CRITICAL SUCCESS FACTORS IN ENTERPRISE RESOURCE PLANNING IMPLEMENTATION: CASE STUDIES OF TURKISH COMPANIES WHICH USE ORACLE ERP SOFTWARE

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ABSTRACT

CRITICAL SUCCESS FACTORS IN ENTERPRISE RESOURCE PLANNING IMPLEMENTATION:
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In this thesis success and failure of Enterprise Resource Planning (ERP) implementations through case studies of three Turkish organizations based on Critical Success Factors (CSFs) is investigated. The main purpose of this thesis is to reveal success and failure stories according to the effects of CSFs in ERP implementations. The case studies are composed of three Turkish organizations from different sectors. The data is gathered through active observations, analysis of project documents and interviews conducted with project managers who decided to implement ERP systems in their organizations, key users who involved in implementation projects, and consultants. All these projects are evaluated as success stories since most of the determined CSFs affected the implementation projects positively in these three organizations which have been using ERP system effectively for some period. Besides, the case studies show that there are problems about training, change management and legacy systems during projects and more attention should be paid on these issues during ERP implementation projects.

Keywords: Enterprise Resource Planning, ERP success and ERP failure, Critical Success Factors, Oracle Implementatio

ÖZ

KURUMSAL KAYNAK PLANLAMASI UYGULAMALARINDA
KRİTİK BAŞARI FAKTÖRLERİ:
ORACLE UYGULAMALARI KULLANAN TÜRK ŞİRKETLERİNDEN
DURUM ÇALIŞMALARI

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Bu tezde Kurumsal Kaynak Planlaması uygulamalarındaki başarı ve başarısızlık, Kritik Başarı Faktörleri baz alınarak, üç Türk şirketinde durum çalışması aracılığıyla incelenmiştir. Bu tezin esas amacı başarı ve başarısızlık hikayelerini Kritik Başarı Faktörlerinin Kurumsal Kaynak Planlaması uygulama projelerindeki etkilerine göre incelemektir. Farklı sektörlerden üç Türk şirketi durum çalışması olarak ele alınmıştır. Bilgiler aktif gözlemler, proje dökümanlarının incelenmesi ve Kurumsal Kaynak Planlaması uygulamaya karar veren proje yöneticileri, projede çalışan anahtar kullanıcılar ve danışmanlar ile yapılan görüşmeler sonucunda edinilmiştir. Şirketlerin bir süredir programı sorunsuz kullanmakta oldukları ve Kritik Başarı Faktörlerinin çoğunluğunun projeleri pozitif olarak etkilediği gözönüne alındığında, bu üç durum çalışması da birer başarı hikayesi olarak değerlendirilebilir. Bunun yanında, durum çalışmaları özellikle eğitim, değişim yönetimi ve varolan sistemlerle entegrasyon konularında sıkıntı çekildiğini ve bu konuların uygulama projeleri sırasında daha dikkatlice ele alınması gerekliliğini ortaya çıkarmıştır.

Anahtar Kelimeler: Kurumsal Kaynak Planlaması, KKP Başarı ve KKP Başarısızlık, Kritik Başarı Faktörleri, Oracle Uygulamaları

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LIST OF ABBREVIATIONS

AIM: Application Implementation Methodology

CRM: Customer Relations Management

CSFs: Critical Success Factors

ERP: Enterprise Resource Planning

IT: Information Technology

IS: Information Systems

MRP: Materials Requirement Planning

CHAPTER 1

INTRODUCTION

Recently, the most pressing issue in business environment is information. Competitive environment puts high pressure on organizations to be affective, to response fast and to make hard strategic decisions based on complicated huge data and complex environment. The information technology is becoming more important, as it affects all the areas of making business such as business procedures, strategic decisions, dissemination of information and daily operations in organizations.

The above mentioned need leads to application of information system for organizations. Enterprise Resource Planning (ERP) is one of them which is a high-end sophisticated software solution that reduces the pressure and workload of the managers and provides accurate, timely information for taking appropriate business decisions. The objective of the software is to integrate the functions and processes of all departments across the organization into a single computerized system (single database) to fulfill the needs of all various departments. By doing so, it promises effective communication and sharing of information within an organization. Thus, the trend is going towards to implementation of ERP solutions all over the world.

Managers with knowledge of ERP will be able to achieve their targets and goals by proper implementation of ERP system in their organization. In fact, managers are expected to transform the business rules and requirements into ERP software.

The ERP has been adopted by many organizations across the world especially in the last decade. Similar to most of the information technology projects, these ERP projects also incur high-risk and high-cost. There are many ERP implementation projects that are being executed recently. However, most of these projects are not evaluated after completion.

Among all technology installations, ERP installations are usually described as the most painful and fraught with change. The reason: a new ERP system does not just change one department or division — it changes the entire organization (Campbell, 2000). Therefore, ERP implementation is considered as a critical process since they are not only information technology projects but also they incur total change in business processes for most of the departments. It is indicated that approximately 90 percent of ERP

implementations are late or over budget, which may be due to poor cost and schedule estimations or changes in project scope rather than project management failure (Holland and Light, 1999; Donovan, 1999b). Therefore, ERP Implementation can reap enormous benefits for successful organizations-or it can be disastrous for organizations that fail to manage the implementation process (Holland and Light, 1999).

The primary purpose of the thesis is to reveal success and failure stories of Turkish organizations which implemented ERP system. The research is based on Critical Success Factors, which can be defined as the essential aspects of the ERP Implementation processes in order the project to be successful. The case studies of three Turkish organizations from different sectors constituted the subject matter of this research. As the aim of the thesis is to explore success and failure in ERP Implementations, starting point is determined to be the definition of success and failure. The investigation is conducted in two stages: First, the meaning of success and failure is analyzed. Then, the critical success factors realization in ERP implementation projects are investigated.

Definition of success usually differs according to people and their point of view. The general definition of success in ERP implementation states certain goals to be met such as; completion of project on time and with-in budget, realization of expected results and design , efficient use of project resources and satisfaction of stakeholders. On the other hand, projects that are over budget and exceed the planned time-scale, and do not fulfill the expected requirements are categorized as failure (Donovan, 1999b; Daneva, 2003; Smith, 2002; Chang, 2004).

In order to explore Critical Success Factors on the selected ERP implementation projects, first these factors are analyzed comprehensively. Then interviews are conducted with people who had worked for those projects. The following questions constitute the main structure of the interviews:

1. Do the project team members assess the ERP project as a success or a failure?
2. Are the project team members satisfied with the implemented ERP system?
3. How Critical Success Factors affect the implementation of the project?

The thesis is composed of four parts.

In the first part, introduction of thesis subject and research question are presented.

In the second part, the theoretical background of ERP is analyzed in three sections: First, definition, history and characteristics of ERP software are analyzed. Then,

ERP benefits and problems with ERP are discussed. In the last section of the second part, ERP implementation process, success and failure definitions and Critical Success Factors are investigated.

In the third part, research methodology, organizations which are subject to study is explained, and the results of case studies are discussed.

CHAPTER 2

THEORETICAL BACKGROUND

2.1. ERP Systems

The changes in business and economic environment emphasize the importance of information. According to Laudon and Laudon (1998), there are three main strong worldwide changes that alter the business environment in 1990s. "These are:

- The emergence of global economy,
- Transformation of industrial economies and societies into knowledge and information-based service economies,
- Transformation of business economies."

These changing environment and characteristics of business enterprise also change the information usage, storage and requirements of business organizations. An information system can be defined as " a set of interrelated components that collect, process, store and distribute information to support decision making, coordination, control, analysis, and visualization in an organization" (Laudon and Laudon, 1998). Although there are many types of information systems, management, organization and technology work together to create formal computer-based information systems that exist within the organizations. ERP System is one of these computer-based information systems that meets information integration requirements both within the organization and with its vendors and customers.

ERP is defined as business management system that integrates all facets of the business, including planning, manufacturing, sales, and marketing. As the ERP methodology has become more popular, software applications have emerged to help business managers implement ERP in business activities such as inventory control, order tracking, customer service, finance and human resources (Webopedia, 2006).

Therefore Sousa and Collado (2000) defines ERP as an integrated software package composed by a set of standard functional modules (production, sales, human resources,

finance, etc.) developed or integrated by the vendor, which can be adapted to the specific needs of each customer. The current generation of ERP systems claims that they also provide reference models or process templates which embody the current *best business practices* by supporting organizational business processes (Sousa and Collado, 2000).

2.1.1 Historical Development of ERP Systems

ERP has evolved as a strategic tool to manage business with continuous improvement in information technology (Tuteja, 2005). Inventory and manufacturing control would be seen at the roots of ERP.

Mostly, traditional ways for inventory management were used until 1960s. Then the first computerized systems were called Re-Order Point (ROP) systems were developed and used to control manufacturing inventory by re-ordering materials when supplies of the material were low (Karnopp, 2006).

Materials Requirement Planning (MRP) is a dependent demand system that calculates materials requirements and production plans to satisfy known and forecast sales orders (The Manufacturing Advisory Service, 2005). This technique fundamentally explodes the end product demand obtained from the Master Production Schedule (MPS) for a specified product structure, which is usually taken from Bills of Material, into a detailed schedule of purchase orders or production orders taking into account the inventory on hand (Tuteja, 2005). MRP helps calculate volume and timing requirements to meet an estimate of future demand.

There are three major types of computer-based MRP systems:

- MRP I,
- Closed loop MRP
- MRP II (The Manufacturing Advisory Service, 2005).

MRP I is used for inventory control, production planning and purchasing but not for capacity planning. MRP demonstrated effectiveness in:

- Reduction of inventory
- Reduction in production and delivery lead times by improving co-ordination and avoiding delays
- Making more realistic commitments
- Increased efficiency

In 1970s, ‘Closed loop’ MRP emerged as a response to the shortcomings of MRP I. ‘Closed loop’ MRP systems control capacity as well as inventory. They contain feedback loops that ensure that checks are made against capacity to see if production plans are feasible. All but the most basic MRP systems are now closed-loop systems (The Manufacturing Advisory Service, 2005).

In 1980s, the need was felt to integrate the other resources of a manufacturing organization. Therefore, the next generation of computerized control systems was the manufacturing resource planning (MRP II) systems which were developed. These systems integrated many other processes that are outside the operation function such as personnel, cash, and facilities to MRP to have one database access and used by whole organization (The Manufacturing Advisory Service, 2005).

The limitations of MRP II such as fixing lead times led to the development of total integrated solution called ERP that integrates the suppliers and customers with the manufacturing environment of organization (Tuteja, 2005). Although the development of ERP systems expanded in 1990s, it is stated by some of the researchers that the first actual ERP system was created in 1972, in Mannheim Germany, by five former IBM employees who founded the organization SAP to produce and market standard software for integrated business solutions (Enterprise Solutions Competency Center, 2006). One of the reasons why ERP and its usage improved significantly in the 1990's, is the Year 2000 computer problem. Businesses realized the benefits of ERP systems, which try to integrate entire organization, including accounting, human resources and project management focusing more on quality, therefore overcoming the Year 2000 problem, improving client server platforms and integrating all the core systems across their internal enterprise (Enterprise Solutions Competency Center, 2006).

This integration focus resulted in a considerable increase in the widespread use of ERPs. Today, in the world of the Internet and e-commerce, ERP vendors are moving toward integrating businesses with other businesses by building an organization that connects your supplier’s supplier to your customer’s customer (Enterprise Solutions Competency Center, 2006).

The early versions of ERP software were basically large-scale, on-site installations in the user organizations. (ICFAI University Press, 2006) Now, they are moving from client/server applications to Internet-based applications. ERP software will mostly used in electronic commerce, sales force customization and customer relationship management with

characteristics like self-service applications, web based order entry, expense entry (Sauter, 2006).

The competition on this market is increasing for small and medium sized organizations as most of the large organizations have already implemented ERP. Therefore, both large vendors of ERP and other local ERP suppliers are focusing on these organizations and their needs. According to research of Bernroider and Koch (2000) on differences in characteristics of the ERP system selection process between small or medium and large sized organizations, the adaptability and flexibility of the software is evaluated as more important by smaller organizations. Besides, a short implementation time and lower costs are estimated as vital aspects of ERP system in the selection process for small and medium sized organizations. Hence, the trend in ERP market is going towards to improve ERP programs with more standard implementation procedures and unique business processes that decrease implementation time and cost.

2.1.2 Characteristics of ERP Software Packages

According to Nah (2001) among the most important attributes of ERP are its abilities to:

- Automate, standardize and integrate an organization's business processes,
- Share common data and practices across the entire enterprise,
- Generate and access information in real-time.

ERP systems employ client/server technology, allowing a user's (client's) system to run an application (accounting, inventory management, etc.) that accesses information from a common, core database management system (server) (Allen et all, 2002). This system reflects the concept of decentralized computing simultaneously with a centralized database. This database structure allows all users to access on-line data to update and query within the determined user responsibilities and security.

Consolidating all business operations into a uniform system environment and using a centralized database operating on a common computing platform, ERP system components interact with an integrated set of commonly designed applications (Davenport, 1998). ERP system consists of different modules, so organization decides on the modules to be implemented. At the same time it has open system architecture which allows system to be interfaced or detached by any other module without affecting the system. It also supports third party programs as add-ons (Tuteja, 2005).

ERP systems usually support variety of organizational functions and suitable for wide range of business organizations (Tuteja, 2005). These systems have standard business process flows which are usually defined as best business practices. Although they automate the way of doing business, they must also be flexible to adopt and change according to changing business environment and needs of business organization.

2.1.3 ERP Suppliers

There are two ways for acquiring ERP software. One of them is to purchase pre-package ERP Software from an ERP vendor. Another one is to have a tailor made one especially designed for the organization.

AMR Research on ERP market shows that the largest ERP Software vendor seems to be German firm SAP. While the ERP market has grown in revenue, consolidation continues to change the industry. In 1999, the top five vendors (J.D. Edwards, Baan, Oracle, PeopleSoft, and SAP) in the ERP market accounted for 59% of the industry's revenue. AMR Research expects the top five vendors in 2005 (SAP, Oracle, Sage Group, Microsoft, and

Table-1: ERP Vendors Ranked by 2004 ERP Revenue *Source AMR Research, 2005*

2004 Revenue Rank	**Organization Name**	**Revenue 2004 ($M)**	**Revenue Forecast 2005 ($M)**	**Revenue Share 2004 ($M)**	**Revenue Share Forecast 2005 ($M)**	**Growth Rate Forecast 2004-2005**
1	SAP	9372	10403	40%	43%	11%
2	People Soft	2880	0	12%	0%	-100%
3	Oracle	2465	4534	10%	19%	84%
4	Sage Group	1243	1375	5%	6%	11%
5	Microsoft	775	891	3%	4%	15%
6	SSA Global	700	700	3%	3%	0%
7	Geac	445	445	2%	2%	0%
8	Intenti	388	407	2%	2%	5%
9	Infor	375	395	2%	2%	5%
10	Lawson	357	358	2%	2%	0%
	Total inc. other ERP Vendors	23649	24288	100%	100%	3%

SSA Global) to account for 72% of ERP vendors' total revenue. This picture has changed because in 2004 Oracle acquired PeopleSoft, which had acquired JD Edwards in 2003 [Table-1].

Pre-packaged ERP systems support many industries. These industries can include diverse industries such as automotive, construction, chemical, energy, professional services, utilities, and distribution. Generally, pre-packaged ERP systems must provide some customized software modules to facilitate these different types of industries (Karnopp, 2006).

2.2 ERP Effects

2.2.1 Benefits of ERP

The characteristics of automation, standardization and integration of real-time accurate data of ERP systems provide necessary business working conditions (Nah, 2001). The integrated software solution, which the ERP system provides, meets organizations' requirements of information processing. With its ability to automate and standardize business procedures, it increases efficiency.

Benefits of ERP to organizations can be analyzed as follows:

- Greater accuracy and timeliness of information is reached as data redundancy and duplicative data entry is reduced with a unique, common database. Information is organized in more efficient way and the system allows wide variety of individuals to access data. Therefore, management could have online access to information for decision making and managerial control.
- Decision making is based on accurate information as the integration of subsystems is maintained. The system support coordination across different business functions.
- The usage of the system with the requirements reduces paper documentation. For example the purchasing procedures include the approval hierarchy and notifications within the system.
- The system is flexible to respond changing business environment. The processes are consistent and based on an information model.
- The structure of the system allows analysis of costs and revenues based on product and customers according to the organization vision. This structure is maintained

during the implementation period with the reporting and analysis requirements of organization. Therefore, building a data structure in required levels, organizations could acquire data in detail which they prefer.

- Aggressive cost control is gained with more efficient manufacturing procedures. The decrease in operating costs, which is gained with the lower inventory control costs and productions costs, is an expected benefit of ERP system.
- Inventory problems, material shortages, delivery and cash management problems are eliminated with the accuracy of integrated data.
- Business processes are designed more efficiently with ERP system as the system requires standard business procedures. Therefore, daily operations are done more effectively.
- The ERP system improves also international operations by supporting a variety of tax structures, invoicing schemes, multiple currencies, multiple period accounting and languages.
- One of the significant benefits of the ERP system is the improvement in supply-demand linkage. The ERP systems streamline all supply chain processes in order to create plans and forecasts with optimization tools. Besides, aggregate planning and detailed scheduling could be used to ensure maximum benefits.

The potential benefits could be in terms of increase in sales, improvement in margins, and savings in inventory carrying costs. According to Meta Group (1999) survey conducted among the large enterprises that adopted ERP systems, the need to implement the ERP system arises from:

- internal integration,
- to support growth,
- to support new processes or a changed business model in a firm's supply chain.

The main and probably the most important promise of ERP is *the best business practices* they incur. ERP packages promises bringing the functionality of best way of doing business. This promise emerges from the experience that the ERP vendor got through implementations of the package in different industries and organizations.

2.2.2 Problems with ERP Systems

Despite the benefits and promises of ERP systems, there are many problems that can be associated with ERP systems. Although most organizations prefer to implement a standard ERP package, some organizations would prefer to develop their own inside ERP program or try to have tailor-made one according to their necessities. The reason for that may be explained as follows:

First, despite ERP packages promises standardization, automation, flexibility, and best practices for business operations, at the same time organizations may lose their competitive advantage by standardizing their business, as highlighted by Davenport (1998).

Second, ERP systems require massive investments. Total cost of acquisition and implementation of ERP package is very costly. These costs may be explicit costs of licensing and consultancy for implementation. However, there may also be some implicit costs such as maintenance of system after implementation and training and recruitment of qualified employee.

Further to the requirement of huge investments, ERP implementation projects incur high risk. Acquisition of right ERP package does not always mean that it will be configured effectively. The implementation project requires high level of expertise and long time. It needs effective and successful implementation period to fully realize the benefits of the system.

The implementation also brings risk because of its nature that necessitates radical changes within the organization. Difficulties in organizational resistance to change and unrealistic expectations may result in project failure. Therefore not only technical issues but also organizational culture plays a vital role in taking the risk for the implementation of ERP systems.

2.3 ERP Implementation

ERP Implementation is very difficult process because it requires long time and effort not only in the implementation period, but also in its all cycle from pre-implementation to post-implementation phases.

ERP implementation requires right implementation strategy to be adopted for it to be successful. In general, there are two different ERP implementation methodologies (Sousa and Collado, 2000: Holland and Light, 1999). One of them is *Big Bang approach* in which organizations install a single ERP system and leave using all their legacy systems at once. In

most cases, as ERP does not promise to meet all organization functions, this approach creates problems in implementation of multiple modules on one time (Koch, 2006). The other one is *phased implementation* which is composed of designing, developing, testing and installing of different modules of the same ERP package. This methodology is usually used when the organization will continue to use its legacy system.

The implementation strategy is mostly set-up by the managers in accordance with the organizational and technical constraints of the organization. The organization business strategy and organizational needs and requirements characterize the implementation method. The following questions are considered while making up the strategic decision:

- Which ERP package will be selected?
- Which modules will be implemented?
- How many/which functions will be used?
- When will they be introduced?
- To what extent integration will take place with the legacy system?

Sousa and Collado (2001) define ERP Lifecycle as *a structured framework that ERP system goes through during its whole life.* These ERP Lifecycle stages are:

- Adoption decision: It is a decision phase where the need for ERP become clear with the objectives of firm
- Acquisition: Selection process of the ERP package
- Implementation: Configuration of the ERP package inline with organization business processes
- Use and Maintenance: Use of product to utilize expected benefits
- Evolution : Improvements or additions to system take place
- Retirement Phase: Substitution of ERP with another new information system

Despite Sousa and Collado's definition of ERP Lifecycle consisting of six stages, in general in the literature ERP implementation process are divided and investigated in three stages: pre-implementation, implementation stage and post-implementation.

2.3.1 Pre-implementation Stage

Donovan (1999a) mentions the importance of pre-implementation tasks. These tasks are defined as designing the process need, cleaning up data files and educating people. He

states that without performing necessary pre-implementation tasks the problems would be the same as the old system although the implementation takes place.

But what is meant exactly with pre-implementation stage? This stage covers the adoption decision and acquisition of ERP package. In the first stage, depending on the size of the organization, type of business, customer base and business drivers, ERP software's are investigated. While evaluating ERP systems, the key issues to be examined are the functional fit with the organization's business processes, flexibility and scalability of the software, complexity and user- friendliness of the packages (ICFAI University Press, 2006). Furthermore, the ability of the package to support multi-site planning and control, the necessity of regular upgrades, customization required, and the local support infrastructure should be investigated as these affect cost of the project (ICFAI University Press, 2006).

Cost and benefit analysis of the proposed ERP projects are analyzed and assessed by managers before the implementation. According to the assessments made by managers two alternatives may occur: either choosing one of the best fit ERP package or tailor made system especially for the organization needs. Up to the decision the cost analysis of chosen project is carried out.

The typical costs involved in ERP projects would be in the areas of hardware, software, customization, data conversion and training. (ICFAI University Press, 2006) After considering the business costs involved, the annual cash flows due to the project can be estimated, and the net present value of the project can be derived. Managers, by carrying out a sensitivity analysis, will decide if the project is designed effectively both in terms of time and cost. This analysis will also provide the firm the need to have a contingency plan (ICFAI University Press, 2006).

2.3.2 Implementation Stage

The second stage is the implementation phase which needs huge effort and time. This stage is shaped with the implementation strategy applied and the phases of the project it incurs.

2.3.2.1 Phases

Implementing an ERP package is pretty long and cumbersome process. Step by step method of implementing will yield a better result as each successfully completed stage will allow a proper implementation process. The total time required for successfully

implementing an ERP package will be anything between four and twenty four months. The normal steps involved in implementation of an ERP are:

1. Project Planning
2. Business & Operational analysis including gap analysis
3. Business Process Reengineering
4. Installation and configuration
5. Project team training
6. Business Requirement mapping
7. Module configuration
8. System interfaces
9. Data conversion
10. Custom Documentation
11. End user training
12. Acceptance testing
13. Post implementation/Audit support
14. Online Support

2.3.2.2 Phases of Oracle AIM

Application Implementation Methodology (AIM) is a toolkit for deploying Oracle Applications, providing a tested framework for quality implementations. It is a mostly used roadmap to guide for implementation of Oracle Applications that are executed in Turkey and worldwide. It is developed from the experience of consultants, and has been applied in many enterprises to plan and execute successful implementations of Oracle Applications.

AIM consists of project management documentation templates which help project team to produce project deliverables. AIM is composed of step by step implementation processes which consist of the phases below (Lo et all, 2005):

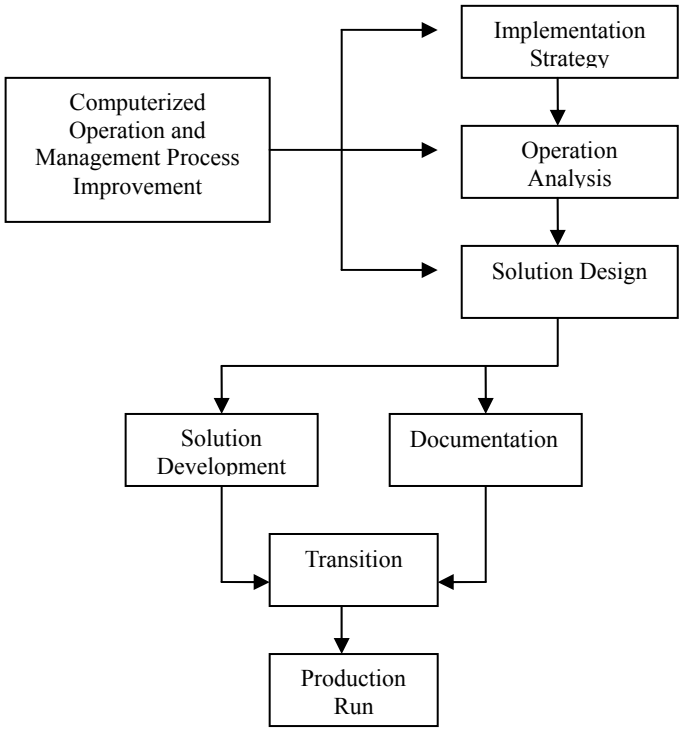

Figure-1: The AIM Flow (Lo et all, 2005)

1. **Definition Phase:** In the Definition Phase of implementation project, the project planning and project team composition is conducted. The necessary project environment, sources and infrastructure are designed and planned. There are two main parts in this phase.

- Currently Based Business & Data Conversion: Complete business analysis of current business flows such as sales, procurement, accounting and manufacturing, and data conversion requirements are studied in this phase. Current business process and business practices are comprehensively evaluated.
- Key User Training: In the end of this phase project team members are trained about the ERP package.

2. Operation Analysis Phase: Business requirements are analyzed and system mapping to fit requirements with ERP package is carried out.

- Future Process Model & Business Requirements Scenarios: Future Process Mapping is created in order to represent all business processes on the new

system. Business Requirements Scenarios are studies according to organizational and operational needs. The organization mapping is done between the system future process design and business requirements.

- Reporting Requirements: Reporting needs of the organization is studied and decisions on how these requirements will be held are made. These requirements can be met with standard package reports or new reports can be studied. These reports can involve monthly sales reports or invoices.
- Information Access Model: This model represents a structure for definition of system users within the organization. This indicates who will access which module or responsibilities.
- Application Architecture: Application architecture represents overall module integration and data access. It includes necessary customization needs and integration with other systems.
- Transition Strategy: The strategy for transition to new system is studied and risk and contingency plans are executed in this phase.

3. **Solution Design Phase:** In this phase test environment is arranged and data conversion needs are analyzed.

- Application Set-up: Definition lists are prepared and the application test setup is done according to operational analysis phase is done in solution design phase.
- Conversion Environment: The conversion requirements of old system are analyzed and conversion environment is prepared.
- Conversion Data Mapping: According to conversion requirements data mapping is held by technical team for data mapping between the ERP system and the conversion data.

4. **Build Phase:** In this phase complete tests for application, data conversion, integration and customizations are carried out.

- Test/Live Installations: Key users and consultants perform unit and system tests in this phase. At the end of the phase complete working system is delivered when the necessary system, customization and integration tests are completed.
- Transition & Contingency Plan: Transition plans, which include time lines and needs for smooth transition, and contingency plans for risk assessments are conducted and reviewed.

5. **Transition Phase:** Completion of Build Phase successfully allows transition phase to begin.

- Production Environment: Production environment is prepared by the technical team.
- Set-up Applications: Set ups for production environment is completed by key users and consultants.
- End-user Training: End-user trainings are held by key users in accordance with the business requirements mapping of the system held in operational analysis phase.

6. **Production Phase:** This phase begins with the usage of the system. In this phase Information Technology personnel and key users work as help desk for all system users. In this phase organizations usually get consultant support for problems. This phase is usually composed of refinement and measurement activities.

- Go live: This is starting point of system usage in daily operations of organization. In the early stages, consultants provide help for users.

2.3.2.3 Success in ERP Implementations

ERP project success is defined differently by people in the sector. Thus, the redefinition of what success means in ERP projects is necessary. The general definition of success in ERP implementation states certain goals to be met such as (Daneva, 2003):

- Ease of use and the enhancement of the daily tasks, according to end users of ERP programs
- Completion of project with in time and budget, according to the project managers
- Realization of expected architecture design
- Efficient use of project resources
- Happiness of stakeholders

As these criteria imply timing and budgeting of the ERP projects are vital. But usually it is really hard to measure the success of projects. These factors do not have significant effect on the success individually as qualitative objectives of the project are considered such as realization of promises of ERP packages, cost reduction or accurate data control. Smith (2002) defines troubled IT project as having characteristics of:

- It exceeds the planned time-scale by more than 50%, excluding the time-scale impact of agreed changes in scope.

- It exceeds the build cost by more than 35%, excluding the cost of agreed changes in scope.
- It is the cause of major buyer dissatisfaction to the extent that the future of the project is called into question.
- The buyer lacks the commitment to make the project succeed.
- It substantially fails to support the intended business processes.
- It substantially fails to deliver the anticipated benefits.
- The outcome for buyer-vendor is not win to win.

It is also argued that the assessment of any ERP implementation as success or failure is unlikely as this claim usually hide all effects of ERP life cycle-wide implementation, management and support, and fails to appreciate the rich variety of stakeholders' expectations of the system (Chang, S, 2004).

Donovan (1999b) summarizes the reasons for why people do not fully utilize the new systems in three ways:

> *First, inaccuracies in data records and sales and operations planning problems are widely prevalent causes for poor ERP system output. Poorly educated and trained users are another reason for failure. People must know the who, what, how, when and why to be effective ERP users. The third reason for failure is when management applies just ERP information technology as the solution to correct fundamental flaws in underlying business processes. If business processes are run still the same old way then the same old results are guaranteed. Any one or a combination of these reasons means a lot of money, resources and time were wasted and there is no appreciable return on your investment. The fact is, however, ERP system implementation disasters are avoidable.*

Since definition of success varies relative to people, it is essential to explore what make up success. A project can be completed exceeding the time schedule but retain desired functionality, or it may finish within the determined time and budget but may not provide what is expected. Daneva (2003) suggests that "the distinction between success and failure is not always evident". In the study on six degrees of success and failure in ERP Requirement Engineering, six ways that the application of generic reengineering process model can succeed or fail is identified. The six ways are addressed organizational, infrastructure, and

process aspects to consider are suggested. These success and failure categories are (Daneva, 2003):

- Catastrophic Failure (negative impact): This is defined as failure which is resulted as implementation of complex business functionality, massive customization and underestimation of change analysis impact.

- Visible Failure (marginal value): This failure defined as the visibility of at least one goal which has been missed with an identifiable cause of failure. This failure results in the rework of stages or delays in the project.

- Invisible Failure (imitates success): This failure is characterized as underutilization of standards, limited interest of both consultants and team members, skipping some practices or no use of requirements validation practices. This invisible failure creates a misleading successful appearance as it seems requirements are fulfilled.

- Invisible Success (mixture of sporadically and systematically applied practices): This category of success is similar to invisible failure. In both cases the implementation may be carried out in similar standards. The average completeness and consistency can be observed in the system. However it is the satisfaction of stakeholders that determine the success.

- Visible Success (visibly achieved goals): This success type is realized when the planned goals are achieved. This results in consistent and complete requirements definitions, correct system design, happy stakeholders and completion of the project within the time and budget constraints.

- Resounding Success (best-in-class processes): The project is defined as resounding success as if it creates significant benefits for organization.

Software development project literature contributes to the categorizations with the following definitions (Fitz-Gerald and Carroll, 2003):

- Failed: product does not meet customer or quality expectations
- Low Success: above average cost, effort and schedule performance but meeting quality expectation
- Successful: average cost, effort quality and time
- High Success: less than average cost, effort and time

- Exceptional Success: meeting all quality, cost effort and schedule expectations

The implementation failure is also explained in three types in the project abandonment literature as (Fitz-Gerald and Carroll, 2003):

- Total abandonment which is complete termination of all aspects of the project prior to implementation
- Substantial abandonment which is major reduction or simplification of project specifications prior to implementation
- Partial abandonment in which original project scope reduced but overall project specifications remain the same prior to implementation

As it is seen, there is no clear cut boundary between success and failure. Also, the period over which the success of a project should be evaluated has no clear limit in time and in space (IT Cortex, 2006). However, in general the terms "success" and "failure" is defined as:

- Success: the degree to which overlapping goals are achieved as:

1. Delivery of requirements on time and budget,
2. Correct architecture design,
3. Complete and consistent requirements
4. Happy stakeholders.

- Failure:

1. Rework of the processes later due to poor requirements
2. Missed deadlines,
3. Budget overruns,
4. Decreased consistency and completeness of the requirements,
5. Increased client dissatisfaction.

In the thesis research, the success of implementation is defined in different ways. First, the success of project is evaluated based on Software Development project literature categorization. This is as mentioned above the completion of project with in the project time, budget and meets average expectations. The second criterion used in order to identify project success is the satisfaction of users and degree of expectations met.

2.3.2.4 Critical Success Factors for ERP Implementation Projects

Critical Success Factors (CSF) emerges as a key concept in ERP theory as the literature states that most of the implementations fail (Bingi et all, 1999; Holland et all, 1999; Nah et all, 2001). CSF approach is the typical approach which is used to define and measure ERP implementation success. The main idea of this theory is to analyze and define all aspects of project that has effect on its success. These aspects include not only technical and financial factors but also organizational and managerial issues.

ERP systems can bring great advantages to organizations as the implementation process is completed successfully, on the other hand there are failure stories. Every organization that decides to install an ERP package and carry out an implementation process struggles with its cost and complexity. However, as Davenport (1998) states the most important problem that may create disaster is the installation of new system without thinking through its full business implications.

Many organizations have implemented ERP projects during the last few years, and ended up with mixed results. There are lots of factors affecting the success of projects, which are related with all the stages of the project from choosing the ERP package to be implemented to post implementation improvements of the system. The Critical Success Factors are mostly related with the second stage of the ERP project which is the implementation process.

Critical Success Factors (CSFs) can be defined as the vital aspects of the ERP Implementation processes that is need to be taken into account in order to realize the objectives of the project. This model becomes important because ERP Implementation projects can not be only considered as Information Technology issue. Implementing any integrated ERP solution is not as much a technological exercise but an "organizational revolution" (Bingi et all, 1999). The nature of the ERP implementation problem includes strategic, organization, and technical dimensions from a management perspective (Holland et all, 1999). Actually most important parts that the ERP Implementation projects involve are the change management and business process reengineering.

Therefore, CSFs is one of the most interesting research areas in ERP Implementation literature. There is certain amount of research had been done on the issue. Bingi et al. (1999) identify Critical Implementation Concerns as; top management commitment, reengineering, integration, ERP consultants, implementation time, implementation costs, ERP vendors, selecting the right employees, training employees, employee morale. In the study on CSFs, Nah, Shang Lau and Kuang come up with 12 CSFs (Nah et all, 2001). As stated by them, CFSs typically consist of ERP teamwork and composition; change management program and culture; top management support; business plan and vision; business process reengineering with minimum customization; project management; monitoring and evaluation of performance; effective communication; software development, testing and troubleshooting; project champion; appropriate business and IT legacy systems. Certain other works on the subject try to discover all the factors that have effect on the process and classify them in to structured groups.

Holland et all (1999), developes a CSFs model identifying factors needed to assure a successful ERP project. In their model they categorize these factors in two groups; tactical factors such as technical software configuration and broader strategic factors such as overall implementation strategy. [Figure-2]

ERP Implementation Process

Strategic	Tactical
• Legacy Systems • Business Vision • ERP Strategy • Top Management Support • Project schedule and plans	• Client Consultation • Personnel • BPC and Software Configuration • Client Acceptance • Monitoring and Feedback • Communication • Trouble Shooting

Figure-2: CSFs Model with Strategic and Tactical Factors (Holland et all, 1999)

In their report "Towards the Unification of Critical Success Factors for ERP Implementations", Sousa and Collado (2000), analyze the CSFs in ERP literature with a grounded theory and propose a unified model of the critical success factors in ERP implementations which have four perspectives. They improve the CSFs model of Holland and Light adding organizational and technological factors. According to their mapping these four perspectives are organizational, technological, strategic and tactical.

> *Organizational perspective is explained as related concerns like organizational structure and culture and, business processes. The technological perspective focuses on aspects related to the particular ERP product in consideration and on other related technical aspects, such as hardware and base software needs. The strategic perspective is related with core competencies accomplishing the organization's mission and long-term goals, while the tactical perspective affects the business activities with short-term objectives (Sousa and Collado, 2000).*

In this study, this Unified Critical Success Factors Model [Figure-3] is used in order to identify essentials of ERP Implementation success. In accordance with this model, the identified 40 root causes of troubled IT projects by Smith (2002) are also taken into consideration [Figure-4]. Since all these factors have significant effect on Success of ERP Implementation, these factors are needed to be analyzed in detail.

Organizational Perspective

Strategic Factors:

As mentioned above, strategic factors are different from tactical factors in a way that they are correlated with mission of the organization. Therefore, it focuses on more long term oriented targets of the organization and its vision. Thus in this schema, tactical issues are more related with project processes which has to be completed in limited time.

1. Sustained Management Support

One of the most important strategic factors is the support of top management throughout the project implementation cycle. This commitment, at both top and middle levels during the implementation, in terms of their own involvement and the willingness to allocate valuable organizational resources to project is critical for implementation process (Holland et all, 1999).

	STRATEGIC	TACTICAL
ORGANIZATIONAL	• Effective organizational change management • Sustained management support • Good project scope management • Adequate project team composition • User involvement and participation • Comprehensive business process redesign • Adequate project champion role • Trust between partners	• Dedicated staff and consultants • Strong communication • Formalized project plan • Adequate training program • Preventive trouble shooting • Appropriate usage of consultants • Empowered decision-makers
TECHNOLOGICAL	• Adequate ERP implementation strategy • Avoid customization • Adequate ERP version	• Adequate infrastructure and interfaces • Legacy systems

Figure-3: Unified Critical Success Factors Model (Sousa and Collado, 2000)

Project Conception

RC01 Project based on an unsound premise or an unrealistic business case
RC02 Buyer failure to define clear project objectives, anticipated benefits and success criteria
RC03 Project based on state-of-the-art and immature technology
RC04 Lack of buyer board-level ownership/commitment or competence
RC05 Buyer's funding and/or time-scale expectations unrealistically low
RC06 Buyer failure to break a complex project into phases or smaller projects

Project Initiation/Mobilization

RC07 Vendor setting unrealistic expectations on cost, time-scale or vendor capability
RC08 Buyer failure to define and document requirements (functional and non-functional)
RC09 Failure to achieve an open, robust and equitable buyer-vendor relationship
RC10 Vendor failure to invest enough resources to scope the project prior to contract
RC11 Buyer lack of sufficient involvement of eventual end-users
RC12 Vendor underestimation of resources (predominantly person-effort) required
RC13 Vendor failure to define project tasks, deliverables and acceptance processes
RC14 Failure to actively manage risks and maintain robust contingency plans
RC15 Poor project planning, management and execution
RC16 Failure to clearly define roles and responsibilities in the contract/subcontracts
RC17 Full-scope, fixed-price contracting (requirements, design and development)

System Design

RC18 Failure to 'freeze' the requirements baseline and apply change control
RC19 Poor choice of technical platform and/or architecture
RC20 Vendor starting a phase prior to completing a previous phase
RC21 Poor choice of design/development method
RC22 Failure to undertake effective project reviews and take decisive action
RC23 Vendor lack/loss of skilled resources
RC24 Poor vendor standards deployment (design, coding, testing, configuration management etc)
RC25 Poor vendor requirements traceability (requirements > design > code > test)
RC26 Buyer retention of design authority with right to approve/reject low-level designs

Figure-4: Root Causes of Troubled Projects (Smith, 2002)

System Development

RC27 Delays cause the project to be overtaken by advances in technology
RC28 Vendor failure to 'freeze' the design (and technical platform) and apply change control
RC29 Inadequate vendor training and supervision of junior staff
RC30 Inadequate vendor review of designs/code/documentation
RC31 Poor vendor management of sub-contractors

RC32 Lack of a formal, 'engineering' approach to integration and testing by vendor
RC33 Insufficient attention paid by vendor to non-functional requirements

System Implementation

RC34 Buyer failure to manage the change implicit in the project (people, processes, technology)
RC35 Inadequate user/systems training
RC36 Catastrophic failure of the system, with no effective contingency arrangement
RC37 Missing a crucial 'go live' date

System Operation, Benefit Delivery, Stewardship and Disposal

RC38 Buyer failure to measure actual delivered benefit and take corrective action
RC39 Buyer failure to maintain/enhance system post-implementation
RC40 Changes in the competitive or macro-economic environment

Figure-4 (continued): Root Causes of Troubled Projects (Smith, 2002)

Firstly, the project must have the approval and be consistent with the business strategy of the firm. The lack of their assistance in terms of having advice or making decisions would create problems for project's overall success. Executive leadership and support must be visible in the early transformation phase and must be durable throughout. At the time of ERP projects, project team must also complete their usual work. Therefore, management should explicitly identify the project as a top priority (Wee, 2000).

New organizational structures, roles and responsibilities should be established and approved and a shared vision of the organization and the role of the new system and structures should be communicated to employees by management (Nah et all, 2001).

Building cooperation among the diverse groups in the organization, intervention from management is often necessary to resolve conflicts. Constant commitment of top management generates overall organizational commitment which in turn felt as sure way to ensure a successful implementation (Bingi et all, 1999).

2. Effective Organizational Change Management

The top management must not only fund the project but also take an active role in leading the change. In review of successful ERP implementations, the effective change management from top is proves itself to be the key to a smooth transition to new system and procedures (Bingi et all, 1999). What is embodied in an ERP implementation is the business process change according to best practices. Consequently, this also implies that the process of change, which includes enterprise wide cultural and structural change, must be managed carefully.

A successful organizational change approach demands a proper integration of people, process and technology (Sousa and Collado, 2000). Especially, change emerges from individuals. The change management approach tries to make the acceptance and readiness of the new system certain and allows the organization to get the benefits of its use.

Users should be involved in design and implementation of business processes and the ERP system as part of the change management efforts, and formal education and training should be provided to help them (Bingi et all, 1999; Holland and Light, 1999).

Any ERP project team would face organizational resistance from people because of its disruptive change (Hong and Gul Kim, 2001). The success of management of change is usually based on people and social aspects of the transformation process.

3. Good Project Scope Management

The execution strategy and implementation plan must be well defined and clear to all stakeholders. Program milestones must be designed to deliver program goals and objectives. Project goals must be clearly defined in line with the organizational mission and strategic goals which includes both scope definition and subsequent scope control. For example, a project scope that is too broad or ambitious can cause severe problems especially the customization which is another critical success factor (Chang, 2004). Some components of this factor are: scope of business processes and business units involved, ERP functionality implemented, technology to be replaced/upgraded/integrated, and exchange of data (Sousa and Collado, 2000).

The milestones of the project should be underlined formally and the critical paths of the project should be determined (Nah et all, 2001). Deadlines should be met to help stay within the schedule and budget and to maintain credibility (Wee, 2000).

4. Adequate Project Team Composition

The structure of the project team has a strong impact in the implementation process as ERP implementation demands multiple skills such as functional, technical, and interpersonal skills. ERP projects typically require some combination of business, information technology, vendor, and consulting support (Sousa and Collado, 2000). Mostly, the project team consists of ERP vendors or consultants from consulting firms and key users of buyer firm. Therefore, it is essential to have project team consisting of consultants with an adequate experience and talent, and key users with suitable capabilities and knowledge on their own business processes. Selecting the right employees for the project team is vital. Internal resources on the project should exhibit the ability to understand the overall needs of the organization and should play an important role in guiding the project efforts in the right direction (Bingi et all, 1999). Operation departments usually do not want to sacrifice their best human resources for the project but ERP system implementation can be a critical step in organization future and they must dedicate their best internal resources (Bingi et all, 1999).

These key stakeholders, internal and external, must be identified early in the program. In the project team, roles and responsibilities need to be clearly defined. Two other important factors are the integration of third-party consultants within the team and the retention within the organization of the relevant ERP knowledge. As managing the consulting firm and its employees somehow challenging, the success or failure of the project depends on how this challenge is met (Bingi et all, 1999).

5. Comprehensive Business Process Reengineering

Reengineering defined as "the radical redesign of business processes, combining steps to cut waste and eliminating paper-intensive tasks to improve cost, quality, and service and to maximize the benefits of information technology" (Laudon and Laudon, 1998).

Implementing an ERP system involves reengineering the existing business processes to the best business process standard (Bingi et all, 1999). This process involves the design and use of new processes in accordance with the ERP package, modeling and negotiation of the existing way of doing business. Aligning the business process to the software implementation is critical (Holland et all, 1999). This process will allow the improvement of

the software functionality according to the organization needs.

According to Nah et all (2001), broad reengineering should begin before choosing a system and in conjunction with configuration, a large amount of reengineering should take place iteratively to take advantage of improvements from the new system.

6. Adequate Project Champion Role

Project champion role involves the position and the skills that are critical for handling organizational change. The role is very important for marketing the project throughout the organization (Sousa and Collado, 2000). By having the power to take actions, set goals and making decisions, the project champion can resolve conflicts and manage resistance (Nah et all, 2001).

7. User Involvement and Participation

According to Sousa and Collado (2000), user participation refers to the behaviors and activities that users perform in the system implementation process. For a successful ERP implementation user psychological involvement is vital and clearly related with the importance of a system to a user. User involvement and participation will result in a better fit of user requirements achieving better system quality, use and acceptance. Therefore, organizational and individual performance measures must be aligned to the objectives of the project and to maintain user participation. People in the project must feel like they win to make the organization win.

8. Trust between Partners

During the implementation phase there are different partners involved in the project such as consultants and software and hardware vendors. Achievement of the goals defined would be easier with a satisfactory partnership between them (Sousa and Collado, 2000). Any problems related to trust between the partners creates unpleasant environments to meet project goals.

Tactical Factors:

9. Dedicated Staff and Consultants

ERP projects really need huge time and effort. Employees working on an ERP implementation project spend long hours for it. But usually, they spend the rest of their times to their regular work. Therefore, they work under pressure of time limitations also.

Moreover, it is also important to ensure that the staff believes in the project success. Consultants should be involved in a way that helps the implementation process while also sharing their expertise with the internal staff involved. This is related with the recruitment and motivation of staff and consultants (Sousa and Collado, 2000).

10. Strong Communication Inwards and Outwards

Effective communication is critical to ERP implementation in two ways: 'inwards' the project team and 'outwards' to the whole organization (Sousa and Collado, 2000). This means, first, the well handled communication should be obtained for the project team about their requirements, comments and approvals. And then, this created knowledge should be communicated to the rest of the organization in all stages of the project. The whole organization should be aware of the project progress. Employees should be told in advance the scope, objectives, activities and updates, and admit change will occur (Nah et all, 2001).

11. Formalized Project Plan/Schedule

The project must be formally defined in terms of its milestones (Holland et all, 1999). There must be a well-defined plan/schedule for all the activities involved in the ERP implementation, with an appropriate allocation of budget and resources for these activities (Sousa and Collado, 2000).

Most of the projects fail to finish the activities on time and within budget. Therefore, timeliness of project and the forcing of timely decisions should be managed, deadlines must be met and the project must be monitored closely to take the budget and time conditions under control (Nah et all, 2001). Furthermore, there should be planning of well-defined tasks and accurate estimation of required effort. If there is a disparity between the project plan and the real time and certain justifications exist, then the whole plan should be reviewed and updated when necessary.

12. Adequate Training Program

All the employees, who will be impacted by the new system, should be trained and ready for their new assignments. The training is one of the hidden costs of ERP implementation. Without proper training, about 30 percent to 40 percent of front-line workers will not be able to handle the demands of the new system (Bingi et all, 1999). The training plan should take into consideration of both technical staff and end-users. Technical staff should be trained and refreshed based on the requirements of the new system.

Employees need training to understand how the system will change their business processes.

ERP systems are extremely complex and therefore demand rigorous training. It is difficult for trainers or consultants to pass on the knowledge to the employees in a short period of time (Bingi et all, 1999). This would be also hard if the employees lack computer literacy or have computer phobia. The quality of the training is also critical for people who will create and enter data. So, adequate training program can be defined as the transmission of know how from consultants (vendor) to users (buyer). But this process is usually assisted by live support.

Training usually held by consultants but some firms prefer to use in-house training approach. Since the training is kind of a long knowledge transfer process, after the completion of implementation there is usually a need for support, such as help desk or consultancy (Nah et all, 2001).

13. Preventive Trouble Shooting

Software development, testing and troubleshooting is essential, beginning in the project phase. The overall ERP architecture should be established and tested before deployment, taking into account the most important requirements of the implementation (Nah et all, 2001).

The problem and risk areas exist in every implementation so the trouble-shooting mechanisms should be included in the implementation plan. Two important aspects are the adaptation and transfer of old data and the 'go live' moment. The time and effort involved in the transfer of data from previous systems should not be underestimated (Sousa and Collado, 2000). So there should always be risk analysis and contingency planning throughout the project.

14. Appropriate Usage of Consultants

Determining the number, how and when to use external consultants appropriate to the ERP implementation needs is critical. The usage of external consultants will depend on the internal know-how that the organization has at the moment (Sousa and Collado, 2000). According to budget and time limitations usage of consultants must be at optimum.

15. Empowered Decision Makers

As the project involves a kind of change in the way of business, usually critical decision making is necessary. Empowered decision makers refers to the ability of project

team members to make quick decisions which will be supported by the organization and which reduce delays in implementation related with slow decision-making (Sousa and Collado, 2000).

Technological Perspective

Strategic Factors:

16. Adequate ERP Implementation Strategy

As mentioned above, a new ERP system does not just change one organization department or division but it changes the entire organization. ERP implementation strategy is critical as ERP projects require major changes and transformations in corporate infrastructure. Therefore, decisions on how the ERP package is implemented and selecting the implementation approach would have effect on the success of the implementation.

There are two different approaches to ERP implementation strategy: Phased approach (skeleton) and Big-bang implementation approach. Usually, ERP package is implemented in a phased manner as this yield a better result than big-bang introduction (Sousa and Collado, 2000). Big-bang introductions as it name suggest propose full functionality all at once at implementation end. But the organization should decide carefully on the strategy and the methodology to use in the project. According to Holland et al (1999) existing legacy systems are critical while selecting the implementation strategy for ERP.

17. Avoid Customization

At the stage of implementation, sometimes there is need to customize the program if it is impossible to adapt to processes when they are specific to organization. The amount of custom development depends on whether an organization is willing to change its business to fit the software, or whether it prefers to change the software to fit the business (Holland et all, 1999).

The total cost of implementation rises, when an organization customizes the software to suit its needs. The more the customization, the greater the implementation costs (Bingi et all, 1999). If the effects of customization are too radical, ERP implementation can critically disrupt the organizational environment (Chang, 2004).

Custom development is one of the things that should be minimized for a successful implementation not for only cost considerations but also time and quality limitations. As software is modified and standard functions of the ERP package are lost, it would be hard to take advantages of newer versions and support. Therefore, it is highly recommended to avoid

customization as much as possible. In this sense, a good business vision is helpful because it reduces the effort of capturing the functionality of the ERP business model and therefore minimizes the customization effort (Sousa and Collado, 2000).

18. Adequate ERP Version

Deciding on which version of the ERP program to use is another critical issue. First, selecting the right ERP package is important. Once the choice for the package is made, then decision on what versions or modules of the package would best fit the organization is made (Akkermans and Helden, 2002). If it is not decided correctly, several upgrades may be needed because of this misfit between package and business processes and strategy which means more effort on costly, risky and time-consuming modifications.

Tactical Factors:

19. Adequate Software Configuration

ERP packages are needed to be configured according the requirements of the specific organization. Generic functionality of the software is reshaped in line with the Organization way of doing business. Organizations need to understand their current business structure and business processes associated with their existing IT systems, and map this to the business processes contained within the ERP system (Holland et all, 1999).

Business requirements analysis, mapping and testing is critical for correct configuration. Overall structural design should be completed before the usage of the system.

Process modeling tools are used in order to help organizations to align business processes with the standard package (Holland et all, 1999). These tools may also be used in the interface design, which may be another requirement of the architecture. But most importantly, testing of the all system and processes should not be underestimated.

20. Legacy Systems

Legacy systems are the business and IT systems prior to the ERP that encapsulate the existing business processes, organization structure, culture and information technology (Holland et all, 1999). They are a good source of information for ERP implementations. According to characteristics and needs of these systems, the starting point of the implementation is shaped (Holland et all, 1999).

Deciding on usage of legacy systems or integration between systems are important issues. Since no single application can meet all the requirements of an organization,

organizations may have to use other specialized software products that best meet their unique needs. Therefore, these products should be integrated along with the ERP suite (Bingi et all, 1999). Legacy systems are not separate problems since their design and operation bind so many components of a business, such as work flow and processes (Holland et all, 1999). The interfaces and/ or other legacy systems need to be developed in-house if it is not available. Here, the critical point is the maintenance of interfaces as this brings more complexity to business process. It is a nightmare for IS personnel to manage this software whenever there are changes and upgrades to either ERP software or other software that is integrated with the ERP system (Bingi et all, 1999).

2.3.2.5 Risk Factors in ERP Implementation Projects

Risk factors are usually defined as the negative factors that lead ERP system implementation failure (Fitz-Gerald and Carroll, 2003). These factors are usually composed of the negative of CSFs. According to Donovan (1999b), there are three common reasons for ERP implementations to fail:

1. Inaccurate data records, sales and operations planning problems and poor master scheduling are widely prevalent causes for poor ERP system performance.

2. Poorly educated and trained users are another reason for failure. People must know who, what, how, when and why to make ERP effective.

3. A management that believes that just applying ERP information technology will correct fundamental flaws in underlying business processes is another frequent cause of failure.

On the other hand, Axam and Jerome (2003) define three most common mistakes of ERP Implementations as:

1. Focusing on technology, thinking that the technology alone is solution for a business problem
2. Ignoring the importance of requirements definition
3. Jumping from the requirements definition to the development phase

Commonly cited reasons in ERP literature as to why ERPs do not meet project objectives include:

1) Unclear business objectives

2) Lack of engaged, visible leadership at executive level

3) Poor communications

4) Lack of project methodology, or poor adherence to the methodology used

5) Resistance to change within the organization

6) Failure to prepare the organization for change, including inadequate training

7) Failure of user departments to take ownership

8) Lack of experience of project team

9) Incomplete requirements definition

2.3.3 Post-Implementation Stage

This stage covers usage and maintenance, evolution and retirement of ERP system. ERP implementation projects may take limited time. But it is important to analyze live system and make necessary changes whenever business operations require. Monitoring of an implemented ERP system is as important as selecting the right ERP package and implementation project. In deed, the structure of ERP program forces improvements of the system.

Post-implementation stage is important because it includes the adoption period after beginning of the usage of the system. This period is critical to fully understand as if the designed structure is working. During this period the organization may need external support from consultants or project team members. Contingency plans or risk decisions may need to be executed during this period in the case of failure.

Another important issue is the assessment of the ERP system. ERP benefits are realized after a period of time. Post implementation review should take place in order to get full benefit from the system.

Sousa and Collado (2001) define evolution as integration of additional capabilities to the system. They classify evolution that occurs in this period in two types:

- Evolution which takes place upwards; orientation of functionality to include other applications such as advanced planning and scheduling, etc.
- Evolution which takes place outward to system's environment; ie CRM or Supply Chain Management

They also mention the retirement of the system with the full life cycle approach when new technologies appear or system becomes inadequate.

2.4 Chapter Summary

In this chapter, ERP systems are analyzed in detail. Definition, historical development, characteristics of ERP software and ERP supplier and ERP market are

investigated. In the second part of the chapter, advantages of ERP systems and problems with them are discussed. As mentioned in the third part of the chapter, ERP implementation could be analyzed in three stages, which are pre-implementation, implementation and post-implementation. As discussions reveal, the ERP implementation projects incur high-risk and high-cost. This is why CSFs become important and should be carefully taken into consideration while executing ERP projects. The main focus was on CSFs for ERP Implementation Projects in this part and these factors were clearly classified and explained.

In the next chapter, research methodology and the findings of the research will be explained in the light of CSFs.

CHAPTER 3

CASE STUDIES

3.1 Research Methodology

This research was conducted using case study approach in order to have exploratory research on experienced success of ERP projects and CSFs which positively or negatively affect the implementation projects. Exploratory research is defined as research type that has emphasis on the discovery of ideas and insights (Churchill, 1995).

Case study approach is one of the qualitative research techniques. *Qualitative research methods* were developed in the social sciences to enable researchers to study social and cultural phenomena (Myers, 1997). There are various qualitative research methods. Qualitative data sources include observation and participant observation (fieldwork), interviews and questionnaires, documents and texts, and the researcher's impressions and reactions (Myers, 1997; Yıldırım and Şimşek, 2005).

The Case Study research method is used in order to analyze research question. The Case Study research is usually designed along with theoretical proposition, although it is mostly used to describe organizational phenomena (Lee, 1999). The case study is valued as a research method for its capacity to examine a phenomenon in its real-life context (Bensabat and Mead, 1987). According to Myers (1997), it is the most common qualitative method used in Information Systems studies. Yin (2003) defines Case Study as:

A case study is an empirical inquiry that:

- *investigates a contemporary phenomenon within its real-life context, especially when*
- *the boundaries between phenomenon and context are not clearly evident.*

In this study of CSFs for ERP implementation success, the case study method is used for exploration, for description of cases and for testing the theory. The *multiple case study design,* which consists of three cases, is adopted in order to generate necessary data for analyzing and providing different issues related the subject. This design allowed seeing a wide picture of ERP project realities and problems.

At the beginning of the study, exploratory research is held in order to have literature review about the concepts and theories. In order to explore ERP implementation projects comprehensively, active observations, analysis of project documents, and interviews with people are used to clearly investigate case studies. In Case Studies, primary data collection is realized by conducting interviews with people from the ERP sector. A questionnaire[1] which includes detailed questions about organization profiles, general project facts and CSFs realization, is used during interviews. Interviews are held with managers who have decided to implement ERP system of sample organizations, key users who involved in implementation projects, end users who use ERP packages in their daily business process and consultants and projects managers of ERP supplier who involved in ERP project implementation. Open-ended nature of interview questions helped to catch participant insights about the projects.

Administrative project documents, meeting notes, project reports and deliverables or project assessment notes are used to have deep insight about project evaluation. Direct or participant observations are another tool for gathering data. Direct observation was one of the most important data gathering tools in this research. The researcher had been the participant of these two of three ERP implementation projects as a consultant. Furthermore, active participant observations were held about one year for each organization. Besides, the researcher has been offering live support for the last organization about one year. The case study analyses are based on these massive examinations.

According to Yin (2003), there are three general strategies for analyzing case studies, namely relying on theoretical propositions, thinking about rival explanations and developing case study descriptions. In this research the case study descriptions were developed based on theoretical propositions. Analysis of selected cases includes the intensive study of selected cases of the phenomenon under investigation.

The cases are analyzed through the interpretive approach. According to Yin (2003), qualitative research can be positivist, interpretive, or critical. Myers (1997) states that the assumption of accessing reality is only through social constructions such as language , consciousness and shared meanings is the starting point of interpretive researchers. In this thesis research, the cases are used to reveal and interpret the CSFs and understand the context of their influence on project success.

[1] English version of the questionnaire can be seen at Appendix B. The Turkish version including a sample reply of one interview with a project manager can be seen at Appendix C.

The name of the organizations and respondents are not revealed because of the confidentiality. Although it appears as it is an obstacle for research, this guaranteed the accuracy of information gathered through interviews with respondents.

3.2 Organizations and Respondents

The sample is composed of three Turkish organizations which use "Oracle" ERP package (Oracle E-Business Suite). The sample shows differences in their sectors, their size, in number of modules they use and in the period of time they have been using Oracle.

All these organizations experienced ERP Implementation project and implemented Oracle in the last three years. Two of them are manufacturing organizations from one of which is operating in the textile and the other one is operating in the food sector. These two organizations are large size organizations both with their manufacturing capabilities, employee numbers and their revenue and sales operations. The third organization is a medium size organization operating in the entertainment services sector.

Respondents are project managers, consultants and key users involved in these projects. For Organization A there are 7 respondents; 1 project manager, 3 consultants, 1 technical analyst from the organization and 2 key users. For Organization B, 3 interviews are executed; 1 with project manager and other 2 with consultants. For Organization C, there are 3 respondents for interviews; 1 project manager and 2 key users. The number of respondents shows differences because of time and location constraints to conduct interviews.

3.3 Results

3.3.1 Organization A

3.3.1.1 Organization A Profile

Organization A is a private organization that operates in the textile sector with their more than 500 employees and 4 factories in the different areas of Turkey. They are supplying the knitting, weaving and carpet industries with the finished yarn primarily made of acrylic and wool in addition to various types of natural, artificial and synthetic raw material. The annual output is about 30.000 tons. This organization has been successfully promoting its trademark in local and international markets since 1970s.

3.3.1.2 ERP Project

The primary aim of the Organization A implementation project was to calculate cost based on their production plants. This goal, namely *profit centers' analysis,* is attained with aggressive cost control, greater accuracy and timeliness of information, elimination of inventory problems, material shortages, and sustains prompt delivery, and successful cash management. This project also intended other benefits of ERP package, such as coordination between business departments and having unique, accurate database.

The project scope covered the implementation of Oracle Financials including Oracle General Ledger, Oracle Payables, Receivables, Fixed Assets, Oracle Cash Management, and Oracle Logistics including Inventory, Purchasing, Order Management, Shipping, Advance Pricing and Project Costing modules in multi-organization environment. Therefore, the configurations and setups were held for three organizations. The project scope included the integration of the system for these three organizations with existing manufacturing system of the organization.

Organization A has been using Oracle E-Business Suite for about 26 months, more than 2 years. They are using 11.5.9 version of Oracle E-Business Suite. They executed Oracle ERP Project between June 2004 and December 2004, and went live –begin using system- on the 1st of January, 2004. Their ERP Project completed in 7 months as they planned without any delay. About 100 to 199 people are using Oracle E-Business Suite in their organization now.

All modules are implemented within the project time but the costing module could be used effectively after three months delay. About 70 percentages of the old data converted into new system. During business process reengineering about 41 to 70 percentages of the work processes were redefined. Less than 10 percent of the ERP software was redesigned to be adapted to organization.

After the project was completed, Organization A benefits Oracle E-Business Suite functionalities such as ease in controlling, reporting and analyzing data, accurate and timely data and database, and a good base to have improvements above for the future business processes.

The ERP project was completed with 10% variation above the budget. They finalized the implementation of all modules and the integration between Oracle modules and legacy system within the project time excluding the manufacturing side. However, the costing module fulfilled its requirements late, after three months of going live phase. Both the

problems in the legacy manufacturing system and the requirements of localization costing module's customization needs produced this delay. Actually they are still not satisfied with this costing solution. This project had begun as the 1st phase which had been decided to be followed by the 2nd phase which covers the implementation of Oracle Manufacturing modules. However, some other circumstances did not let the second phase to start.

The project team rates their satisfaction from Oracle E-Business Suite to meet their expectations differently. They especially think that the program is insufficient for *export and import* operations. But at average 50-69 percentages of their expectations are met by the program. However, on average, they rate project ***successful*** referring the completion of project at average cost, effort quality and time.

After one year of project completion and they started to use Oracle Applications, the top management made an assessment of the ERP system. They define negative sides of the Oracle Applications as follows:

- Continuing dependence on consultants
- Not suitable for Turkish business conditions
- Standard reporting is not adequate, many reports are required to created again
- Data should be corrected from the source to be accurate, which requires more time for controlling and fixing
- Detail analysis require detailed data input
- Requires complicated work and training

3.3.1.3 CSFs Affecting Organization A's ERP Project

NEGATIVE FACTORS:

Effective change management

In the project, they face with *high* user resistance to new system especially during re-definition of the business processes and the delegation and reassignment of work between departments. This resistance mostly comes into sight because of the massive change and rearrangement of duties with the new business procedures. Most of the project team members agree that this change was not managed properly. There might be many reasons for this. There was the limited time and resources mostly allocated to project for more technical and functional issues. Some team members state that this opportunity to change might have been used more effectively. The will to transformation of the businesses processes to Oracle system with minimal changes, made it hard to have effective change process within the organization.

It seems that the key users holding the position to explain project goals and redesign needs to employees, tried to manage this change. But most of them agree that if there was any change management method used by management, it was only ***pressure.*** Project manager forced to project team to make this happen. This is why project team states that change management was not effective.

Trust between partners

During the project, they realized trust issues between partners. They feel lack of trust especially for the supplier organization and consultants. But as the project manager states, this important factor surprisingly did not make the project fail. There was also some trust issues to ERP package.

Legacy systems

The project covered integration between the legacy system and Oracle Applications. They had major problems with integration on the performance and reconciliation of the data between systems. They could cope with these issues by hard working.

Training for employees

In the project, necessary time and resources were allocated for training. The training program is conducted in two parts as the used methodology requires. First, consultants trained key users and then key users trained employees. However, project team members were mostly dissatisfied with training because of the time allocated. They think that more time would have been assigned to training. According to a member from the customer consultant committee, who is also the manager of IT department, timing of trainings leads confusions. Trainings were done after the *definition phase* so it was hard for project team to comprehend the program.

POSITIVE FACTORS

Top Management Support

The project highly supported by top management. This reinforcement of top management affected process success positively. Although project team felt this as pressure, this pressure made this project success real. They still believe that top management had given more support to project.

Good project scope management

The implementation plan of the project and execution strategy was well defined. It was also made clear to all stakeholders. There were clearly established project goals to be

accomplished in line with the organizational strategic goals. They believe that the project scope was realistic. They used formal plan to define project's milestones and revised it when necessary.

Adequate project team composition

Project team was composed of key users from different departments relatively for Oracle module needs. There were many consultants to work with. These key users knew their job well and worked with consultants effectively to design future processes of business. They were aware of their responsibilities and duties about project. There were not any changes in the project team composition during project.

Figure-5 represents project organization of Organization A. ERP projects typically require some combination of business, information technology, vendor, and consulting support (Sousa and Collado, 2000). This figure of Project organization clearly shows how a project team composition should be for ERP Implementation projects. This demonstrates how Organization A's project composition includes both vendor and buyer participants with both functional and technical skills.

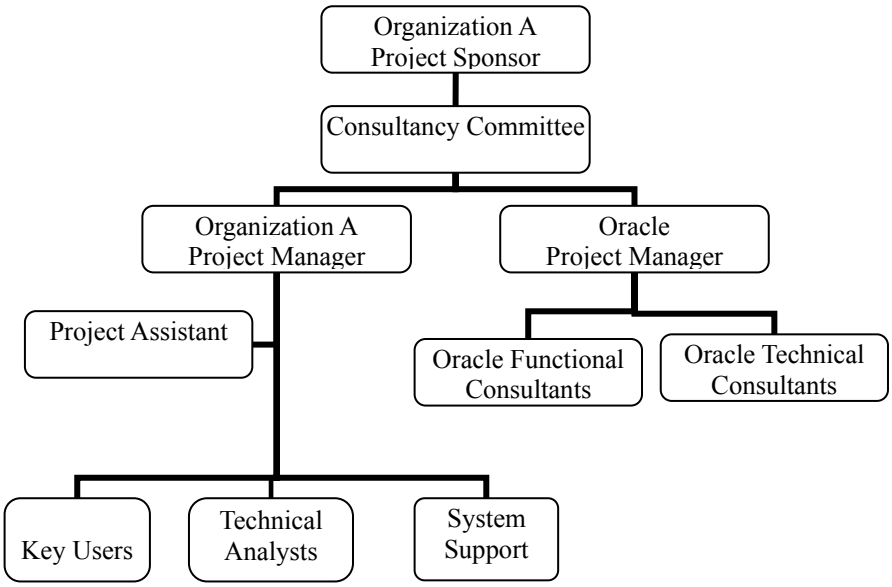

Figure-5: Project Organization of Organization A

User involvement and participation

User involvement and participation was very high during the project. All key users and consultants worked hard for the project requirements. It was forceful for key users to completely involve in the project and meet its requirements at the same time they were obliged to their daily operation duties.

Empowered decision-makers

In the project, project team was satisfied with the people they work to make decisions. They all agree that, they could make decisions when necessary, or found someone to have quick decisions on business processes without causing and delay on project plan.

Adequate project champion role

The project manager, using her *authority* to take actions, setting goals and making decisions, managing resistance and forcing people to work on the project long times, acted as the project champion in this project. The major affect of the project manager was to persuade people on success of project and oblige people to work hard. It was one of the important factors with top management support that affect project success.

Strong communication inwards and outwards

The project team had some communication problems throughout project. But they were still pleased with communication within the project team. They arranged weekly meetings for project team to both cope with these communication problems and update people about progress of project. They also executed meetings to inform top management and customer consultant committee.

Dedicated staff and consultants

One of the advantages of this project was to have responsible team members. Both key users and consultants worked long hours after normal work hours. They fully dedicated themselves to project and made whatever they could do for project.

Formalized project plan/schedule

The AIM methodology was used and its' requirements were followed and fulfilled during the project. The formalized project plan was developed and its schedule revised when necessary. The management allocated necessary budget and resources for the project.

Appropriate usage of consultants

The project team was composed of Oracle consultants, Oracle Partner firm consultants and key users. Complete consultant side consisted of five functional and two technical consultants and one project manager of the consulting firm. Their number and time allocated to project were appropriate comparing other ERP projects. The management of

project also evaluated the usage of consultants proper. However, key users asserted that they might have used more consultants. In deed, this is usually the case in most of the ERP projects that employees state that they need more consultants. Neverthless, most of the projects show that the use of optimum number of consultants is vital not only to stay within the budget but also to make the workers feel responsible with their business structures.

Adequate ERP implementation strategy

The project team and the project manager were satisfied with the implementation strategy. They documented necessary deliverables during the project. The Oracle system was began to use after seven-month project time. On the 1st day of January 2004, Organization A executed all their operations, from order management, shipping to billing with new system.

Adequate ERP version

The last version of Oracle Applications was implemented for Organization A. It was the most suitable version. After one year of the project, the project team involved in smaller project for the requirements of Turkish currency transformation to New Turkish Lira. The system was successfully configured for this necessity.

Adequate software configuration

The software configuration held carefully by the project team. Necessary definitions and setups were made to create the structural design on the system. The project team agrees that they spent more than ten days for testing. But they still commit that they should have spent more time to test full cycle of business operations.

Comprehensive business process reengineering

Most of the time project covered the reengineering of business processes. Oracle applications forced *best business practices* to apply throughout the project. Organization A usually redesigned their operational procedures according to standard functionalities of Oracle Applications. In some cases, Organization A forced Oracle standards to change inline with organization needs. In deed, their business process reengineering continued after the project. Some modifications were done on the system. Most importantly, it is precisely understood that reengineering was something to continue.

Preventive trouble shooting

During project cycle, problem and risk areas were examined carefully and contingency plans were prepared and memorandums were released especially before going live phase. Transformation of old data into new system was carried out successfully. Appropriate testing was done before project time finished.

Avoid customization

The project covered some customizations especially for the procurement and import side. As Oracle Applications does not have any solutions for Turkish requirements of export operations, new forms were written for these procedures. Oracle localization solution was also used to meet requirements of inflation accounting. One of the technical analyst from the customer side states that more than necessary reports were created to meet reporting needs. On the other hand, customization was avoided carefully.

3.3.2 Organization B

3.3.2.1 Organization B Profile

Organization B operates in the entertainment and organization sector, having restaurants, bars, providing banquet and wedding organizations, organizing concerts and festivals. It is a medium size organization with about 100-200 employees changing seasonally in accordance with their seasonal business volume.

Management decides to implement Oracle E-Business Suite after having completed Six Sigma project. According to results of the study, their need to change their business flows and support of information technology to have accurate and timely data become visible. With these considerations they decided to implement Oracle E-Business Suite especially to change and improve their business processes

3.3.2.2 ERP Project

The primary aim of the project is to standardize their procurement procedures with some other business processes, having detail customer database and customer segmentation and analysis, having unique database that help to have greater accuracy and timeliness of information, to decrease work load of finance department automating reporting system, and most importantly to have cost analysis based on actual costing.

Oracle Financials including Oracle General Ledger, Oracle Payables, Receivables, Fixed Assets, Oracle Cash Management modules and Oracle Logistics including Inventory, Purchasing, Order Management, Advance Pricing and Project Costing modules are implemented. The project scope covers implementation of these Oracle Modules and integration of Purchasing and Inventory modules with the existing legacy system. Project starts May 2005, and ends in September 2005, including 1 month delay.

The system is highly new, since it has being used about 6 months. About 10-49 people use Oracle Applications in the organization now. All modules are implemented within the project life cycle. About 10 percentages of the old data converted into the new system. During business process reengineering about 70 percentages of the work processes redefined. Less than 10 percent of the ERP software was redesigned to be adapted to organization.

According to Project Manager all the functionalities of the system are new for the organization. This is because there were not any information system tools for logistics side such as purchasing, inventory management, order management and project costing. Therefore, first two months after *going live* phase required hard work for both the standard procedures and the integration issues. Having problems for the first two months' period closing, which especially happens because of the legacy system, they took actions to solve these problems. The legacy system did not create necessary right data to be converted into the Oracle system. Therefore, the ERP system had minimum modifications after the project is completed. They successfully handled this situation with a crisis management.

The project is completed within the budget although there are some unseen hardware costs. This project finishes in 4 months, with 1 month delay, but which is extremely less in time when take into account being executed in the *high season* for the business. The project manager confirms their satisfaction from the ERP system stating more than 90 percent of their expectations from the ERP software were fulfilled after implementation. They realize very new functionalities which they never ever had. She also rates the overall project success as ***high success*** confirming the conditions of less than average cost, effort and time.

3.3.2.3 CSFs Affecting Organization B's ERP Project

NEGATIVE FACTORS:

Top Management Support

They realized project success against the non supportive behavior of the top management. However, they say that top management support is not only effective at the stage of the project implementation, it is also highly important for on going success of the system after the project completed. Project Manager states that the non-supportive behavior of the top management always puts project's live success under risk.

Adequate project team composition

The project team consists of about five key users which have moderate qualifications to be a part of this kind of project according to Project Manager. They know their job well but they had not been in this kind of an important project before. Nevertheless, they are the best fit ones with in the organization.

Another negative impact is the changes in project team composition with depart of two people during the project implementation period affects the project negatively.

User involvement and participation

User involvement and participation is one of the negative affects for this project. Especially because of the high season, it was hard for customer project team to involve in the project to fulfill requirements. Employees in the project team feel themselves under pressure because of workload. Top management's *unsupportive behavior* also affects this situation generating an uncomfortable environment to perform the project, causing dilemmas for employees.

Preventive trouble shooting

This project lacks the effective preventive action for trouble shooting. It is seen that not enough time devoted to testing mainly for *integration*. This risk area must have been evaluated carefully before going live stage. This issue raised problems after the beginning of usage of system. Nevertheless, at this phase the problem is coped with successfully. Project manager states that if it had not been managed well, this could have turned the project success into *failure*.

Empowered decision-makers

In this project, project manager take the responsibility to make decisions. But working with employees who are not powerful to make decisions affects the project negatively. In the lack of department managers' decisions on the newly defined business processes and flows, it was hard for project team to gain organization support.

Legacy systems

Another important issue that the project manager raised is the importance of integration with legacy system. Having major problems with their legacy systems, she certainly advises minimization of integration between systems and having the unique ERP system for all operations of the organization if possible.

Training for employees

Training was part of this project and handled successfully for the project team. The training program is conducted in two parts; first training of key users by consultants and

second training of the employees by key users. For the consultants' point of view necessary time and effort were allocated to trainings. They claim that they comply with their standard training procedures. However, project manager states that they are not satisfied with the training because of two reasons: trainings might have been not satisfactory or the key users were not aware of the importance of these trainings. Another issue is the dissatisfaction of the employees with trainings given by key users. According to project manager, this resulted in major mistakes which were made during the first month of live phase while using the new system. But she agrees with the consultants that the adequate time is arranged for trainings.

POSITIVE FACTORS

Effective change management

In the project, they face with *high user resistance* to new system. They use many methods to cope with this situation. They use different persuasion methods to explain people the benefits of the system and make the acceptance of the system guaranteed. Preparing detailed procedures of new business processes, they tried to get rid of any confusion. Therefore, they realized project as not only an IT project but also as a chance to bring change into their organization to make improvements on business processes.

Strong communication inwards and outwards

According to project manager, *communication* is the most risky affect in the project. Hence, they give special attention on these communication problems and more effort on resolving them with in the project team and outwards to organization. They make group or individual meetings, special conversations and release memorandums to minimize these problems. The project manager stated the following confirming the importance of communication: *"It would be true to say that I spent %75 of my whole effort to communication. If this special effort on the communication had not been spent, this project would have been an example of "unsuccessful projects""*

Good project scope management

The execution strategy and implementation plan of the project was well defined and made clear to all stakeholders. Project had clearly established goals to be met in line with the organizational strategic goals. The project manager says that the project scope was realistic. The project's milestones were underlined formally, which affects the project success positively.

Comprehensive business process reengineering

This project benefits the extensive business process reengineering. It is firstly because of the starting point of the project. The Six Sigma project, which widely analyzes the business practices and problems, create a very suitable environment for ERP implementation project which necessitates modifications and transformations in the business routines. Therefore, this allow ERP implementation project to be successful in re-design the business processes to the best business practices. It was a good chance for project team to have clear business and requirement analysis before the project begins.

Adequate project champion role

Project manager, who is also a Six Sigma Manager, having the power to take actions, setting goals and making decisions, solving conflicts and managing resistance acted as the project champion in this project. She completely allocated her time and effort to this project, making it successful. It may be the most critical factor that affects this project success. Because, without sustain top management support, it is hard to make this kind of project successful.

Trust between partners

During the project, they did not realize any trust issues between partners. But they feel lack of trust in the organization through the project. But the project team could cope with this problem with existing confidence and will.

Formalized project plan/schedule

They have formalized project plan and schedule which was revised when necessary. Appropriate budget and resources were allocated to perform activities in the project plan which made the project in accordance with real time. They use AIM methodology to complete project requirements and deliverables.

Dedicated staff and consultants

Although the key users did not completely dedicated themselves to the project because of the some other issues affecting project negatively mentioned above, the project did not suffered from the necessary work and requirements to be completed. This is because of the dedicated behavior of the consultants and the project manager.

Appropriate usage of consultants

The project team included four consultants and one project manager of the consulting firm. Their number and time allocated to project were appropriate. They spend all their four-month completely for the project tasks.

Adequate ERP implementation strategy

The project team and the project manager were satisfied with the implementation strategy. In accordance with their legacy system, after carring out four-month project, they started to use functionalities of Oracle modules on the 1st of September.

Avoid customization

The project covered minimal customizations which only took place on the Order Management side. Mostly, the organization was willing to change its business to fit the software. This was usually because of the claim of Oracle E-Business Suite to have *best business practices.* Therefore, avoiding customization also made this project successful.

Adequate ERP version

ERP version was adequate. It is a general rule to implement the last version of the ERP package so the systems does not suffer lacking newly generated functionalities or requires a new upgrade project.

Adequate software configuration

The project completed with the adequate software configuration. Setups were made in accordance with the design of future business process and the functional requirements of the organization. Although the key users did not devote enough time for testing, necessary testing was held by consultants. But especially the lack of integration testing may cause this project to be unsuccessful if it had not been managed successfully after going live phase.

3.3.3 Organization C

3.3.3.1 Organization C Profile

Organization C is a private manufacturing organization that produces consumers' goods in food sector. It has different facilities in Turkey with more than 500 workers. The organization began to produce in 1968 and develops its production facilities and capacity since then. The Organization C's sales network includes 15 branch offices, 26 main distributors and 22 secondary distributors throughout country. It currently exports many countries including China, Hong Kong, Saudi Arabia, and Macedonia.

3.3.3.2 ERP Project

The ERP project of Organization C aimed improvement of coordination between departments, standardization of business processes, greater accuracy and timeliness of

information, decision making based on more information**,** flexibility to respond changing business environment, elimination of inventory and delivery problems and improvement of supply and demand management especially creating web applications for suppliers.

The project scope covered the implementation of Oracle Financials including Oracle General Ledger, Oracle Payables, Receivables, Fixed Assets, Oracle Cash Management, and Oracle Logistics including Inventory, Purchasing, Order Management, Shipping, Advance Pricing and I-Supplier and Sourcing applications.

Organization C has been using Oracle E-Business Suite more than one year. They are using 11.5.9 version of Oracle E-Business Suite. Their ERP Project was carried out in 4-6 months as they planned without any delay. About 50 to 99 people are using Oracle E-Business Suite in their organization now.

The project completed on time except Sourcing, I-Supplier and costing modules. These applications could be used after 6 months of project completion. Less than 10 percentages of the old data converted into new system. About 11 to 40 percentages of the work processes were redefined. Less than 10 percent of the ERP software was customized to be adapted to organization. System had minimum modifications after project completion.

The ERP project cost realized 10% variation above the budget. Implementation of most modules was completed within the project time. At this time, order taking, shipping, invoicing and other financial and operational activities were began to made using Oracle Applications. As mentioned above implementation of Sourcing, I-Supplier and costing modules were delayed. However, they were started to use at June 2005.

The project manager states that 90 percentages of project goals were realized after project completion. He confirmed their satisfaction from the ERP system that 70 to 89 percentages of their expectations from the ERP software were fulfilled after implementation. Although 6 months delay occurred for Sourcing and Supplier modules the project team evaluates overall project success as ***successful*** referencing the completion of project at average cost, effort quality and time. The project manager explains this with the unrealistic project scope which lacks necessary time to complete all project goals.

3.3.3.2 CSFs Affecting Organization C's ERP Project

NEGATIVE FACTORS:

Effective organizational change management

Change management was not carried out effectively during the project. The absolute goal was to complete project on time with necessary changes. These changes were not executed based on well-planned organizational requirements. Modifications on business procedures were mostly faced with user resistance since they were believed to increase workload on employees or only they were different from what they did. Therefore, meetings were arranged to make people clearly understand and accept the new system. Employees were usually forced to understand that they had to learn the system and make practice on it.

Adequate project champion role

It seems there was not any project champion role within the project team. The project team worked together to make decisions or persuade employees on business procedural changes. The team members did not realize anybody to have that kind of project champion role. But mostly it seems this role was implicitly played by project manager.

Training Program

The project team was not satisfied with the training they were given. The project time was claimed to less than necessary. The project team was not pleased with program and participation. One of project team member clearly states that he had only one module training. Usage of English version of Oracle Applications was another reason for this disappointment. The project manager claims that although training for technical members carried out, background of technical team was incompatible to fully take advantage of this education.

After the completion of project, a *help desk* was established from key users in order to make quick responses to problems. Organization C continued using consultants after project completion. The organization still has support from a consultancy firm.

Appropriate usage of consultants

The usage of consultants was not sufficient according to project manager. He kindly states that there were enough consultants but they had been worked with extra time.

Empowered decision-makers

In the project, project team was satisfied with the people they work to make decisions. They all agree that, they could make decisions when necessary, or found some one to have quick decisions on business processes without causing any delay on project plan.

They coped with the situation working with their managers and benefiting from their guidance to take decisions. But decision making has taken more time.

POSITIVE FACTORS

Sustained Top Management Support

The project was completely supported by top management. The project team experienced full support and control by top management during project. The departmental managers' guidance on decision making let project team members work effectively. The project members confirmed that without sustained support and control of top management, this project had not been successful.

Good project scope management

The project had clearly established goals and aims. The project team was well informed about project strategy and plan. The project had structured project plan with defined deadlines. The project manager believes that the project scope could have been more realistic especially on recognizing costing procedure and Supplier and Sourcing web applications. Although, this leads a delay in these modules, still does not affect most of the project goals to be met on time.

Adequate project team composition

The consultants and the key users from different departments composed the project team. The key users were chosen from employees who were knowledgeable about their jobs and could arrange sufficient time for the project. They were not experienced about projects but they got used to requirements of project quickly. According to project manager they were the ones who fit best for the project. The project team composition did not change throughout the project, which affected project positively.

Strong communication inwards and outwards

During project even though the project team experienced communication problems, they dealt with these difficulties effectively. The project team was mostly satisfied with the communication and harmony within the team. The departments and department managers were also informed about the project progress and newly designed business structure.

User involvement and participation

There were not any problems related to user involvement and participation during the project. All key users were aware of the requirements of the project and their role. They actively participated in future business process design.

Dedicated staff and consultants

Key users worked hard for the project. They completely devoted themselves for project work. Usually working times last longer than normal work hours. It was an advantage for this project to have dedicated staff.

Trust between partners

There were not any trust issues during project. The project team completely worked with belief in project success and trust.

Formalized project plan/schedule

During the project formalized project plan was followed. This project plan was revised when needed. The AIM methodology was used and it required project to have formal plan. The project was kept in line with the structured plan.

Adequate ERP implementation strategy

The project was completed in 6 months using the AIM methodology. Necessary documentation was prepared according to methodology used. The project team was satisfied with the implementation strategy that was executed.

Adequate ERP version

Organization C is now using Oracle Applications 11.5.9. The project manager stated that it was the suitable version. But as the new version was released within the one year they would decide to upgrade to new version.

Adequate software configuration

The software configuration held carefully by the project team. Necessary definitions and setups were made to create the structural design on the system. The project team agrees that they spent more than 10 days for testing. But they still commit that they should have spent more time to test full cycle of business operations.

Legacy systems

The organization still uses some other programs along with Oracle Applications. The project covered integration between the legacy system and Oracle Applications. They do not have problems about integration. But their costing procedure had problems because of legacy system issues. Actually, detail integration would be developed soon.

Comprehensive business process reengineering

Most of the business processes were redesigned during the project. Organization C usually made modifications on their existing business procedures in accordance with Oracle standard business models. This was the one of the problematic areas that employees usually question while changing business procedures align with ERP application. But the project

team coped with this issue modeling the future process successfully and convincing employees that standards of the application would be used and they would benefit of program.

Preventive trouble shooting

During project cycle, necessary risk assessment was done. About 10 days were spent on testing and examining the future structure. But the project manager states that more time should have been assigned for testing, especially for full cycle simulation. Less than 10 percentages of old data was converted into Oracle system. This conversion process was performed successfully.

Avoid customization

The project covered some customizations about legal cost calculation and invoice. New forms were created and some modifications were made on existing forms to add extra functionalities or set several restrictions. But these were required for organizational necessities and tried to be kept at minimum.

3.3.4 Comparative Results of Case Studies

The study discloses the differences in organization profiles in which ERP implementation project executed. Table-2 shows General Organization Profiles for three organizations.

Table-2: General Organization Profiles

	Organization A	**Organization B**	**Organization C**
Success Realization	**Successful**	**High Success**	**Successful**
Industry	Textile/ Manufacturing	Food and Beverage/ Entertainment/ Service	Food/ Manufacturing
Number of Workers	>500	100-199	>500
Number of Oracle Application Users	100 to 199	10 to 49	50 to 99
Time period Oracle has being used	> 2 years	6 months	> 1 year
Project Duration	7 months	4 months	4-6 months
Number of Modules Implemented	10	9	12

It is seen that the size of the organization with the number of modules to be implemented may affect the project duration. The effort and time to understand and align business requirements with the system could possibly decrease with less modules and organizations' business volume. For example for Organization A, set up was done for 3 different organizations which means increase in effort for multi organization set up and intercompany transaction tests.

The below table (Table-3) represents the General Project Assessments for the three organizations, according to case studies. As it shows, degree of meeting goals is high which is vital in assessment of the project as successful. Another important issue is that all these projects are completed within time and with minimum budget variation. All these criterias help to create implications about project success. On the other hand, rates for overall satisfaction of expectations can be used as reference for improvement of these implemented systems.

The degree of data conversion and the reengineering to be done during projects differ for organizations. Actually these are the strategic decisions that affect project scope. The data conversion requirements may increase for large organizations if the old data which would be created in the new system is massive.

Table-3: General Project Assessments

	Organization A	**Organization B**	**Organization C**
Success Realization	**Successful**	**High Success**	**Successful**
Degree of meeting goals	>90 %	>90 %	>90 %
Overall satisfaction of expectations	50-69 %	>90 %	70-89 %
Budget Variation	10%	—	10%
Time Variation	—	1 month	—
Percentage data conversion	41-70%	<10%	<10%
Percentage of work processes redefinition	41-70%	>70%	11-40%
Degree of customization	<10%	<10%	<10%
Degree of modifications after project completion	medium	Minimum	Minimum

Table-4 represents the moduls implemented during ERP Project. This table clearly shows that usually Oracle Financials and Oracle Logistics product familes are chosen for implementation. These product families are core of ERP system and business operations. However, ERP products are wide range and especially manufacturing product family is another important part of the system. For a manufacturing organization, manufacturing information system and integrating it with financial system should be critical for businesses. Therefore, why two of these manufacturing organizations did not implemented manufacturing moduls can be questioned.

Table-4: Oracle Modules Implemented

	Organization A	Organization B	Organization C
General Ledger	√	√	√
Accounts Receivable	√	√	√
Accounts Payable	√	√	√
Fixed Assets	√	√	√
Cash Management	√		√
Inventory	√	√	√
Purchase Order	√	√	√
Order Management	√	√	√
Costing	√	√	√
Project Costing	√	√	
Bills of Material			
Work in Process			
Quality			
MRP			
MS			
Human resources			√
Other: Sourcing & I-Supplier			√

Table-5 represents Critical Success Factors effects on projects. It can be seen from the table that although there are some factors that have negative effects in implementation project, especially Organization A and Organization C benefits the positive effects of most of the CSFs. It may take attention that the Organization B realize success and high satisfaction despite the fact that negative effects of CSFs are realized significantly during the project.

Another important issue that takes attention is the negative effects of *training* in all three cases. This picture signals the fact that ERP implementation projects suffer from adequate training. The consultants and project managers usually claim that the training is sufficient and the transmission of the knowledge in this kind of projects is slow. However, since most of the project team members are dissatisfied with training, the quality of the training procedure should be examined.

The change management has negative affect in two of the three projects. The nature of ERP projects creates change in all kind of business structures. The change may be observed clearly that new business flows are created and reassignment of duties and resposibilities occur. However, change should also be created in the organizational culture. Therefore, these projects should consider the reengineering process as well. In deed, in the two projects, the importance of change management was not taken into account because these projects were only considered as technic issues or because of time and budget limitations, completion of the project on time was supposed more important than how it is completed. Therefore, change management issues in ERP implementation projects should be improved.

Legacy systems appear as another critical issue in projects since in two of the three projects there are integration problems with legacy system. This problem may occur because of many reasons. The old system and its architecture may completely be different and inconsistent with ERP system. The effort for integrating systems may be underestimated. In projects with many partners, responsibilities for carying interfaces may not be clear. Thus, in the first project, it is seen that integration necessiated the effort more than estimated. As the organization (A) executes some of its core processes (manufacturing, demand forecasting and some cost calculations) with the legacy system, more effort is spent in order to have consistency between two systems. This issue is also true for the other organization (B). This organization also suffers from the responsibility assignment of integration and intefaces because more than two parties were involved in the project.

Table-5: Critical Success Factors Effect on Projects

Critical Success Factors	**Organization A**	**Organization B**	**Organization C**
Sustained management support	√	—	√
Effective organizational change management	—	√	—
Good project scope management	√	√	√
Adequate project team composition	√	—	√
Comprehensive business process reengineering	√	√	√
Adequate project champion role	√	√	—
User involvement and participation	√	—	√
Trust between partners	—	√	√
Dedicated staff and consultants	√	√	√
Strong communication inwards and outwards	√	√	√
Formalized project plan/schedule	√	√	√
Adequate training program	—	—	—
Preventive trouble shooting	√	—	√
Appropriate usage of consultants	√	√	—
Empowered decision-makers	√	—	—
Adequate ERP implementation strategy	√	√	√
Avoid customization	√	√	√
Adequate ERP version	√	√	√
Adequate software configuration	√	√	√
Legacy systems [Integration problems]	—	—	√

CHAPTER 4

CONCLUSION

ERP systems assure business process improvements and decrease in costs by functionalities of accurate and timely information, elimination of inventory and delivery problems, accurate customer and supplier base, operational linkage with multiple period accounting, multiple currency, enhanced supply-demand linkage and reporting simplicity and affectivity.

Especially most medium-size organizations in Turkey still do not have standardized structures and procedures for operations. Mainly a financial computer program is used because of the requirements of legal general accounting procedures. Besides Microsoft Office programs especially Excel is used for reporting and budgeting necessities. One of the organization cases clearly shows that the organization even do not have any procedures or use any computer program for their procurement processes. The others though required manufacturing programs are used, have problems with data accuracy, departmental interrelationship and reporting with difficulties in purchasing and inventory operational activities.

These project cases mainly show how ERP system implementations and integrations realized in Turkey. ERP systems are preferred specifically since they promise structured business models and *best practices*. They are used as a tool to standardize business procedures and business flows, rather than the real ERP benefits considerations.

All these three case studies demonstrate successful ERP implementations in the sense of completing within the arranged time, allocated budget and fulfilling the expectations with accordingly. All CSFs affect project success explicitly and implicitly, as being effective both on progress of project and affecting other critical factors within the project.

Sustainable top management support plays essential role in projects; both in realization of project goals and keeping the live system alive effectively. It's the most important factor for employees to dedicate themselves to project. The ERP projects, requiring main changes in business practices, somehow disturbing normal way of doing daily operations, requiring qualified and trainable human resource, brings fear of losing jobs for employees. To cope with this kind of difficulties and make the acceptance of system certain,

top management support is necessary. It is a must for a project to guarantee overall organizational commitment and proceed the critical adaptation process successfully. The Organization B case illustrates how lack of top management support jeopardizes system success even though a successful project is accomplished.

Training is vital in transformation of know how from consultants to employees. Mandatory training take part in all of these case projects. Nevertheless, these are usually realized as insufficient by project team members. One of the observed weaknesses of trainings is the absence of top management. Still they provide support for projects; they usually are the last people in organization to gain knowledge of system. All these project participants are not satisfied with training. Therefore, this shows the necessity of training approach, methods or quality to be discussed. There should be some improvements in quality or time of training.

The project plans cover training and one or two-day module trainings, which take about 10 days in total, are arranged for group of key users. However, it seems that training is one of the problematic areas of project since all customer project members from three organizations claim their displeasure about trainings. Mainly budgetary effects have influence on training duration. In Turkish economic and business environmental conditions, projects are carried out with limited budgets and human resources. This reality shows its impact on total project duration and usage of consultants. However, the quality of trainings and the knowledge transformation process can be analyzed and improved for ERP projects.

Project managers play significant roles at projects. The success of project is positively related with behavior and leadership style and capabilities of project manager by some means. They usually take part as *project champion* delivering communication platforms between both key users and consultants and key users and employees, resolving conflicts and problems, managing user resistant and supporting effective decision making.

Project managers are usually effective in change management. But it is change management which is not professionally held. Change management is the critical part of the project especially as project brings massive change in business operations. However, projects are not carried out as *change projects*. This results in change necessities and project goals to be misunderstood or underestimated by project team and overall organization. Realizing this situation, the project manager and top managers perform forceful behavior towards project team and employees. This usually illustrates how Turkish organizations and managers conduct change management. Indeed, change management should be taken into account with the concept of *organizational culture.* However, case projects show that change comes after

project implementation with the authoritarian manners of management destroying all other alternatives for employees.

Communication problems usually exist within the projects. Managing communication issues is important for both projects to progress and to be understood well by the whole organization units. Therefore, arranging periodic meetings for both project team and organizational managers and employees is vital to overcome communication problems. It is vital for project success to have meetings for delivering feedbacks about project progress.

The project team composition has significant effect on redesign of operational procedures. It is important to work with people who have operation knowledge in order to make designed processes realistic and practical in actual business, not only on papers or deliverables. Taking into account that employees do not want to work much or have workload to have accurate system data, benefits of the system for both organization and employees should be made clear. The employees should realize this situation as win-win case.

Three different cases demonstrates that project team members do not have experiences on project work even though they are well experienced about their jobs. Their talent for information technology affect training period as well. The customers' background knowledge of information technology is another criterion for effective team composition. In most of the projects technical analysts are required to be trained internally or new experienced technical engineers are employed. Therefore, consultants play a critical role in project with their guidance both in technical and functional issues about the program and configuration of program to meet customer expectations. They, on the other hand, act as business analyst and redesign engineers to create newly business procedures. Consequently, their qualification and experience both in program training and business analysis is significant for project success.

Decision process before choosing the right ERP package for implementation is important. This process should handle carefully before execution of project. It is clear that ERP packages can not cover all of the unique business requirements. However the success of project necessitates the best match package to be selected. The doubt about ERP package brings problems for project implementation procedures.

Organization B is the first organization in the entertainment, food and beverage service sector that implement Oracle E-Business Suite. It was a challenging and risky project being the first in the sector. Therefore, from this point of view, there exists the lack of

know how on the sector for consultants or Oracle side. Nevertheless, the system was configured and business processes are redesigned successfully to meet expectations of organization.

Integration between applications and existing legacy systems are usually needed in order ERP system to operate effectively in accordance with legacy system or to have data transfer between systems. But the maintenance of interfaces is very hard as they bring more complexity to business process. Consequently, the integration issues should be held carefully and realistically, like all other redesign of business flows. They have to be look after especially at the live operations. Therefore, responsibilities on maintenance should be clear after project completion especially if there were many partners involved in the project.

Successful projects are usually achieved with formal project plan, carefully scheduled activities and resources, and keeping inline with this project plan. It seems in all three projects, using the AIM methodology brings success displaying definite tasks to be completed.

Even though these case study projects are affected negatively by several critical factors, positive effects of other factors show their influence on projects' existent success. In most of them, top management support, dedication of right team members with required involvement, usage of appropriate number of consultants, carefully and realistically design of business processes with mostly aligning the procedures with best practices of application standards affect projects positively. Still, these factors are related and affect each other. Therefore, it is hard to mention absolute effects.

Most importantly, ERP systems should be considered as live systems which can be improved and changed after time with the requirements of real operations. Realization of this makes system ongoing success persistent as system develops overtime.

Further research on project assessment is necessary for contribution to ERP concept. Many implementation projects are being conducted but there is lack in the post-implementation reviews. Projects are not assessed and project failures can not be identified. Furthermore, most of the large-size organizations in Turkey have already implemented ERP systems. Therefore, ERP systems for medium-size organizations, these organizations' requirements and changes that they bring into ERP market could be analyzed.

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APPENDICES

APPENDIX A

Oracle and Oracle E-Business Suite 11i.

A.1 Oracle

Oracle Corporation is an enterprise software Organization that develops, manufactures, markets, distributes and services database software and infrastructure software, including application server, collaborative software and development. The Organization also offers a suite of business applications software. It is organized into two businesses, which are further organized into five operating segments. The software business consists of two operating segments: new software licenses and software license and product support. Oracle's services business consists of three operating segments: consulting, advanced product services and education. (Enterprise Solutions Competency Center, 2006)

In December 2004, the Organization acquired PeopleSoft, doubling the Organization's share of the ERP market. PeopleSoft had acquired JD Edwards in 2003. The PeopleSoft acquisition will require Oracle to support multiple product lines while simultaneously pursuing a significant effort to merge the diverse ERP products. (Enterprise Solutions Competency Center, 2006)

A.2 Oracle E-Business Suite 11i

Oracle E-Business Suite is a fully integrated, comprehensive suite of business applications for the enterprise. Whether you implement one module at a time, multiple modules or the complete suite — Oracle E-Business Suite provides better business information for effective decision-making and enables an adaptive enterprise for optimal responsiveness.

Complete suite of business applications that run the world's largest enterprises. There are also E-Business Suite Special Edition for mid market Organizations and industry specific functionality to meet industry's unique requirements.

A.3 Oracle E-Business Suite Families

Advanced Procurement

Oracle Advanced Procurement helps to reduce spending on goods and services by enabling spot savings opportunities immediately, drive more and better sourcing, and enforce contracted pricing and terms. Additionally, streamlines procurement processes, which frees staff for high value activities, automates and controls employee buying, and reduces supplier errors, lag-time, and costs. Oracle Advanced Procurement allows to enforce policy compliance by reforming spending behaviors, eliminating expensive budget overruns, and globally monitoring compliance in real time.

Manufacturing

The Oracle E-Business Suite Manufacturing family of applications enables to optimize production capacity, from raw materials through final product — regardless of manufacturing methodology. A unified data model provides a single, accurate view of manufacturing process, so customer orders can be configured, optimize subcontracting, and cost, quality, and compliance can be managed. And when Oracle Manufacturing runs on Oracle technology, implementation becomes faster, performance is optimized, and return on investment is maximized.

Manufacturing Product Family is composed of Discrete Manufacturing, Flow Manufacturing, Process Manufacturing, Manufacturing Scheduling and Shop Floor Management.

Financials

The Oracle E-Business Suite Financials family of applications automates and streamlines all financial business processes. A unified data model provides a single accurate view of all your financial information.

Oracle Financials Product family is generally composed of General Ledger, Accounts Payable, Accounts Receivable, Fixed Assets and Cash Management. But there are also solutions such as Financial Analyzer or IPayment and Ireceivables.

Order Management

Oracle E-Business Suite family of Order Management applications streamline and automate the entire sales order management process, from order promising and order capture to transportation and shipment. Oracle Order Management drives the order fulfillment process of any business. The open, workflow based architecture supports tailored, automated fulfillment processes without customization.

Order Management Product Family is composed of Advanced Pricing, Configurator, Global Order Promising, Order Management, Transportation Planning and Warehouse Management.

Projects

The Oracle E-Business Suite Oracle Projects supports the full lifecycle of project management. Chosing, assigning resources, proactively streamline execution and tracking profitability, forecasting and budgeting can be done.

Human Resource Management

The Oracle Human Resources Management System family of applications automates the entire recruit-to-retire process, so the aligning of workforce with strategic objectives can be done effectively. A unified data model provides a single, accurate view of human resources-related activities, including recruiting, performance management, learning, compensation, and real time analytics.

APPENDIX B

Interview Questionnaire-English Version

Questions

The aim of this questionnaire is to investigate the affects of Critical Success factors in the ERP implementation project that was exacuted. The organization and respondents' names will be kept secret.

Ω	Questions for all respondents	©	Questions for Consultants
®	Questions for PM	Δ	Questions for Key Users

Organization name……

Part 1

1. Ω What is your position in the Organization?
.....
2. Ω What was your position in the ERP Project?
    - PM
    - Key User
    - Functional Consultant
    - Technical Consultant

3. Ω What is the sector of the Organization?
    - Public
    - Private

4. Ω What is the product type of your Organization?
    - Goods
    - Services
        - Food &Beverage
        - Other
    - Consumption products
    - Chemistry
    - Construction
    - Technology
    - Automotive
    - Energy
    - Textile
    -
    - Finance
    - Medicine
    - Media
    - Telecommunication
    - Health
    - Automotive

5. Ω What is the number of employees?

- ☐ 1-19
- ☐ 20-49
- ☐ 50-100
- ☐ 100-199
- ☐ 200-499
- ☐ 500-

6. Ω How long have you been using Oracle E-Business Suite?

- ☐ 1-6 mo
- ☐ 7-12 mo
- ☐ 12-23 mo (1-2 yr)
- ☐ 24-35 mo (2-3 yr)
- ☐ 35-59mo (3-5 yr)
- ☐ 60mo- (5 yr)

7. Ω Which version of Oracle Applications are you using?
.....

8. Ω How long did the implementation take?

- ☐1-3 mo
- ☐ 4-6 mo
- ☐ 7-12 mo
- ☐ 13-18 mo
- ☐ 19-24 mo

9. Ω What was the planned implementation time?

- ☐1-3 mo
- ☐ 4-6 mo
- ☐ 7-12 mo
- ☐ 13-18 mo
- ☐ 19-24 mo
- ☐ 25-30 mo

10. Ω What is the ratio of your participation to project?

- ☐ Less than %10
- ☐ %11-%24
- ☐ %25-%49
- ☐ %50-%74
- ☐ %75-%89
- ☐ %90-%100

11. Ω How many Man-Days did you spend for the project?

- 1-14 man/days
- 15-29 man/days
- 30-59 man/days
- 60-119 man/days
- More than 120 man/days

12. Ω What is your participation in the project according to months and projects phases?

1. Definition (CBB)	2. Analysis (FPM)	3. Solution design (Mapping)	4. Build Setups and Testing	5. Transition Conversions &Live Setups
Less than %10	Less than %10	Less than %10	Less than %10	Less than %10
%11-%24	%11-%24	%11-%24	%11-%24	%11-%24
%25-%49	%25-%49	%25-%49	%25-%49	%25-%49
%50-%74	%50-%74	%50-%74	%50-%74	%50-%74
%75-%89	%75-%89	%75-%89	%75-%89	%75-%89
%90-%100	%90-%100	%90-%100	%90-%100	%90-%100

13. Ω How many people use ERP in the Organization?

- 1-9
- 10-49
- 50-99
- 100-199
- 200-

14. ® At what percent and how your project budget deviated according to actual cost of the project?

- Project completed under budget
- No variation, project completed within budget
- 10% variation, project completed over budget
- 10%- 25% variation, project completed over budget
- 25%-50% variation, project completed over budget
- 50%-100% variation, project completed over budget
- Over 100% variation, project completed over budget

15. ® What percentage of the old data converted into the new system?

- None
- Less than %10
- 11-40 %
- 141-70%
- More than %70

16. ® During business process reengineering what percentage of the work processes redefined?

- None
- Less than %10
- 11-40 %
- 41-70%
- More than %70

17. ® What percent of the ERP software was redesigned to be adopted to Organization?

- None
- Less than %10
- 11-40 %
- 141-70%
- More than %70

18. ® © What percent did you make modifications to ERP system after the project is completed?

- No modifications
- Minimal Modifications
- Significant Modifications
- Moderate Modifications

19. ® © Which modules did you implemented?

- Financials
  - Oracle General Ledger
  - Oracle Payables
  - Oracle Receivables
  - Oracle Fixed Assets
  - Oracle Cash Management
- Logistics
  - Oracle Inventory
  - Oracle Purchasing
  - Oracle Order Management
  - Oracle Shipping
  - Oracle Advance Pricing
- Production
  - Oracle Bills of Material
  - Oracle Work in Process
  - Oracle Quality
  - Oracle MRP/MPS
  - Oracle Master Scheduling
- HR
- Projects
- Other.....

20. Ω How long does each module take to implement?

	□1-3 mo	□4-6 mo	□7-12 mo	□13-18 mo	□19-24 mo
GL					
AR					
AP					
FA					
Cash M					
Inv					
PO					
OM					
Costing					
Projects					
BOM					
WIP					
Quality					
MRP					
MS					
HR					
Other_____					

21. Ω Is there any cancellation for a module?
.....
22. Ω What kind of functionalities did the system bring?
.....
.....
23. Ω What was your basic criteria and targets at the beginning of the implementation?
.....

- Analysis of costs/revenues based on product and customers
- Aggressive cost control
- Decision making based on more information
- Greater accuracy and timeliness of information
- Flexibility to respond changing business environment
- Reduce paper documentation
- Eliminates inventory problems, cash management, material shortages, prompt delivery
- Improves international operations by supporting a variety of tax structures, invoicing schemes, multiple currencies, multiple period accounting and languages
- Improves supply-demand linkage
- Other_____

24. Ω Did you meet this after the implementation?

Yes
% 90
% 75
% 50
% 25
No

25. Ω What percent of your expectations from the ERP software were satisfied after implementation?

None
Less than %10
11-40 %
41-70%
More than %70

26. Ω Please check your satisfaction rate according the modules implemented.

	0-25%	25-49%	50-74%	75-89%	90-100%
GL					
AR					
AP					
FA					
Cash M					
Inv					
PO					
OM					
Costing					
Projects					
BOM					
WIP					
Quality					
MRP					
MS					
HR					
Other_____					

27. Ω How would you rate the success of your ERP implementation as whole?

failed (product does not meet customer or quality expectations);

low success (above average cost, effort and schedule performance but meeting quality expectations);

successful (average cost, effort quality and time);

high success (less than average cost, effort and time);

exceptional success (meeting all quality, cost effort and schedule expectations)

Part 2 Evaluation of CSFs

- Did you get top management support throughout the project implementation cycle?
- Do you think you had effective change management from top during project?

Do you face some problems during redefinition of processes?

Did you face with user resistance to new system? What kind of actions did you take to overcome?

- Do you think you had clearly established goals and objectives? Were you informed about these goals? Do you think your project scope is realistic?

Do you think milestones of the project were underlined formally?

- Do you think you have well composition of project team? (right people from departments, experienced consultants?)

Were roles and responsibilities clearly defined (within the project team)?

Did you have change in project team composition during project?

- Did you redesign (reengineer) your processes where necessary and align these with the system?
- Did you have someone as playing project champion role to have effective change management and solve problems?
- Are you satisfied with the user involvement and participation? How you would evaluate workers participation in the project?
- Were there any trust issues between partners?
- Did you have a dedicated staff and consultants? (huge time and effort)
- Did you have communication problems during the project?

Were you satisfied with the communication within the project team? (inwards)

Was knowledge created within the project team communicated throughout the

organization such as the progress of the project? (outwards)

- Did you have a formalized project plan and schedule? Was it reviewed when necessary?
- Did you have proper training?

  Were you satisfied with the training?

  Were you satisfied with the time allocated to training?

  Did you have training for both technical staff and end-users?

- Did you have enough testing and troubleshooting?
- How many days did you spend for testing?

  □ 1-2 days
  □ 3-5 days
  □ 6-7 days
  □8-10 days
  □ More than 10 days

- Are you satisfied with the usage of consultants? (number and time)
- Did you have empowered decision makers to take quick action?
- Did you have adequate implementation strategy?

  Did you have adequate ERP Implementation methodology? (AIM?)

  Did you take documentation (deliverables) during implementation?

- Did you have much customization?
- Did you think you had the adequate ERP version?
- Did you have adequate software configuration? (set up)
- Did you have much integration with the legacy system? Do you have problems?

Other questions:

- Did you get live support or have help desk after the project go-live?
- If you could re do the project what would you do differently? (control)

At present, there is a list of all CSFs in ERP Imlementation. All these factors have significant effect on the success of implementation project. Please clarify the importance of them in your project success, marking from 1-21

- Project scope management
- Training
- Top management Support
- Implementation strategy
- Communication
- Change Management / user resistance to change
- Business Reengineering
- Legacy system
- Dedicated staff and consultant
- Appropriate usage of consultants
- Trust between partners
- Adequate ERP version
- Adequate ERP Configuration
- Project champion role
- Project team quality
- User involvement and participation
- Degree of customization
- Communication
- Preventive trouble shooting
- Empowered decision makers
- Formalized project plan/schedule

APPENDIX C

Interview Questionnaire-Turkish Version

(with a sample reply)

Anket Soruları

Bu anketin amacı yapılmış olan ERP projesinin başarısında Kritik Başarı Faktörlerinin etkisini ölçmektir. Şirket ve kişi adları yapılacak çalışmada açıklanmayacaktır.

Ω	Herkes için	©	Danışmanlar
®	Proje Yöneticileri	Δ	Anahtar Kullanıcılar

Şirket Adı:

Bölüm 1

1.Ω Şirketteki göreviniz nedir?

6 Sigma Proje Yöneticisi

2.Ω Projedeki göreviniz nedir?

√ **Proje Yöneticisi**
 Anahtar Kullanıcı
 Fonksiyonel danışman
 Teknik danışman

3.Ω Şirketinizin sektörü nedir?

 Kamu
√ **Özel**

4.Ω Şirketiniz hangi alanda faaliyet göstermektedir?

 Enerji
 Hizmet
 √ **Yiyecek İçecek**
 √ **Diğer_Eğlence Sektörü**
 Tüketim ürünleri
 Kimya
 İnşaat
 Teknoloji
 Otomotiv
 Tekstil
 Sağlık
 Finans
 İlaç
 Medya
 Telekominikasyon
 Diğer_____

5.Ω Şirketinizdeki çalışan sayısı nedir?

- □ 1-19
- □ 20-49
- □ 50-100
- √ **100-199**
- □ 200-499
- □ 500-

6.Ω Ne kadar zamandır Oracle Uygulamaları kullanıyorsunuz?(Canlı kullanıma geçtiğiniz tarihten itibaren)

- √ **1-6 ay**
- □ 7-12 ay
- □ 12-23 ay (1-2 yr)
- □ 24-35 ay (2-3 yr)
- □ 35-59 ay (3-5 yr)
- □ 60 ay- (5 yr)

7.Ω Oracle uygulamalarının hangi versiyonunu kullanıyorsunuz?

Oracle 11.5.10

8.Ω Oracle uygulama projeniz ne kadar sürdü?

- □1-3 ay
- √ **4-6 ay**
- □ 7-12 ay
- □ 13-18 ay
- □ 19-24 ay

9.Ω Planlanan uygulama süresi ne idi?

- □1-3 ay
- √ **4-6 ay**
- □ 7-12 ay
- □ 13-18 ay
- □ 19-24 ay
- □ 25-30 ay

10.Ω Projeye katılım yüzdeniz ne idi?

- □ %10 dan az
- □ %11-%24
- □ %25-%49
- □ %50-%74
- □ %75-%89
- √ **%90-%100**

11.Ω Proje için yaklaşık kaç adam/gün harcadınız?

- □1-14 adam/gün
- □15-29 adam/gün
- □30-59 adam/gün

□60-119 adam/gün
√ **120 adam/gün den fazla**

12.Ω Proje aşamalarındaki katılımınız nasıldı?

1. Tanım (Mevcut Durum Analizleri)	2. Analiz (Gelecek durum modeli)	3. Çözüm (İş ihtiyaç senaryoları ve örtüştürme)	4. Kurulum ve Test	5. Geçiş
□ %10 dan az	□ %10 dan az	□ %10 dan az	□ %10 dan az	□ %10 dan az
□ %11-%24	□ %11-%24	□ %11-%24	□ %11-%24	□ %11-%24
□ %25-%49	□ %25-%49	□ %25-%49	√ **%25-%49**	□ %25-%49
□ %50-%74	□ %50-%74	□ %50-%74	□ %50-%74	□ %50-%74
□ %75-%89	□ %75-%89	□ %75-%89	□ %75-%89	□ %75-%89
√ **%90-%100**	√ **%90-%100**	√ **%90-%100**	□ %90-%100	√ **%90-%100**

13.Ω Şirketinizde kaç kişi Oracle Uygulamalarını kullanıyor?
□ 1-9
√ **10-49**
□ 50-99
□ 100-199
□ 200-

14.® Proje Bütçeniz gerçek proje maliyetlarinden nasıl ve ne oranda saptı?
√ **Sapma yok (hardware ihtiyacı sebebiyle ek olarak el terminali ve teraziler alınmıştır**)
□ Proje maliyeti bütçelenenin 10% üzerinde
□ Proje maliyeti bütçelenenin 10%- 25% üzerinde
□ Proje maliyeti bütçelenenin 25%-50% üzerinde
□ Proje maliyeti bütçelenenin 50%-100% üzerinde
□ Proje maliyeti bütçelenenin 100% üzerinde

15.® Yaklaşık eski verilerin ne kadarı yeni sisteme akltarıldı?
□ Hiç
√ **%10 dan az (sadece müşteri ve tedarikçi bilgileri aktarıldı)**
□11-40 %
□ 41-70%
□ %70 den fazla

16.® İş süreçlerinizin ne kadarını yeniden dizayn ettiniz?
□ Hiç
□ %10 dan az
□11-40 %

 41-70%
√ **%70 den fazla**

17.® Şirket ihtiyaçlarına uydurabilmek için standart programda yüzdesel olarak ne kadar değişiklik yaptınız?

 Hiç
√ **%10 dan az**
11-40 %
 41-70%
 %70 den fazla

18.® © Proje tamamlandıktan sonra kullandığınız sistemde ne kadar değişiklik yaptınız?

Hiç değişiklik yapmadık

√ **Az değişiklik yaptık**

 Orta derecede değişiklikler yaptık

 Belirgin değişiklikler yaptık

19.® © Projede hangi modüller uygulandı?

√ **Finans**
- √ **Oracle Genel Muhasebe**
- √ **Oracle Borçlar**
- √ **Oracle Alacaklar**
- √ **Oracle Sabit Kıymetler**
- Oracle Nakit Yönetimi (nakit yönetimi ile ilgili kasıt edilen "banka" ile entegrasyon ise; Hayır)

√ **Lojistk**
- √ **Oracle Stok Yönetimi**
- √ **Oracle Satınalma Yönetimi**
- √ **Oracle Sipariş Yönetimi**
- Oracle Sevkiyat (fikrim yok, dahil miydi?)
- √ **Oracle İleri Fiyatlandırma**

 Üretim
- Oracle Ürün Ağacı
- Oracle Üretim
- Oracle Kalite
- Oracle Malzeme İhtiyaç Planlaması
- Oracle Genel Planlama

İnsan Kaynakları

√ **Proje (Proje Maliyetlendirme)**

 Diğer_____

20. Ω Proje uygulması her modül için ne kadar sürdü?

	□1-3 ay	√ **4-6 ay**	□7-12 ay	□13-18 ay	□19-24 ay
GL		x			
AR		x			
AP		x			
FA		x			
Cash M					
Inv		x			
PO		x			
OM		x			
Costing		x			
Projects		x			
BOM					
WIP					
Quality					
MRP					
MS					
HR					
Other_____					

21. Ω Herhangi bir modül için erteleme yapıldı mı?
Hayır

22. Ω Sistem size ne gibi fonksiyoneliteler getirdi?

Bizim şirketimizde hiçbir süreç yapısı yoktu. Dolayısıyla uygulanan tüm süreçler bizim için "yeni" bir fonksiyonalitedir. Ancak en önemli değişiklik "actual costing" yapısına gidilmesidir

23. Ω Proje başlangıcında ana hedefiniz ve kriteriniz ne idi? İşaretleyiniz.

√ Gelir ve giderlerin ürün / müşteri bazında analizi

√ Agresif maliyet kontrolü

√ Departmanlar arasındaki kordinasyonu artırmak

√ İş süreçlerinin standartlaştırılması

√ Veriye dayalı karar alınması

√ Veride tutarlılık ve zamansallık sağlanaması (online data)

√ Değişen iş süreçlerine uyumda esneklik

√ Kağıt işinin azaltılması

√ Stok problemlerinin azaltılması, zamanında ulaştırma

√ Nakit yönetiminin sağlanması

√ Tedarik zinciri yönetiminin geliştirilmesi

√ Satınalma standart ve prosedürlerinin belirlenmesi

√ Müşteri bilgilerinin tutulması, segmentasyonu ve analizi

√ Bütçe ve Gerçekleşen Performanslarının Ölçüm ve Analizi

√ Finansman departmanının iş yoğunluğu azaltacak otomatik raporlama sistemler

√ Tekil bilgiye dayanan ortak bir database yapısının oluşturulması

√ Firmanın mevcut üretim sistemiyle Oracle sisteminin entegrasyonunun sağlanması

24. Ω Uygulamadan sonra bu hedefe ulaştınız mı??

√ **EVET**
□ % 90
□ % 75
□ % 50
□ % 25
□ Hayır

25. Ω Oracle Uygulamaları (ERP Sistemi) beklentilerinizin ne kadarını karşıladı?

□ %10 dan az
□11-25 %
□ 26-49%
□ 50-69%
□ 70-89%
√ **%90 dan fazla**

26. Ω Lütfen modüllerden memnuniyet derecenizi işaretleyin.

	□0-25%	□25-49%	□50-74%	□75-89%	√ **90-100%**
GL					X
AR					X
AP					X
FA					X
Nakit Yönetimi					
Inv					X
PO					X
OM					X
Maliyet					X
Proje					X
BOM					
WIP					
Kalite					
MRP					
MS					
HR					
Other_____					

27. Ω Genel olarak ERP uygulama projenizi nasıl değerlendiriyorsunuz?

 başarısız (ürün müşteri beklentilerini karşılamıyor, kalite sorunu);

 az başarılı(ortalama maliyet, efor ve zaman çizelgesini aşmış ama beklentileri karşılar nitelikte);

 başarılı (ortalama maliyet, efor ve zamanda);

√ **yüksek başarı (ortalama maliyet, efor ve zaman çizelgesinin altında)**

Bölüm 2 Kritik Başarı Faktörleri Değerlendirmeleri

- Tüm proje süresince üst yönetim desteğini aldınız mı?

  Kesinlikle hiçbir destek almadık. En büyük problemimiz üst yönetime rağmen proje yapmak idi. Hem projenin uygulanış, hem de live sürecinde üst yönetim desteği çok önemli. Özellikle live sürecinde bu desteğin olmaması, implementasyonda başarılı olan bir işin, live aşamasında sürekli tehdit altında kalmasına sebep oluyor.

- Proje süresince efektif bir değişim yönetimi uygulandığını düşünüyor musunuz?

  Evet. Yönetim desteğinin az olması sebebiyle, çok zor bir süreçti, ama buna rağmen başarılı oldu. Bunun sebebi değişim yönetimi stratejisi olarak çalışanların birebir ikna edilmesine özel önem verilmesidir.

- İş süreçlerini yeniden tanımlarken, ele alırken problemler yaşadınız mı?

  Evet problemler yaşadık, özellikle firmanın mevcut Possible sistemiyle Oracle'ın birbiriyle entegre edilmesi aşamasında, programların birbirlerinden çok farklı olmaları sebebiyle stok ve üretim süreçlerini istediğimiz gibi dizayn etmekte problem yaşadık. Problemlerimiz genellikle Oracle sisteminden değil, Possible sisteminden kaynaklandı. Ancak Oracle'ın güçlü database yapısı firmamızdaki mevcut Possible sisteminin nerelerinde problemler olduğunu anlamamıza yardımcı oldu. "Life" sürecinde bu problemleri anlayıp iyileştirme için hemen aksiyon alabildik. Oracle sistemi bizi doğru yönlendirdiği için doğru kararlar alabildik; Life sürecinde bu konuda yaptığımız değişikliklerin başarılı olduğunu rakamlarla ispat edebiliyoruz.

- Yeni sistemle ilgili kullanıcıların direnciyle karşılaştınız mı? Bunların üstesinden nasıl gelindi?

Kullanıcı direnciyle çok karşılaştık, ama proje yönetimi olarak sürekli ikna metotlarını kullanarak, sistemin insanlara faydasını anlatarak, ve ihtiyaç olan noktalarda Life süreci esnasında kullanıcıların hayatını kolaylaştıracak küçük değişiklikler yaparak sistemi oturttuk. Özellikle online sistem ile offline süreç arasındaki bağlantıyı detaylı olarak kurgulamamız, bununla ilintili olan prosedürleri soru işaretine yer bırakmayacak kadar açık bir şekilde yayınlamamız, görev tanımları, sorumluluk ve organizasyon yapısını bu sistem ile entegre etmemiz, yapılan işin boyutunu sadece bir software paketi uygulamasından çıkarıp gerçek hayatın kendisi haline getirdi.

Proje yöneticisi olarak benim aldığım en büyük ders şudur: Kullanıcılar böyle bir programı ne kadar çok gerçek hayatla ve kendi iş yapış şekilleriyle özdeşleştirebilirlerse ve sistemin kendi performanslarına ne kadar çok katkısı olacağını anlarlarsa, kullanıcı nezdindeki direnç o kadar iyi aşılabilir. Önemli olan insanları buna ikna etmek.

- Sizce projenin açık şekilde belirlenmiş hedefleri varmıydı? Bunlardan birebir haberdar mıydınız? Sizce proje kapsamı gerçekçi miydi?

Hedefleri açık, net ve gerçekçiydi. Bunlardan birebir haberdardık.

- Sizce projenin ana taşları resmi bir şekilde bildirilmiş miydi?(Projede yapılacak işlerin ve dead lineların belirli olması)

Evet. Fazlar bazındaki "deliverable" lar net olarak tanımlanmıştı.

- Sizce proje ekibi uygun kişilerden mi oluşuyordu? Doğru alan ve departmanlardan doğru kişiler ve deneyimli danışmanlar?

İnsan kaynağı kalitesi olarak finansman ve mali işler süreçleri haricindeki diğer tüm key-user'lar tecrübe açısından "zayıfa yakın orta" seviyede tecrübeye yakındılar. Hemen hepsi hayatlarında ilk defa bir proje gerçekleştirdiler. Projeyi ancak danışman firmanın ve proje yöneticisinin yönlendirmeleriyle götürebildiler. Ancak yinede bu kullanıcılar şirketiçinde bulabileceğimiz "en iyi" alternatiftiler.

Danışmanlara gelince: Projenin başarısı için, şirketin gerçeklerini kabul edip,

mevcut görev tanımları ve kapsamlarının haricindeki konularda da özel gayret sarfederek büyük katkı sağladılar.

Projenin başlangıcında proje ekibinin motivasyonunu sağlamak yöneticiler olarak bizim için çok zorlu bir süreçti, ancak projenin sonlarına doğru (Live'dan önceki son 2 ay) motivasyonları oldukça yükseldi, çünkü projenin kendi performanslarına katkısı olacağını görüp ikna oldular.

- Roller ve sorumluluklar açıkça belirtilmiş miydi? (ekip üyeleri)

Evet. Ancak bu sorumlulukları algılamakta çok zorlandılar. Sorumluluklarının devamlı kendilerine hatırlatılması gerekiyordu. Kısacası, otomatik olarak kendiliklerinden insiyatif alarak değil, ancak talep edildiği zaman sorumluluklarını yerine getirdiler. Bu konuda oldukça zorlandığımızı söyleyebilirim.

- Proje süresince proje ekibinde değişiklikler oldu mu?

Evet, 2 kişi değişti. Ancak bunların yerine yeni "key user"lar atanamadı. Mevcut "key user"lar gidenlerin de sorumluluklarını üstlendiler. Bu durum projeyi negatif olarak etkilemiştir.

- Gerektiği yerlerde iş süreçlerinizi yeniden dizayn edip sistemle uyumlu hale getirdiniz mi?

Evet bu tür uygulamalarımız hem proje aşamasında, hem de "live" sürecinde oldu. Özellikle müşteri memnuniyetini sağlamak adına özellikle satış süreçlerinde bazı "ödünler" vermek zorunda kaldık. Şirketin en büyük dezavantajı olan "istisnalara" özel süreç dizaynları yapmak zorunda kaldık. Bu ödünler, bütünün bekası için verildi.

Ancak sonuçta bu tür uygulamalar, genelde yönetimle ve çalışanlarla gerçekleştirilen pazarlıklar sonucunda "al-ver" ilişkisine dayandırıldı. Yani istediğimiz ve hedeflediğimiz bir iş yapış şekline onay alırken, başka bir iş yapış şeklinden feragat etmek durumunda kaldık.

Ayrıca "live" sürecinde üretimden kaynaklanan problemlerin çözümü için, offline

dünyadaki sürecimizde radikal değişiklikler yapmak zorunda kaldık ve "live" sürecinin 3üncü ayından itibaren bu değişikliğin pozitif efektlerini rakamsal olarak ispat edebildik. (Offline süreçteki değişiklik mutfağa verilen reçete bilgisi, reçete içeriğinin düzeltilmesi ve değişikliklerin transfer hareketlerine yansıtılması olarak açıklanabilir. Bu değişiklik mevcut sürecimizde bu tür bir bilgi akışının olmadığının keşfedilmesi, ve bu bilgi akışının sağlanması için yapıldı ve bu aşamada mutfak ekibinin ikna edilebilmesi için gerçek bir kriz yönetimi uygulandı. Mutfaktan kaynaklanan bu süreçlerden dolayı "live" sürecinin ilk 2 ayında Oracle sisteminde ay kapanışı gerçekleştirememiştik)

- Projede "Proje Şampiyonu" rolünde biri var mıydı? (Değişim yönetimini uygulayan, karar alınmasında çabuk ve etkin olunmasını sağlayan, sorunlara çözüm bulan)

Evet ben vardım. Bu görevi Proje ve 6 Sigma Yöneticisi olarak üstlendim.

- Kişilerin katılımından memnun muydunuz? Projede çalışanların katılımını nasıl değerleniriyorsunuz?

Şirketin en yoğun olan yaz sezonunda proje çalışması yapıldığı için katılım konusunda çok büyük problemler yaşadık. Hatta gelen şikayetler sebebiyle, üst yönetim yaz sezonu bitene kadar projeyi dondurmayı bile düşündü. Ancak çeşitli ikna toplantılarından sonra yönetimi bu karardan caydırabildik. Dolayısıyla projenin ilk 4 ayındaki katılımdan oldukça hoşnutsuz oluğumu, son 2 aylık katılımının da "orta" seviyede gerçekleştiğini söylebiliriz.

- Proje ekibi içinde güven problemi yaşandı mı?

Özellikle satış modüllerinin (sipariş) anahtar kullanıcısının Oracle sistemini sorguladığını ve güven duymadığını gözlemledik. Bu durum projenin sonlarına doğru iyileşti. Genelde proje ekibi içinde değil ama, diğer şirket çalışanları tarafından proje ekibine karşı güvensizlik duyulduğu hissedilmiştir.

- Proje çalışanları ve danışmanlar kendilerini projeye adamışlar mıydı?

Danışmanlar için cevap "evet" dir. Proje çalışanlarını ile ilgili problemleri yukarıdaki sorularda cevaplandırmıştım; Genel olarak cevaplandırmak gerekirse

proje çalışanlarının proje esnasındaki performans pek iyi değildi, ancak Live sürecinden sonra olağanüstü bir performans gösterdiler.

- Proje süresince iletişim konusunda problem yaşadınız mı?

Evet oldukça sıkıntılı problemlerimiz oldu. Genel anlamda söylemek gerekirse, hem ekip içinde hem de şirket içindeki en büyük problemimiz alınan kararlar ve uygulanması öngörülen prosedürlerin insanlar tarafından "şahsi" olarak algılanması ve bu konularda profesyonel iş yapış tarzına uygun olmayan son derece kalitesiz yorumların üretilmesi olmuştur. Burada iletişimin yönteminden çok çalışanlar nezdinde ciddi bir "kültür" problemi yaşandığını söyleyebiliriz. İletişimi yapılmamış olan konularda bile şirket içinde "olumsuz" yorumlar üretilmiş ve yaygınlaştırılmıştır. Bu spesifik problem aslında hem çalışanların birbirleri arasındaki, hem de yönetime karşı duydukları "güvensizlikten" kaynaklanmaktadır.

Proje yönetimi olarak sık sık memorandumlar yayınlamak, birebir toplantılar gerçekleştirmek veya grup terapileri düzenlemek suretiyle bu olumsuzlukları minimize etmeye çalıştık.

İletişim problemleriyle ilgili sorunları çözmek için Proje Yöneticisi olarak ben toplam eforumun %75'ini bu konuya ayırdığımı söyleyebilirim

.İletişim konusunda özel bir efor sarfedilmesiydi, bu projenin başarısız olması kaçınılmaz olurdu, hatta bu proje "başarısız" projeler için tipik bir "benchmark" olabilirdi diyebiliriz. İletişim problemleri bizim en büyük "risk" faktörümüzdü.

- Proje ekibi içindeki iletişimden memnun muydunuz?

Yukarıda anılan tüm problemlere rağmen, proje ekibinde projenin son 1 aylık döneminden başlamak üzere "live" sürecini de kapsayan bir şekilde düzgün bir iletişim ortamı yaratılmış ve tüm ekip üyelerinin aynı dili konuşması sağlanmıştır.

- Proje ekibince yaratılan bilgi tüm şirkete iletiliyor muydu?

Yukarıda anmış olduğumuz iletişim problemleri ve ekip üyelerinin bu konudaki yetkinliklerinin yetersizliği sebebiyle, ekip haricinde yapılacak olan tüm iletişimi

merkezileştirmeye karar verdik. Çünkü iletişim açısından bu kadar olağan üstü problemlerin yaşandığı bir ortamda, farklı kanallardan farklı mesajların gönderilmesi problemi içinden çıkılmaz duruma getirebilirdi. Bu sebeplerden dolayı iletişim konusundaki sorumluluğu Proje Yöneticisi olarak ben bizzat üstlendim. Ancak benim projeyi yönetime devretmemden sonra bu konuda problemler yaşanması muhtemeldir ve bu konuda gerekli sorumluluğu gerçekçi anlamda üstlenecek bir yetki devri maalesef gerçekleştirilememiştir. Organization C'de yapılan ERP projesi bu sebeplerden dolayı "risk" altındadır ve durumu gözlem altında tutulmalıdır.

- Resmi bir proje planınız ve zaman çizelgeniz var mıydı? Gerekli olduğunda tekrar gözden geçirildi mi?

Evet vardı ve bu konuda gereken sıklıkta revizyonlar düzenli olarak yapılmıştır.

- Yeni sistemle ilgili uygun eğitim aldınız mı?

Anahtar kullanıcılar ve teknik çalışanlar bu konuda eğitim aldılar, ancak onların şirket çalışanlarına yapmış oldukları eğitimlerin kalitesinin iyi olduğunu söylemek pek mümkün değildir. Bunun sebeplerinin ne olduğu konusunda karar vermek benim açımdan pek mümkün değil. Burada 2 alternatif olabilir;

a) danışman firma yeterli eğitim vermemiş olabilir
b) proje çalışanları aldıkları eğitime yeterli derece dikkat ve önem vermemiş olabilirler

- Eğitimlerden memnun kaldınız mı?

Anahtar kullanıcıların eğitimleri hakkında ben proje yöneticisi olarak yorum yapamam. Ancak şirket çalışanlarının aldıkları eğitimlerin kalitesinden memnun kalmadığımı yukarıda zaten açıklamıştım. İnsanlar sistemi daha çok kullanarak öğrendiler ve live sürecinin ilk 2 ayında çok hata yaptılar.

- Sizce eğitimlere ayrılan zaman yeterli miydi?

Kesinlikle evet.

- Eğitimleri hem teknik çalışanlar hem diğer departman kullanıcıları aldı mı?

  Evet

- Projede testlere ve problem çözümüne yeterli süre ayrıldı mı?

  Bence hayır. Özellikle şirketin mevcut pos programıyla Oracle sistemi arasındaki veri akışı için yeterli test yapılamamıştır. Pos sisteminin testi "live" sürecinde gerçekleştirilmiş ve bu durum projenin "live" sürecinin ilk 2 ayında ay kapanışı yapılamamasına sebep olmuştur. Ayrıca oluşan hatalar sebebiyle Oracle sisteminden kaynaklanmadığı halde, kullanıcılar ve yönetim tarafından Oracle sisteminin doğruluğu sorgulanmıştır. Bu konu iletişim probleminden sonra bizim malesef ikinci en büyük dezavantajımız olmuştur.

- Ω Testler için ne kadar zaman harcadınız?

  □ 1-2 gün
  □ 3-5 gün
  √ **6-7 gün**
  □8-10 gün
  □10 günden fazla

- Danışmanların sayı ve zaman anlamında kullanımından memnun muydunuz? Projede yeterli sayıda ve sürede danışman kullanıldığını düşünüyor musunuz?

  Evet

- Proje süresince karar alımlarının çabuk olmasını sağlayan karar almada yetkili kişilerle mi çalıştınız?

  Maalesef hayır. Yukarıdaki sorularda da belirtmiş olduğum üzere, hem proje çalışanlarının deneyimsiz olmaları, hem de yeterli yönetim desteğinin olmaması sebebiyle, alınan kararların hemen hemen %95'ine yakın olanını ben Danışman Proje Yöneticisi ile birlikte aldım.

  Hesap planı gibi çok kritik olan konularda ise, almış olduğumuz kararları yönetimle paylaştık. Bu kararlar hiçbir değişikliğe uğramadan yönetim onayını aldılar.

- Sizce proje uygulama stratejiniz uygun muydu? (Faz yaklaşımı..vs) AIM hakkında ne düşünüyorsunuz?

  Faz yaklaşımı, özellikle AIM metodolojisi bence çok uygun bir seçimdir. Eğer

vakitsizlik ve proje çalışanlarından kaynaklanan katılım eksikliği gibi problemlerimiz olmasaydı, Proje yöneticisi olarak ben de bulunan 6 sigma know-how'unu da kullanabilirdik. Özellikle senaryo çalışmaları esnasında 6 Sigma metodolojisinde bulunan ve planlanan dizayndaki risklerin değerlendirilmesi için kullanılabilecek olan bazı "tool" lar değerlendirilebilseydi, "live" sürecinde yaşanan problemleri önceden görmemiz ve bunlara engel olmamız mümkün olabilirdi.

- Proje sırasında dökümantasyon tutunuz mu?
  Evet. Çok detaylı bir dökümantasyon çalışmamız oldu.
- Projede sistem standartlarının dışına çıkarak şirkete özel bir takım uyarlamalar yapmak zorunda kaldınız mı? Ne kadar? (Ek formlar, kod değişikliği..vs)
  Evet. Ancak bunu teknik danışmanlar daha iyi değerlendirebilir.
- Sizce uygun ERP versiyonunu mu kullanıyorsunuz?
  Projede ihtiyaç olunan tüm beklentileri karşılaması açısından bakıldığında, kullanılan versiyonun uygun olduğu söylenebilir.
- Sizce uygun kurulum yapıldı mı?
  Hesap planı, depo yapısı, depo hareketleri, projeye çıkış hareketleri gibi çok spesifik ve yoğun entegrasyon gerektiren konularda (Oracle- Pos sistemi), şirketin süreçlerine uygun kurulumlar yapılmıştır. Projenin hedeflenen çıktılarını almak açısından çok önemli olan bu kurulum sürecinde çok detaylı çalışmalar yapılmıştır. Farklı alternatifler değerlendirildikten sonra, en uygun çözümlere karar verilmiştir.
  Live sürecinde pos sistemi ve üretim sürecinden kaynaklanan problemler sebebiyle, bazı değişikliklerin yapılması ihtiyacı oluşmuş ancak bu ihtiyaçlara uygun değişiklik çok hızlı bir şekilde yerine getirilebilmiştir.
- Diğer sisteminizle entegrasyon yapıldı mı? Entegrasyon ile ilgili problemleriniz var mı?
  Evet cash satış ve üretim süreçlerini içine alan Possible programı ile Oracle arasında entegrasyon yapılmıştır. Yukarıda çeşitli sorularda kısaca değinmiş olduğum bu süreçte çok büyük problemler yaşanmıştır. Entegrasyon süreci projenin live sürecinde başarısızlığa uğramış ve ilk 2 ay Oracle sisteminde ay kapanışları gerçekleştirilememiştir.
  Buradaki en büyük problem, artık kurumsal bir yazılım desteği ve satışı bulunmayan Pos sisteminin, mecburiyetler sebebiyle son derece amatör şekilde çalışan bir danışmandan yardım alınarak entegre edilmeye çalışılmasından kaynaklanmıştır.

Nihayetinde Pos tarafında yapılması gereken "işletme senaryoları" ve "test" çalışmaları "live" sürecinde gerçekleştiği için proje olumsuz yönde etkilenmiştir. Bu durumun projenin en büyük problemi olan "iletişim" konusuna da son derece negatif yansımaları olmuştur.

Nihayetinde mevcut problemlerin çözümüne yönelik olarak "live" sürecinin ilk 2 ayından sonra çok hızlı olarak gerekli iyileştirme çözümleri bulunmuş ve ilgili aksiyonlar devreye alınmıştır. Sonuçların başarısı rakamsal olarak ispat edilebilmiştir.

Entegrasyon süreci halihazırda amaca yönelik olarak çalışmakla birlikte, mevcut iş yapış şekillerine manuel yeni iş adımları eklenmesine sebep olmasından dolayı pratik değildir ve uzun vadede kullanımı işlevsel görünmemektedir.

Bu konuyla ilgili olarak şirket yönetimine yeni bir "faz 2" projesi sunulmuş ve prensipte onay alınmıştır. "Faz 2 " projesinde şirkette bulunan pos sisteminden tamamen vaz geçilerek, tüm cash satış ve üretim süreçlerinin Oracle üzerinden işletilmesi sağlanacaktır.

Kısacası ERP projelerinde, şirketlerin bütçeleri elverdiği müddetçe, entegrasyon süreçlerinden kaçınılmaya çalışılması en doğru stratejik yaklaşım olacaktır.

- Canlı kullanıma geçtikten sonra destek aldınız mı? Ya da yardım masası gibi ani müdahelede bulunacak bir ekip oluşturmuş muydunuz?

  Canlı kullanımı geçtikten sonra danışman firmadan toplam 5 ay danışmanlık desteği alınmıştır. Bu destek kapsamı daraltılarak "aylık destek-bakım" anlaşması çerçevesinde yıl boyunca devam edecektir. Canlı kullanıma geçişte izlediğimiz stratejinin çok yerinde ve doğru bir karar olduğunu düşünüyorum.

- Eğer projeyi tekrar yapsaydınız neyi farklı yapmak isterdiniz, ya da nelerin farklı olmasını isterdiniz?

Bu çok uzun ve filozofik bir soru. Ben projeye bugün başlayacak olsam, pos sistemi ile asla entegrasyon yapmam, direkt olarak Oracle'ın ilgili modüllerini de satın alarak yoluma devam ederdim. Bundan sonra herhangi bir ERP projesi yapacak olursam entegrasyondan kaçınmaya çalışacağım. Ayrıca kurumsal olan ve kurumsal olmayan 2 partiyi bir araya getirerek suni bir çalışma ortamı yaratmamaya çalışacağım; ama hepsinden önemlisi kesinlikle kurumsal olmayan bir firma ile, sırf maliyeti düşük diye entegrasyon çalışması yapmayacağım.

Aşağıda, Kurumsal Kaynak Planlaması projelerinde etkili Kritik Başarı Faktörleri listelenmiştir. Lütfen size göre projenin başarılı olmasındaki önemine göre bu faktörleri numaralandırınız. (1. en önemli/ 21. en son önemli)

1□ Üst yönetim desteği

2□ Proje Şampiyonu Rolü

3□ Uygun ERP versiyonu (istenen özelliklere sahip olması)

4□ Proje kapsam yönetimi

5□ Proje Ekibinin kalitesi

6□ Kendilerini projeye adamış çalışan ve danışmanlar

7□ İletişim

8□ Partnerler arasındaki güven (proje ekibi içi)

9□ İş Süreçleri yeniden yapılandırma

10□ Uygulama stratejisi

11□ Resmi proje planı ve zaman çizelgesi

12□ Varolan sistemle entegrasyon

13□ Önleyici problem çözüm tasarımı

14□ Uygun ERP Konfigürasyonu (kurulumun uygun yapılması)

15□ Kararalmada yetkili çalışanlar

16□ Uygun oranlarda danışman kullanımı

17□ Kullanıcı katılımı (niteliksel ve niceliksel)

18□ Değişim Yönetimi

19□ Sistemde uyarlama oranı (Standart dışı)

20□ Eğitimler