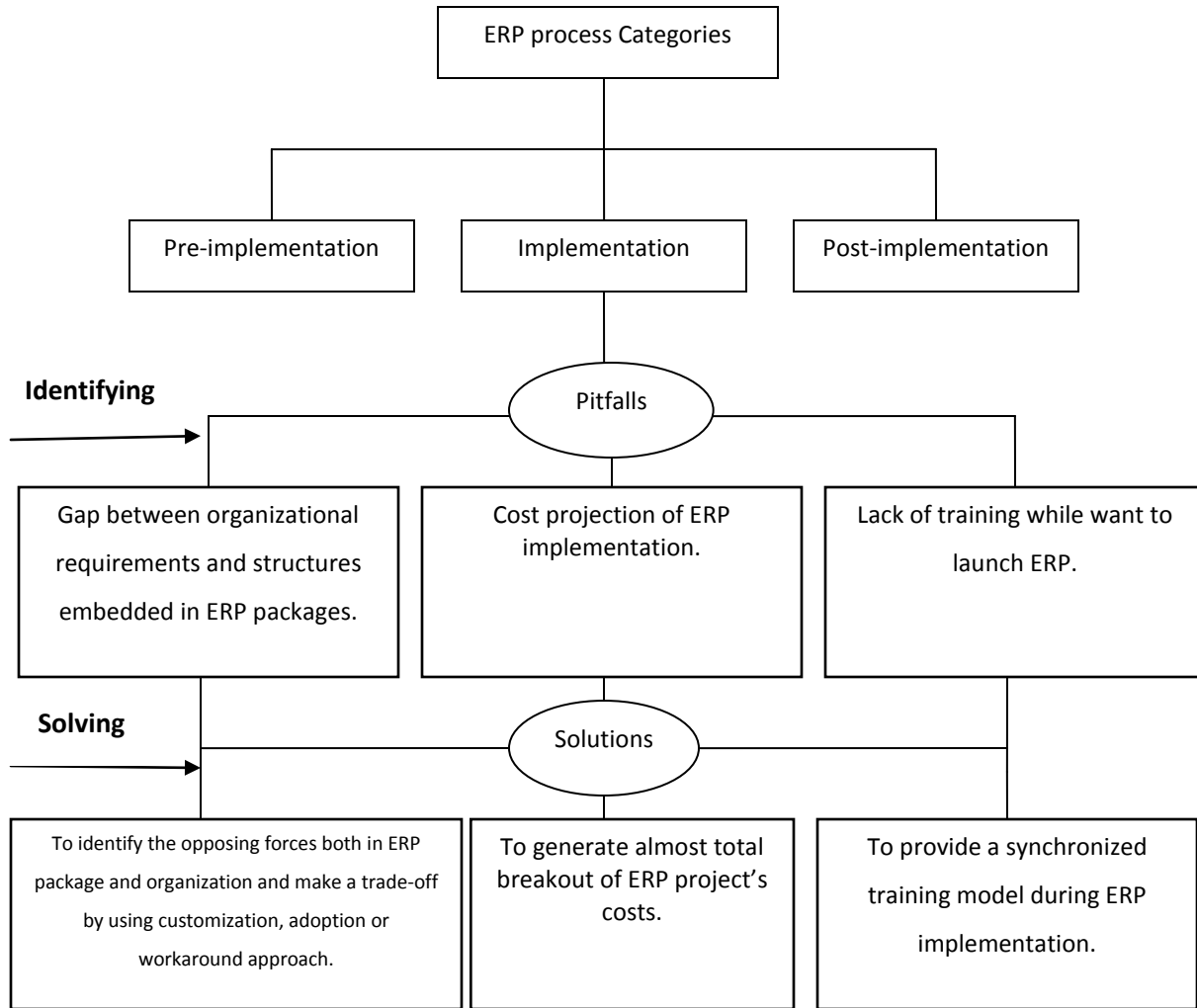
<Figure1> The future trend of ERP

The increased power among buyers and decreased market entry barriers, along with an ever-expanding palette of products and services, have forced firms to rethink ways of keeping their customers loyal and protecting profit margins. It is no secret that developing a long-term relationship with a customer is more profitable than acquiring a new customer. A recent survey also reveals that firms striving to improve customer loyalty are 60 percent more profitable than those who aren't (Saunders, 1999). Customer relationship management (CRM) is a customer-centric business model.

An outgrowth of sales force automation (SFA) tools, CRM systems are also referred to as one-to-one marketing. They can utilize the data mining capabilities of ERP systems and data warehousing to uncover profiles of key customers, customer profitability, and purchasing patterns (Conlon, 1999). The result of harnessed technology, integrated customer touch points and a complete view of customers' needs and wants is superior customer loyalty, reduced cost of sales and services, and ultimately, improved bottom line profits. Major ERP vendors are gearing up for these growing needs by aggressively forming alliances with or taking over other software companies that have been operating in the CRM market. For instance, J.D. Edwards entered into a deal with Seibel, a leading CRM company, in May of 1999 and subsequently shut down its in-house SFA team. Peoplesoft acquired Vantive's CRM software in October of 1999 to integrate with its own ERP systems. Through mySAP initiatives, users of SAP R/3 system can add Web-based CRM and supply chain management (SCM) functions while leaving the core R/3 system intact (Xenakis, 2000). Oracle has taken the most drastic steps in forming a new bond between ERP and CRM. The new flagship ERP/CRM software package, called 11i, is heavily Internet oriented and allows users to seamlessly implement modules of CRM with a smaller ERP suite (Sweat, 2000).

A recent AMR Research report predicts that the CRM market will exceed \$20 billion by 2006. While firms can benefit from lessons learned from ERP implementations, the implementation of CRM systems as either bolt-on or new generation CRM/ERP systems may not be any easier. Like many enterprise systems, successful CRM implementation requires significant changes, especially when integrated with ERP systems, because the combined impact on business processes and organization will be astronomically profound. It requires redesigning core business processes around customers, as the goal of a customer-centric approach is finding products or services to fit customer needs as opposed to finding customers to fit the products. In fact, Dickie (1999) recommends not

initiating a CRM project if senior management does not fundamentally believe in reengineering to a customer-driven model. Employee resistance will not be a surprise, as their positions will be reassigned or eliminated. Culture change is also expected as customer touch points will be linked and the sales department will no longer be the sole owner of customer data. Instead, customer data will be shared across the enterprise or the entire supply chain.



<Figure 2> Research framework

3. Research Methodology

This research is related to the some potential pitfalls around the ERP implementation and tries to comprise most of the elements that would be included in this issue beside some helpful solutions to improve the efficiency of such intergrated systems. Should be mentioned that the information and data of the research project were gathered from various sources of secondary data included journal articles published in magazines and downloaded from the Internet Websites including Emerald, Ebsco, Proquest, ScienceDirect. The Internet search engine like Google and AltaVista also offered excellent search for locating on-line articles. The following research framework was adopted for our study.

4. Results and Discussion

In this part of the paper a complete description of research problems and correspondent solution beside some other findings that might be helpful during each stage of ERP system would be posed. In the stage of readiness should be mention that planning and preparation process consumes a significant portion of time in an ERP project. Just as a woodcutter will often spend one third of his time sharpening the axe before he starts chopping wood, preparation for the ERP project makes the job go more smoothly and quickly. One of the first steps involves evaluating the needs and requirements that will drive the implementation of an ERP system. A needs assessment with a definition of requirements is essential not only to guide the start of the project, but also to gauge the success of the project after completion. We should ask ourselves, “What do I want my business to become?” At this stage of the game the needs assessment should stay at a strategic level and not get so detailed.

The basic description of needs should be refined to a set of specific institutional acceptance criteria at an early phase of the project. This statement will be used at a later date to help evaluate the success of the project in meeting these goals. The next step is to review the different solutions available and see which system can best fit your requirements. As part of the fit analysis, we might develop a detailed accounting of gaps. We’ll need to conduct an evaluation that compares the trade-offs among the various solutions. For example, some solutions are more flexible and can accommodate a wider range of best practice models. Other systems have less flexibility and will require custom modifications to make changes. We should factor the added costs of modifications into the decision process and establish a formal process for evaluating and prioritizing modifications early in the project.

Another issue to consider is best-of breed versus integrated solutions. ERP solutions today often have a spearhead application — some are better at finance, others at human resources. One option is to integrate best-of-breed elements from different vendors; another is to pursue an integrated solution from a single vendor. While an integrated system might not provide the best available solution in all cases, the advantages may outweigh the benefits of best of breed. Integrated solutions often leverage the advantages of having an integrated store of data. The challenge in this rapidly changing environment with its frequent new releases is to ensure that the different systems work well together. Over time, the differences between ERP systems have become less pronounced, and multiple vendors now offer integrated solutions. Also, we should not underestimate the time saved in dealing with only one vendor versus the burden of maintaining relationships and communications with multiple companies. Finally, ERP implementation plan must either follow a phased implementation or attempt the big bang approach. A phased implementation — usually the wisest and most cautious course — takes longer and can incur higher consulting costs.

The pitfalls of ERP implementation are manifold. In the research problem stage, the gap between organizational requirements and structures embedded in ERP system was identified as one of the significant pitfalls. Based on the survey, three major positions need to be addressed, namely- customization, adoption and workarounds.

Customization provides greater fit with organizational requirements but incurs significant costs (both current project and downstream maintenance and upgrades) and has system performance implications (Markus and Tanis, 2000). Adoption may result in improvements in process efficiency, but may also result in legitimate organization needs not being adequately met. Workarounds usually have negative impact on productivity and organizational controls and undermine potential benefits from integration. As depicted in the literature survey, the opposing forces that result in such misalignment are integration and differentiation, process-orientation and functional specialization, flexibility and restrictiveness, and packaged versus organizational domain specificity.

The findings thus show that misalignments that emerge in ERP implementation can be traced to a few fundamental incompatibilities between the embedded structures of ERP and the implementing organization; namely, the tensions between those opposing forces. A dialectic perspective suggested a preliminary typology of misalignment based on the underlying opposing forces. With an appreciation of the embedded structures of ERP, one can examine them against corresponding structural forces in the implementing organizations. The mapping efforts require conscious surfacing of the specificity about the organizational structure, the nature of tasks, the assumptions on user competency, and its business model of funding and resource allocation. Recognizing the tensions between the underlying structures helps to conceptualize the ways to deal with misalignments. At one extreme, an organization can choose to restructure the embedded forces within ERP to forge alignment (e.g., by heavy customization of ERP features like setting up functional identifiers and restricting transaction paths).

However, the organization's inability to control the evolution of the structures of ERP packages in future versions render this option transient, inefficient, and costly. On the other hand, an organization can choose to change its own structures to match those of ERPs (integrative, process-oriented, etc.). The decentralized, functional setup of many organizations, however, demands significant organizational transformation. In most cases the focus is largely on the implementation of the package, and less on the redesign of organizational processes and structures. This approach to technology implementation has been noted in many other studies (Venkatraman, 1998), and has been shown to produce a lower level of organizational benefits than when organizational transformation is explicitly sought. Organizations too often assume that the technology itself will be the "magic bullet" (Markus and Benjamin, 1998) that delivers organizational change, and therefore do not engage in the change management behaviors needed to bring about the transformation. Even with a transformational intent and aggressive change management, most organizations are unlikely to be able to fully align the structural forces at play between the ERP and the organization.

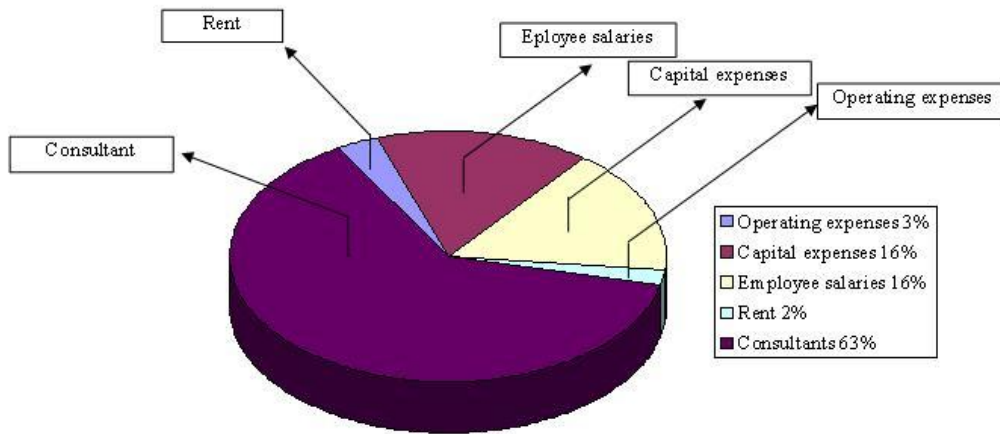
The dialectic view of misalignments takes into account the trade-offs that must be made when dealing with the misalignments. The trade-off issue is illustrated by the prioritization of functional specialization over the process-orientation. The greater screen maneuverability and input variety has "added extra steps to the process" and introduced more data entry errors. Thus, the dialectic perspective helps to assess the trade-offs inherent in solutions to misalignments. Having full integration will tend to compromise differentiation issues (e.g., restricted access) simultaneously. Similarly, flexibility in screen navigation will inevitably add to input complexity. The issue

management has to deal with is to decide on the prioritization of these conflicting structural forces at play and once a choice is made, factor the trade-off issues into change management.

In general, the observation shows that domain-specific misalignments often necessitate customization or the institution of significant workarounds whereas the other three dialectic conflicts tend to result in adoption or workaround resolutions. The dialectic perspectives also remind that these embedded structural forces will continue to operate in the future. Over the long run, an organization may aim to influence the development of its own structures to converge with those embedded within ERPs. As it does so, it may reap greater benefits from integration and process efficiencies. It is perhaps harder to shape the assumptions, norms, and values among the ERP developers. Organizations may attempt to influence ERP vendors by banding together

In relation to cost projection for ERP projects some important items should be considered. Indeed, many of the direct costs of ERP project are obvious. As a result, project planners often budget and account for them directly. However, these costs don't represent the total cost of ownership of an ERP system. The direct costs include the costs of the software applications and tools. These applications are often licensed according to the number of users, so planners need to project anticipated growth based on new web-based applications, not the installed base of legacy systems, which perhaps restricted user access. Next, there is a need to consider about underlying database management system. As it happens, little competition affects this product space at present, though some ERP vendors are making significant efforts to integrate with more than one database vendor. Experience with the hardware environment shows that probably there is a much more need for hardware than anticipated. The hardware components budgeted should include the central servers (CPU, disk, and network equipment). The need to upgrade PCs to a designated minimal configuration should also be considered. (D. Swartz and K. Orgill, 2001).

Probably the largest area of costs will accrue from personnel : project staff, back-filled staff, consultants, recruiters, project managers, and raises for personnel. We should not forget the need and costs for training and mentoring. Contracts with consultants often leave out the important area of knowledge transfer. While we budget for the main consultants to assist us with the project, we should not forget for get consultants to conduct a risk assessment and audit of the project at midstream and prior to cutover phase. Another cost issue to consider before initiating the project is the cost of ongoing maintenance and future upgrades. ERP upgrades aren't cheap and often involve considerable effort. Figure3 provides the breakdown of costs for an ERP project. Note that the highest percentage goes to labor (63 percent consultants and 16 percent employees), followed by costs attributed to capital including hardware and software (16 percent), than operating expenses (3 percent) and rent (2 percent).



<Figure 3> Breakdown of cost

Finally a training model during implementation, must be in place and care should be taken in its implementation and management. Based on the surveys observed, many experts cited hiring a consultant as the most innovative training approach, as expressed by one respondent, who said, "We are seeing companies swing to the short-term expense of bringing on consultants that partner or pair up with in-house people, and thus facilitate knowledge transfer over the course of a short period of time,"

The current method of training is increasingly done through the Internet, and this in itself has undergone rapid changes to become a much more interactive avenue. The vast majority of major employers have at least some sort of online training initiative. A Forrester Group survey of 40 Global 2500 companies found that all except one had an online training initiative in place. Respondents' enthusiasm for online training centered mainly on cost savings and convenience. The study cited two obstacles to online initiatives: static, non-mandatory content, and users who prefer traditional educational methods such as live classrooms. Providers are already looking beyond offering cost savings and convenience, and are starting to develop more highly interactive solutions. Keystone Learning Systems is one such provider. Keystone president Clint Argyle said, "Our goal is to deliver a self-paced solution, but to make it as comparable as we can to instructor-led facilitation. Instructor-led training is the way our society learns things from grade level on up--having a teacher in front of the class teaching us what we're doing."

Global Knowledge Network has also taken up the challenge to deliver interactive content through its Interactive Distance learning (IDL) programs, which provide live, two-way audio instruction through a web-based connection. Global Knowledge's Vice President of Distance Learning, Bob Sanregret noted that, "The majority of the class is taught using two-way voice over IP, so you can raise your hand virtually, and the instructor gives you a microphone and then you can talk." For companies that are cost conscious, online training and in-house training libraries are the way to go. One training broker, IQDestination.com, lets you name your own price for training courses. Modeled after the popular Priceline.com system of reverse auctions, IQDestination.com has more than 650 training centers in

its database. You simply specify what cities you can go to for training, what courses you want, and list a target price. Training centers then review the criteria and place bids.

"It's absolutely perfect for training centers to be able to have an alternative channel to deliver inventory that's otherwise wasted." said IQDestination.com CEO, Brent Handler. He gave an example of one Los Angeles company that purchased seats at a MCSE (Microsoft Certified Systems Engineer) course for four employees, and saved 50 percent. Listed at \$12,000, the company got them for \$6,000 a seat. For companies that transcend cost-consciousness and delve into being downright cheap, there's FreeEdu.com. The company offers hundreds of IT-related courses, aggregated from major content providers like SkillSoft. You pay for courses using a Knowledge Point system. Certain courses may be taken at first for free, and you earn Knowledge Points upon completion. You can use those Knowledge Points to pay for subsequent classes, or you may have the option of putting down a small refundable deposit of \$50 to \$100

One of the most common training solutions is the creation of a corporate library, where an employee can check out CD-ROMs or videos on specific skills. "One of the biggest advantages to self-paced training is that it doesn't go away," said Argyle. "It's there in your library to refer to and to review any time you need to." Argyle touts the advantage of CD-ROMs and videocassettes as a delivery vehicle. "It's much faster running around in your local workstation than streaming it over the Internet. It's also full-motion video and audio. It's a much better experience right now with the bandwidth problems we're having with the Internet. Everybody's talking about higher bandwidth and being able to have better delivery-and it's coming-but it's not there yet."

Mark Hall, cofounder of Ed-X, a portal for online educational opportunities from multiple providers, says, "One of the big things I think is going to happen will be the convergence of audio and video with text, as access to higher bandwidth continues to be more readily accessible to a broader population. That's going to open up a whole new variety of very enticing content. We'll actually be able to interact in many cases with professors at certain times, face to face, through video conferencing at your desktop."

Though we have identified the major pitfalls in ERP implementation, yet, there are some other organizational constraints that should be taken into account, some of which are listed below :

ERP Implementation - Implementation success depends on the skill and experience of the workforce, including training about how to make the system work correctly. Many companies cut costs by cutting training budgets. Privately owned small enterprises are often undercapitalized, meaning their ERP system is often operated by personnel with inadequate education in ERP application.

Personnel Turnover : It is not uncommon for companies to employ new managers lacking education in the company's ERP system, which results in proposing changes in business practices that are out of synchronization with the best utilization of the company's selected ERP.

Customization :- Product customization of the ERP software is usually limited. Some customization may involve changing of the ERP software structure which is usually not allowed due to Intellectual Property Rights (IPR) issues..

Annual Licencing Fees : ERP vendors can charge sums of money for annual license renewal that is unrelated to the size of the company using the ERP or its profitability.

Poor Technical Support : Technical support personnel often give replies to callers that are inappropriate for the caller's immediate problem resolution, which may frustrate the support mechanism. Concerns about computer security may also arise, for example, when telling a non-programmer on how to change a database as a 'quick-fix' approach.

Systems Integration Issue : Many of the integration links between applications need high accuracy in other applications to work effectively. A company can achieve minimum standards in the short run, but in the long run, due to poor housekeeping procedures, "dirty data" will reduce the reliability of some applications.

Switching Costs : - Once a system is established, switching costs are very high for any one of the partners (reducing flexibility and strategic control at the corporate level).

The successful implementation of ERP systems has more advantages than disadvantages. An ERP system leverages a company to gain strategic benefits and to position itself in a competitive position. It is imperative that strategic planners and functional managers at corporations are well aware of the pitfalls and its related issues to ensure a 'well informed' decision in ERP investment and implementation in order to reap its incremental benefits.

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