TC.

MARMARA UNIVERSITY

INSTITUTE FOR GRADUATE STUDIES IN

PURE AND APPLIED SCIENCES

ERP APPLICATIONS IN TEXTILE SECTOR: PROBLEMS AND SOLUTION ALTERNATIVES

Gülce ÇİFÇİ GÜL

THESIS

FOR THE DEGREE OF MASTER OF SCIENCE

IN

INDUSTRIAL ENGINEERING

SUPERVISOR

Assoc. Prof. Dr. Bekir Kemal ATAMAN

İSTANBUL 2010

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ACKNOWLEDGEMENT

First, I would like to thank my advisor, Assos. Prof. Dr. Bekir Kemal Ataman for his help, guidance, advices and encouragement through this thesis study. I would also like to thank my lecturers in the department, especially Asst. Prof. Dr. Serol Bulkan for his comments and discussions.

I would also like to thank to my parents Hülya and Baki Çifçi, my brother Hasan Şevki Çifçi and my husband Serkan Gül for their help and support.

CONTENTS

ÖZET

TEKSTİL SEKTÖRÜNDE ERP UYGULAMALARI: KARŞILAŞILAN SORUNLAR VE ÇÖZÜM ALTERNATİFLERİ

Kurumsal kaynak planlama (KKP) sistemleri çeşitli sektörlerden bir çok şirket için bilgi sistemleri stratejilerinin merkezinde yer alır. Şirketler kurumsal kaynak planlama sistemi uygulamaları için hatırı sayılır bir kaynak yatırımı yapmaktadırlar. Literatür başarılı, başarısız sonuçlara ulaşmış bir çok uygulama örnekleriyle doludur. Başarısızlık olasılığını en aza indirgemek için karşılaşılabilecek sorunlar karar vericiler ve uzmanlar tarafından çok iyi değerlendirilmeli, düşünülmelidir. Paket seçiminden itibaren tüm süreçlere dikkat edilmeli, sektörü iyi bilen, ilgili modüller konusunda uzman ekiplerle çalışılmalıdır. İstenen geliştirmeler sonrasında son derece önemli olan test sürecinde de uygun metodlar kullanılarak tüm süreçler en iyi şekilde yönetilmeli ve proje sağlıklı bir şekilde hayata geçirilmelidir.

Tekstil sektörü büyük ürün çeşitliliğine sahip, dinamik ve hızlı süreçlere sahip dinamik bir sektördür. Ayrıca bu sektör uluslararası ilişkilerin yoğun olarak yürütüldüğü bir sektördür. Çok sayıda üretici farklı ülkelerde tesislere sahiptir ve bir çok şirket ihracata yönelik satışlar yapmaktadırlar. Bundan dolayı tekstil şirketleri sadece yerel değil aynı zamanda global birer oyuncu olmak zorundadırlar. Tekstil sektörü için finansal çakışmaları ortadan kaldırmak, yabancı pazarda çalışabilmek için uygun araçlara sahip olmak ve coğrafi sınırlar olmadan etkili bir bilgi paylaşım sistemi geliştirmek çok önemlidir.

Bu araştırma tekstil sektöründe kurumsal kaynak planlama yazılımlarının seçimi, ve uygulanması sürecinde karşılaşılan sorunlar ve bu sorunlara yönelik çözüm alternatifleri üzerine bir çalışmadır.

Şubat, 2009 **Gülce ÇİFÇİ GÜL**

ABSTRACT

ERP APPLICATIONS IN TEXTILE SECTOR: PROBLEMS AND SOLUTION ALTERNATIVES

Enterprise resource planning systems are central to information systems strategy of most companies from various sectors. Companies have invested considerable resources in the implementation of enterprise resource planning (ERP) systems. The literature is replete with many case studies of both successful and unsuccessful ERP implementations. To decrease failures to minimum levels, all potential problems should be analyzed and possible solutions revised by decision makers and experts. All processes, starting with the selection of the software package should be carefully analyzed and teams with expertise in both the textile sector and related modules of such software packages should be employed. Once the required systems developments have been established, suitable methods should be employed in the testing processes, which are of utmost importance, too, and the project should be brought to a successful end.

Textile sector is a dynamic sector with various products and quick processes. Also, this sector has consistent international relations. Most producers have facilities in foreign countries and most companies aim to export. So, textile companies should become players not only in the local sector but also in global markets. It is very important to avert ambiguities in financial operations, have the instruments to work in the foreign markets and to develop an effective information sharing system without geographical boundaries for textile companies.

This research is a study on problems encountered in choosing and implementing ERP applications in textile sector and possible solution alternatives for these problems.

February, 2009 **Gülce ÇİFÇİ GÜL**

ABBREVIATIONS

APICS **:** American Production and Inventory Control Society

CRM **:** Customer Relationship Management

EAS **:** Enterprise Application System

ERP **:** Enterprise Resource Planning

MRP **:** Material Requirements Planning

MRP II **:** Manufacturing Resource Planning

FIGURES

TABLES

PART I: INTRODUCTION

Technological developments affect daily life, environment and the structure of the companies. In our day, it is not possible to develop and to answer special customer requests without using information technologies.

Information age brings many advantages to firms, but technology investment is a must. Enterprise resource planning systems is one of these investments. A lot of companies that want to improve and want to give better service have invested considerable resources in the implementation of enterprise resource planning systems. These enterprise systems ensure the profitability and value increase to the firms that see enterprise systems as a competition tool. Enterprise resource planning systems enable using factors like time, quality, speed, decreased costs, efficient use of labor force and unconditional customer satisfaction.

Enterprise resource planning systems are central to information systems strategy of most companies from various sectors. These systems are reshaping business structures because they promise to solve the challenges posed by portfolios of supposedly disconnected and uncoordinated business applications. Also referred to as enterprise–wide systems or enterprise systems due to their enterprise-wide scope, these integrated enterprise–computing systems provide seamless integration of all the information flowing through an organization.

The textile industry is basically concerned with the design or manufacture of clothing as well as the distribution and use of textiles. The textile industries have been changed extremely in the last few years. The role played by ERP systems in this change is crucial.

I.1. Purpose

The overall purpose of this thesis is to determine the problems and solution alternatives at Enterprise Resource Planning systems applications in textile sector.

I.2. Background

Enterprise Resource Planning (ERP) has been promoted by the American Production and Inventory Control Society (APICS) since 1980 by extending the Manufacturing Resource Planning (MRP II) operation system to other systems of companies such as finance, marketing and personnel. Currently, the overall resources of a firm can be integrated through ERP (Berchet, Habchi, 2005).

The focus of manufacturing systems in the 1960's was on Inventory Control. Most software packages of the time (usually customized) were designed to handle inventory based on traditional inventory concepts. In the 1970's the focus shifted to MRP (Material Requirement Planning) systems that translated the Master Schedule built for the end items into time-phased net requirements for sub-assemblies, components and raw materials planning and procurement.

In the 1980's the concept of MRP–II (Manufacturing Resources Planning) evolved which was an extension of MRP to shop floor. In the early 1990's, MRP-II was further extended to cover areas like engineering, finance, human resources, project management etc. i.e. the complete gamut of activities within any business enterprise. Hence, the term ERP was coined.

ERP systems are computer software packages that enable companies to manage all of their operations, such as sales, manufacturing, inventory, accounting, etc. using a single platform.

The market of ERP systems continues to grow faster than any other software market (al-Mashari et al., 2003) with estimates that at least 30,000 companies worldwide have already implemented an ERP system (Mabert et al., 2003a).

I.3. Problem Statement

The concept of Enterprise Resource Planning systems have been studied by many researchers from different perspectives. Implementation processes, cost of implementing ERP systems, needs, benefit, etc. have been analyzed.

The textile industry has more varied types of items and process / departments, than many other types of manufacturing. These are almost sub – industries, requiring their own unique procedures and facilities. Therefore, there is need for normally customizing packaged software for departmental terminology, procedures, transactions etc.

Many researchers have studied implementation of ERP applications in various industries. However, there is limited research in the area of Enterprise Resources Planning systems in textile. Textile sector has unusual problems and difficulties. So, a lot of specialized problems can be seen in ERP applications in textile sector.

Enterprise Resource Planning (ERP) systems are comprehensive wide and complicated system. So, it has not been practically possible to determine all problems. However, in this study, the problems of ERP applications in textile industry will be discussed and solution alternatives will be attempted at.

I.4. Overview of Thesis

The text begins with a general survey to Enterprise Resource Planning (ERP) systems. In this part, there will be general information and definitions about ERP and an account of its historical evolution.

The next part describes the benefits, importance of ERP. After that comes information about textile sector and ERP applications in this industry.

PART II: LITERATURE REVIEW

II.1. Introduction and Definitions

II.1.1. Introduction to ERP Systems

Enterprise resource planning (ERP) systems are considered as the most ambitious, advanced, and sophisticated use of information technology (IT) by business to date, and are very important to companies because of the efficiency and uniformity of procedures and potential competitive advantage they offer, as well as the significant cost, risk, and time commitments associated with them (Benco, 2004).

ERP systems consist of many functional modules, which are all linked to a common database, handling a host of corporate functions such as finance, human resources, materials management, sales and distribution (Slater, 1998). The ERP system enables employees to share information across the whole organization (Thao, 2002) on real-time basis and at one time, and also update the information as changes are being made.

Most ERP packages also allow users work on multiple languages and currencies (Gencel, 2003) providing a capability for international operations and operations in different locations all over the world within the same unique integrated system.

II.1.2. Definitions of ERP

There are lots of different definitions in the literature about Enterprise Resource Planning (ERP).

ERP is an enterprise-wide combination of business management practice and technology, where Information Technology integrates and automates many of the business practices associated with the core business processes, operations, or

production aspects of a company to achieve specific business objectives. It is a centralized system with a central database and application server, which all functional areas share. An implementation usually encompasses an entire replacement of the existing system(s) with the new ERP system. Even though there are many parameters to allow for some customization, an ERP system is still a rigid system which requires organizations to conform their business practices to fit the ERP system.

ERP is a planning and communicating system that is made possible by information technology and it integrates all functions and processes of a company. Companies apply ERP systems for integrating and automating their business processes at various functions and for converting automation. (Düzakın, 2002)

Stratman and Roth (2002) describe ERP as an information system that integrates two or more functional areas (one of which must be production operations) through the use of a common database, and transaction processing with the potential for decision support addressing the integrated elements of the enterprise. Al-Mashari et al. (2003) offer that the basic architecture of an ERP system builds upon one database, one application, and a unified interface across the entire enterprise. Mabert et al. (2000) defined ERP concepts as a seamless integration of processing across functional areas with improved workflow, standardization of various business practices, improved order management, accurate accounting of inventory and better supply chain management.

According to Kremzar and Wallace (2001), ERP is defined as “An enterprise-wide set of management tools that balances demand and supply, containing the ability to link customers and suppliers into a complete supply chain, employing proven business processes for decision-making, and providing high degrees of cross-functional integration among sales, marketing, manufacturing, operations, logistics, purchasing, finance, new product development, and human resources, thereby enabling people to run their business with high levels of customer service and productivity, and simultaneously lower costs and inventories; and providing the foundation for effective e-commerce .

Others have defined ERP in terms of its implications. Bingi et al. (1999) state that ERP systems are not mere software systems but they affect how a business conducts itself resulting in an “organizational revolution” rather than a technological exercise. Jacobs and Bendoly (2003) describe ERP systems as representing a corporation’s infrastructure, much in the same way that physical highway systems do. Correspondingly, the authors also suggest that newer IT concepts appearing in business, such as B2B(Business to Business), B2C (Business to Consumer), and CRM (Customer Relationship Management) actually represent extensions of a company’s core ERP system.

ERP has been defined by Ohlsson & Ollfors (2001), as “A type of computer system that assists international companies in managing their information flows”. More definitively it has been described as a system able to “reduce the financial reporting, purchasing, and support expenses of management information system (MIS), and lead to more timely analysis and reporting of sales, customer, and cost data” (Wagle, 1998). The most concise definition of ERP has been offered by Tsung, (2004), “ERP is a system that aims to integrate the main business functions across all the departments within an organization.” In addition ERP has been viewed by (Irani & Love, 2001) as “a structural iterative business process, which offers organizational learning during the life cycle of technology”. The definition of ERP should be modified to be “information technology based computer platform that allows for integration of various business processes of an organization in order to increase efficiency, and thus profits, using a single database”.

Moreover, there are lots of other definitions in the literature (Table 1.2):

Table II.1 ERP definitions (Cotuk, 2007)

Author	Definition
Szitas (2005)	A unified information system, performing all information-processing tasks of a company and realizing an integration of the whole corporation
Marnewick and Labuschagne (2005)	A packaged business software system that lets an organization automate and integrate the majority of its business processes, share common data and practices across the enterprise and produce and access information in a real-time environment. The ultimate goal of an ERP system is that information must only be entered once
Gencel (2003)	A software solution that carries out all the functions of an enterprise to succeed in organizational goals as a collection of integrated subsystems
Kapp et al. (2001)	A system of integrated procedures, rules and algorithms designed to function consistently time and time again.
Brislen and Krishnakumar (1999; cited in Mayer, 2000)	A broad set of activities supported by multi-module application software that help a business manage the important parts of its business.
Everdingen et al. (2000 cited in Wu and Wang, 2003)	A software package which promises enabling a company to seamlessly integrate the data and information flowing throughout its entire organization including financial and accounting, human resource, supply chain, and customer information
Al-Mudimigh (2002)	Integrated information system software comprised of several modules that share a central database, designed to automate business processes across the enterprise.
Brown and Vessey (1999; cited in Beekhuyzen, 2001).	Online interactive system that can provide a 'total' solution to an organization's information systems needs by addressing a large proportion of business functions

Table II.1 ERP definitions (Cotuk, 2007) (Continuous)

Author	Definition
Pawlowski et al. (2000; cited in Beekhuyzen, 2001)	Shared information systems, which are systems that cross typical organizational boundaries and therefore have multiple users and stakeholders who have different cultures and approaches to work
Koch et al. (1999)	A single integrated software package that runs off a single database so that various departments can easily share information and communicate.

II.2 Historical Background of ERP Systems

The present era, which is referred as the Information Age, affected business environment all around the world, since the economy's interest turned away from production, which was the focus of the previous era called Industrial Age, to information. The roots of Information Age can be tracked down to 1956. In 1956 in the United States, researchers noticed that the number of people holding "white collar" jobs had just exceeded the number of people holding "blue collar" jobs. This observation does not imply that the Information Age began at that date, but it points at the beginnings of the new era. Technology was too expensive and difficult to learn, use and maintain when computers evolved. The machines that resemble today's computers began to emerge in 1940's.

Although they were used for scientific purposes, they were very slow and required too many resources when compared to modern computers. Only few people had access and could use computers. Computers began to be used for commercial purposes by 1960's; Material Requirements Planning emerged at the second half of the decade. This was the beginning of the reign of information, though it would need half a century to fully affect the business framework. Advances in both hardware and software technology made Manufacturing Resource Planning possible in 1970's, most of the vendors, who are holding biggest shares of ERP market today, were born during this decade. Smaller and cheaper computers could be obtained around 1980's.

The first wide area network was also operational by 1983. The flow of information began to gain speed. 1990's saw the rise of internet, which brought a fundamental change in obtaining information. Also, in the beginning of 1990's, the term ERP began to be uttered. (Figure II.1) MRP II was lacking the interfaces needed for integration of whole business processes. As the new millennium began, firms were in demand of one integrated business system that ran smoothly and provided them the chance to compete and survive.

The first ERP system was developed by two German engineers who founded SAP in the early 1970s (Edmondson, 1994; Okrent & Vokurka, 2004). SAP has become the world's largest inter-enterprise software company and the world's third-largest independent software provider overall (www.sap.com). Since the foundation of SAP and the introduction of ERP, growth of ERP systems has been dramatic with many vendors offering ERP systems. Some of the major ERP vendors include: SAP, Oracle, Microsoft and PeopleSoft.

Figure II.1 shows the evolution of ERP, beginning at the center and evolving outwards. Each of these steps will be covered shortly.

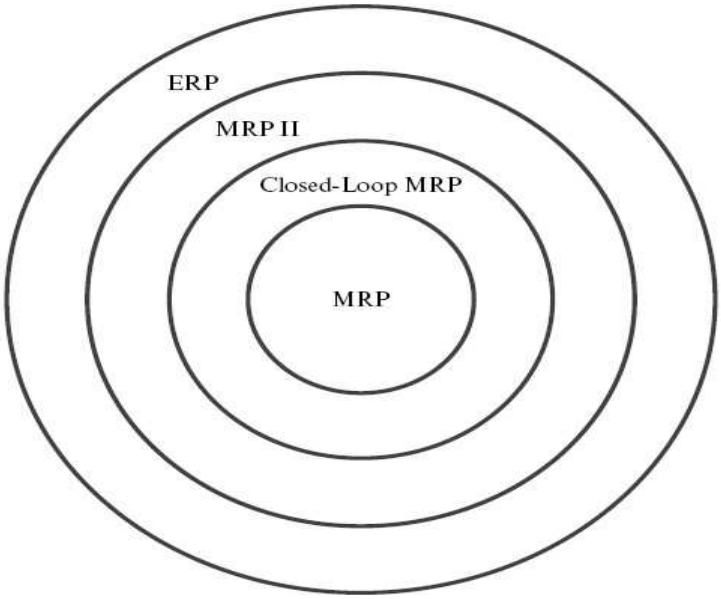

Figure II.1 Evolution of ERP (Wallace and Kremzar, 2001).

II.2.1 Material Requirements Planning (MRP)

Until 1960s, production planning and control were handled manually, using classic solutions. ERP began life in the 1960s as Material Requirements Planning, an outgrowth of early efforts in bill of material processing. Material Requirement Planning (MRP) is a software–based production planning and inventory control system used to manage manufacturing processes.

An MRP is intended to simultaneously meet 3 objectives:

- Ensure materials and products are available for production and delivery to customers.
- Maintain the lowest possible level of inventory.
- Plan manufacturing activities, delivery schedules and purchasing activities.

MRP's inventors were looking for a better method of ordering material and components, and they found it in this technique. The logic of material requirements planning asks the following questions:

- What are we going to make?
- What does it take to make it?
- What do we have?
- What do we have to get?

This is called the universal manufacturing equation. Its logic applies wherever things are being produced. Material Requirements Planning simulates the universal manufacturing equation. It uses the master schedule (What are we going to make?), the bill of material (What does it take to make it?), and inventory records (What do we have?) to determine future requirements (What do we have to get?) (Wallace, 2000).

II.2.2. Closed – Loop MRP

MRP quickly evolved, however, into something more than merely a better way to order. Early users soon found that Material Requirements Planning contained capabilities far greater than merely giving better signals for reordering. They learned this technique could help to keep order due dates valid after the orders had been released to production or to suppliers. MRP could detect when the due date of an order (when it's scheduled to arrive) was out of phase with its need date (when it's required).

This was a breakthrough. For the first time ever in manufacturing, there was a formal mechanism for keeping priorities valid in a constantly changing environment. The function of keeping order due dates valid and synchronized with these changes is known as priority planning.

Techniques for helping plan capacity requirements were tied in with Material Requirements Planning. Further, tools were developed to support the planning of aggregate sales and production levels (Sales & Operations Planning); the development of the specific build schedule (master scheduling); forecasting, sales planning, and customer-order promising (demand management); and high-level resource analysis (Rough-Cut Capacity Planning). Systems to aid in executing the plan were tied in: various plant scheduling techniques inside the factory and supplier scheduling outside the factory — the suppliers. These developments resulted in the second step in this evolution: closed-loop MRP (Wallace, 2001).

Closed Loop MRP is a complete series of functions. These functions are more advanced functions than the functions of MRP system like Sales and Operations Management (Planning), Demand Management, Capacity Planning (Figure II.2).

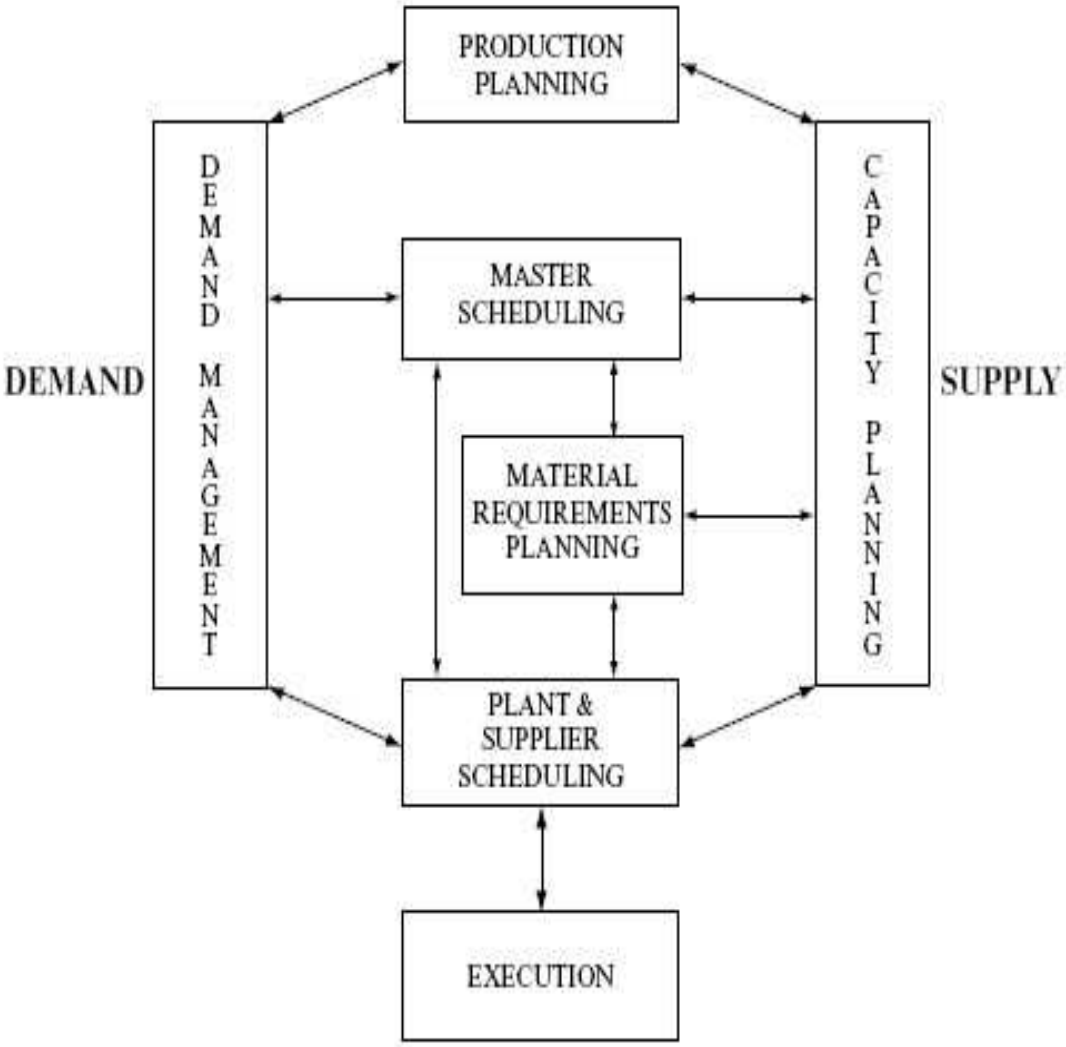

Figure II.2 Closed – Loop MRP (Wallace and Kremzar 2001)

II.2.3. Manufacturing Resource Planning (MRP II)

The next step in this evolution is called Manufacturing Resource Planning or MRP II (to distinguish it from Material Requirements Planning, MRP). During the 1970s and 1980s, MRP had also entered a new stage of development, MRP II. MRP II systems integrated the finance module with the production schedule modules to transform MRP from an inventory tracking program to a system that could run cost-benefit analysis on a manufacturing operation (Harwood, 2003). Furthermore, some program modules in manufacturing sector began integrating product design programs unto manufacturing equipment.

A direct outgrowth and extension of closed-loop MRP, MRP II involves three additional elements:

- Sales & Operations Planning—a powerful process to balance demand and supply at the volume level, thereby providing top management with far greater control over operational aspects of the business.

- Financial interface—the ability to translate the operating plan (in pieces, pounds, gallons, or other units) into financial terms (dollars).

- Simulation—the ability to ask "what- if" questions and to obtain actionable answers—in both units and dollars. Initially this was done only on an aggregate, "rough-cut" basis, but today's advanced planning systems enable effective simulation at very detailed levels (Wallace, 2001)

II.2.4. ERP

Enterprise Resource Planning is a direct outgrowth and extension of Manufacturing Resource Planning and, as such, includes all of MRP II's capabilities. ERP is more powerful in that: it applies a single set of resource planning tools across the entire enterprise, it provides real-time integration of sales, operating, and financial data, and it connects resource planning approaches to the extended supply chain of customers and suppliers. The primary purpose of implementing Enterprise Resource Planning is to run the business, in a rapidly changing and highly competitive environment, far better than before.

ERP uses the method and systematic of MRP II, but ERP is a more improved system than MRP II. So, the decision stage is easier. Finance, distribution and production software is integrated into ERP. We can say that, ERP systems are integrated mode of MRP II.

Enterprise Resource Planning (ERP) systems represent one such set of technologies. They are not only complex but also can impact various business processes within an organization at differential rates.

The ERP systems are integrated software packages that automate core corporate activities such as finance, human resources, and logistics. Many organizations have implemented ERP systems to integrate their data flows and improve their business operations (Banks et al., 1999). The ERP systems serve many industries and numerous functional areas in an integrated fashion, attempting to automate and integrate operations including supply chain management, inventory control, manufacturing scheduling and production, sales support, customer relationship management, financial and cost accounting, human resources, and almost any other data-oriented management process (Hitt et al., 2002).

ERP is a centralized system with a central database and application server, which all functional areas share. An implementation usually encompasses an entire replacement of the existing system(s) with the new ERP system. Even though there are many parameters to allow for some customization, an ERP system is still a rigid system which requires organizations to conform their business practices to fit the ERP system.

As Hossain et al. (2002) noted, ERP systems affect organizations and are implemented mostly to enhance organizational effectiveness. Hanseth, Ciborra, and Braa (2001) stated that the main purpose for deploying ERP systems is to improve control over organizational processes. However, there is insufficient research to indicate how an organization may be affected (Baskerville, Pawlowski, & McLean, 2000; Hossain et al.). ERP systems are information systems packages that are configurable and integrate information and information-based processes within and across functional areas in organizations (Allen, Kern, & Havenhand, 2002; Gattiker & Goodhue, 2004). ERP systems automate and structure an organization’s business processes by furnishing reference models and process templates across the enterprise (Allen et al.).

As Hossain et al. (2002) observed, ERP systems are usually modular in design, utilize a centralized common database management system (DBMS), and have integrated modules so that data flows seamlessly to users through standard interfaces. They further noted that ERP systems are flexible and present best business practices, are complex and have high cost, and require tailoring and configuration setup for various business functions. In addition, ERP systems operate in real time, provide online, batch processing capabilities, and are increasingly Internet-enabled. Hossain et al. stated that ERP implementations involve more organizational and technological challenges than traditional information systems implementations. Gattiker and Goodhue (2000) observed that important elements in ERP systems include data standards, process standards, process restrictions, and integration.

Robinson and Wilson (2001) observed that ERP systems aim at providing a business advantage by facilitating the management of all of an organization's activities as in addition to replacing legacy systems and resolving inconsistencies and interfacing problems among individual information systems. ERP is turning into the business backbone for organizations that perform online business transactions on the Internet (Hossain et al., 2002). Both practitioners and researchers have indicated that in order to survive in the emerging e-based economy, organizations should purchase ERP systems and use them strategically (Hossain et al.).

ERP systems are usually highly complex, expensive, and difficult to implement. Besides the traditional MRP functionality, ERP systems include applications for many other functional areas such as Customer Relationship Management (Gefen & Ridings, 2002; Kim, 2004; Lewis, 2001), Sales and Marketing processes (Gardiner, Hannam, & LaTour, 2002; Hsu & Chen, 2004; Muscatello, Small, & Chen, 2003), Human Resources (Francalanci, 2001; Markus, Tanis, & van Fenema, 2000; Willis, Willis-Brown, & McMillan, 2001), Accounting and Finance (Caglio, 2003; Gornas, 2004), Supply Chain Management (Akkermans, Bogerd, Yücesan, & van Wassenhove, 2003; Al-Mashari & Zairi, 2000; Nah, 2004), and Operational and Logistical Management (Al-Mashari et al., 12 2000; Schonsleben, 2000). Many ERP vendors are offering some or all of these functions as options (of modules) within their offering. Organizations can usually pick and choose from among these modules, implementing only those which are applicable to their situation.

Since implementing an ERP requires the replacement of existing systems with the new system, there are many challenges for organizations. Users must learn to use the new system and may harbor bitterness about having to change. Organizations may have to restructure how they operate in order to fit into the rigid requirements of the ERP system. Businesses may be disrupted during the reorganization or during the cutover from the old system to the new. All data migrating from the various legacy systems must be examined and normalized to reduce the possibility of data corruption or inconsistency.

According to Figure II.3, Enterprise Resource Planning systems forecasts and balances the demand and supply. ERP systems have tools for forecasting, planning and timing. These are:

- Connecting the customers and vendors on a supply chain,
- Starting the operations for making decisions,
- Coordinating sales, marketing, logistics, purchasing, finance, human resources and product development.

ERP systems are central to the information systems (IS) strategy of most international companies. With the global economy, there is pressure to implement such applications at a global level, in order to control and manage all the company processes at all sites.

All companies which integrate complex processes need correct information, and need this information to be transformed into enterprise information. Also they must be quick in their decision making processes. With enterprise resource planning, analyzing and following all operations are far more easier for companies. By using ERP, work processes can be executed as integrated, and operational processes can access information at the same time. A company can grow using these advantages.

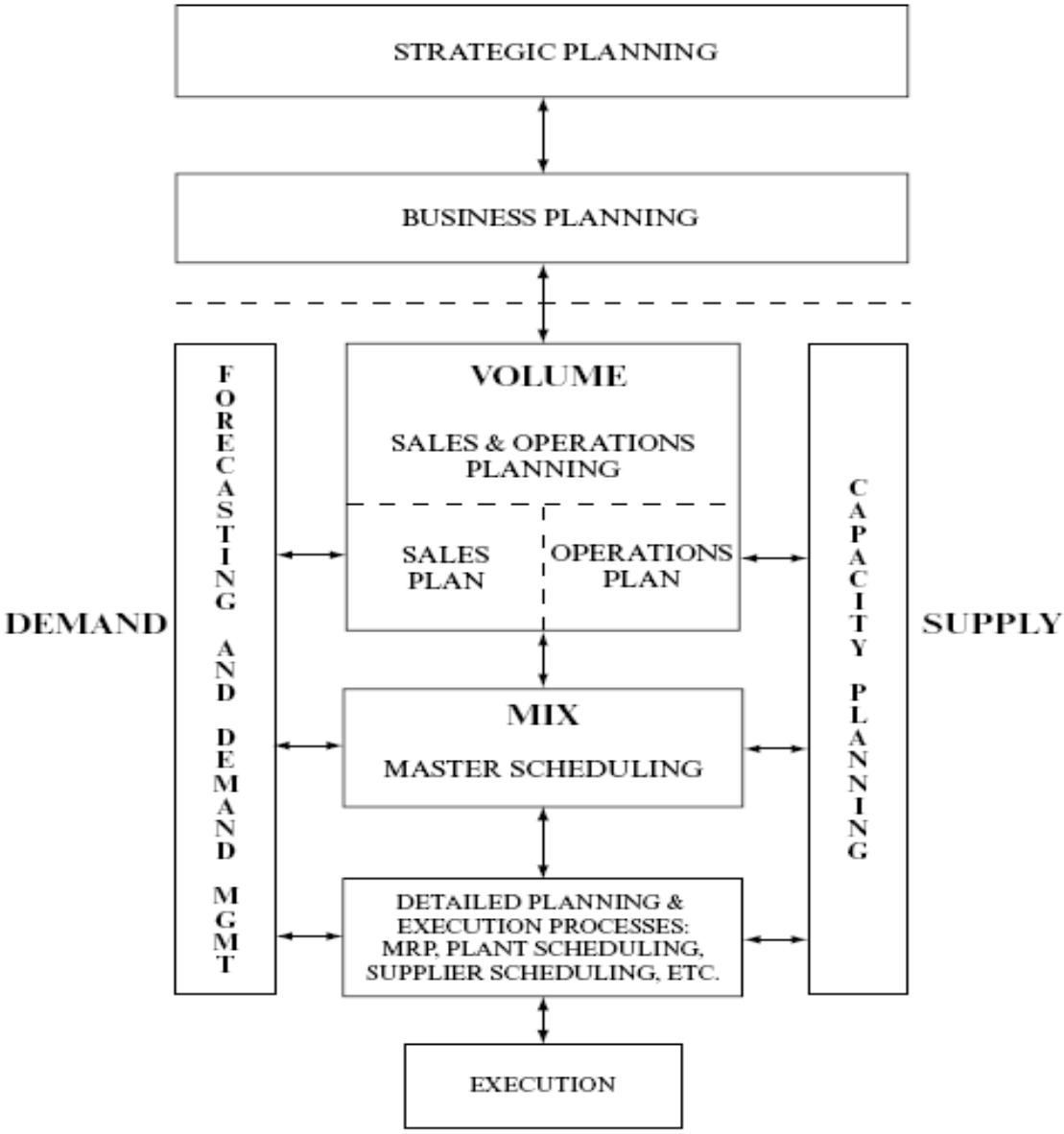

Figure II.3 Enterprise Resource Planning (Wallace and Kremzar 2001)

The importance of using ERP systems in practice is rapidly increasing. In every branch of industry there are many companies which are in the process of implementing these systems. This shows that it is possible to develop a standard functionality, which can be applied in different companies and different branches of industry. The reason is, that ERP systems represent explicit best of breed knowledge in many fields of industry.

ERP systems support most of the business systems, maintain in a single database, the data needed for a variety of business functions, such as Manufacturing, Supply Chain Management, Financials, Projects, Human Resources and Customer Relationship Management.

Why do enterprises use ERP system? There are some technological and functional reasons:

- To increase visibility of information and quality of information
- To compound business applications and systems
- To change old, out of date and isolated systems and programs.
- To compose systems that can expand with growth.
- To join systems which are isolated from each other.
- To increase the success, decrease the cost
- To increase customer satisfaction
- To simplify complex operations
- To achieve possibility of new business associates
- To accord global business life

II.3. Characterization of ERP

ERP can be viewed from a variety of perspectives: as a software product, an infrastructure, from a vendor or user viewpoint, etc. In this study, ERP is considered to be both a commodity and a management concept that seeks to map all major processes and data into a comprehensive integrative structure. It is a software package that is customizable without much programming effort, having preconfigured templates that allow it to target an anonymous market. Typical business processes are generally supported across business units and functions in a seamless way

To assess ERP value or success, a model was developed. An ERP system has many stakeholders. Thus, different actors define its success differently :

- From an implementer's perspective, it entails adherence to projected resource commitments and developing specifications for particular functional objectives.
- From a vendor's perspective, the implementer must carefully consider follow-up investments.
- From an end user's perspective, the ERP system should improve job performance while being usable and satisfying.
- From a manager's perspective, it should be effective and efficient in supporting business objectives.

Measurement of ERP success also depends on time spent for implementation (M.L. Markus, S. Axline, D. Petrie, C. Tanis, 2000). However, ERP success criteria defined in the early stages will not capture the entire scope of ERP related success during use and later periods. Case-based studies have shown that an ERP implementation claimed to be successful can become a failure.

II.4. Scope of ERP

Over the past twenty years or so, ERP system suppliers have expanded the scope of these systems dramatically. Most suppliers created their initial offerings around manufacturing, human resource management or logistics core modules. Through development and acquisition of other software companies, the big players provide very comprehensive suites of software modules.

Most organizations tend to have a varied collection of legacy systems acquired over a number of years. Often these systems are old, inflexible and expensive to maintain. Large, multinational, multi-site organizations are most keen to implement standardized processes and systems across their divisions and subsidiaries. ERP systems, offering out-of-the-box integrated solutions are an attractive prospect and the market for these solutions has grown inexorably.

II.5. Benefits of ERP Systems

ERP systems replace complex and sometimes manual interfaces between different systems with standardized, cross-functional transaction automation. Order cycle times (the time from when an order is placed until the product or service is delivered) can be reduced, resulting in improved throughput, customer response times, and delivery speeds (Cotteleer and Bendoly, 2006; McAfee, 2002). Similarly, automated financial transactions can reduce cash-to-cash cycle times and the time needed to reconcile financial data at the end of the quarter or year (Mabert et al., 2000, 2003; McAfee, 1999; Stratman, 2001). The result is a reduction in operating capital and the headcount of the financial area.

Another benefit of ERP systems is that all enterprise data are collected once during the initial transaction, stored centrally, and updated in real time. This ensures that all levels of planning are based on the same data and that the resulting plans realistically reflect the prevailing operating conditions of the firm. For example, a single, centrally developed forecast ensures that operational processes remain synchronized and allows the firm to provide consistent order information to customers (Bancroft et al., 1998).

Taken together, the standardized firm-wide transactions and centrally stored enterprise data greatly facilitate the governance of the firm (Scott and Vessey, 2000; McAfee and Upton, 1996). ERP reports provide managers with a clear view of the relative performance of the various parts of the enterprise, which can be used to identify needed improvements and take advantage of market opportunities (AT Kearney, 2000; Boston Consulting Group, 2000).

According to Su and Yang (2010), Today's ERP solutions offer even more benefits. Many vendors have begun to enhance their offerings with extended supply chain applications in an effort to create a seamless, integrated information flow, from suppliers through manufacturing and distribution. ERP is a suite of application modules that can link back-office operations to front-office operations, as well as internal and external supply chains.

II.5.1. ERP Benefits Realized

Most of the benefits arising from ERP systems are due to their ability to process transactions efficiently and provide an organized record keeping of transactional data (Olhager and Selldin, 2003, Mabert et.al. 2000, Jacobs and Bendoly, 2003) Moreover, ERP systems help to increase interaction across the organization due to their integrated nature (Mabert et.al, 2000, Olhager and Selldin, 2003, Mabert et al., 2003a).

Research also reveals what areas may be benefiting the least from ERP implementation. (Table II.2) Operating costs are not easily reduced, nor is there much improvement in inventory levels or cash management (Olhager and Selldin, 2003, Mabert et.al, 2000, Mabert et al., 2003a) Moreover, IT costs and personnel management may actually increase after ERP implementation. All three studies neglect to provide explanations for these observations.

The business process and management benefits obtained through the use of databases can be listed as better planning and better management of production, manpower, inventory and physical resources. Also, firms obtain benefits from monitoring and controlling financial performance with respect to products, customers, business lines and geographic area (Shang & Seddon, 2000).

Table II.2 Benefits realized from ERP (Olhager and Selldin, 2003)

Most	Least
Transaction processing efficiency	Operation costs
Accessibility of information	Inventory levels
Interaction across organization	Cash management
	Information technology costs
	Personnel costs

II.5.2. Categorizing ERP Benefits

Shang and Seddon (2000) classified benefits as Operational, Managerial, IT infrastructural, Strategic and Organizational.

Operational benefits include cost reduction, cycle time reduction, productivity improvement, (automating basic and repetitive operations), streamlining business and information processes. Managerial benefits are derived from using data to improve planning and managing resources (production, manpower), and improved decision making arising from improved access to information.

Shang and Seddon (2000) determined that operational benefits of an ERP system arise from automating cross-functional process. They encompass both efficiency-based and effectiveness based performance improvements in order to capture enterprise-wide business benefits. Those benefits are expected to improve day-to-day operations (short-term impact), which include improved inventory control, improved cash management, and reduction in operating costs (Stratman & Rothe, 2002). They will also lead to improvements in production, information and customer service quality. Byrne and Heavey (2006) has argued that an ERP system can improve information sharing between the supply chains echelons.

IT infrastructural benefits arise from reducing costs of maintaining legacy systems, stability of system, business flexibility of system, and increased IT infrastructural capability. Strategic benefits consist of supporting business growth (through ability to add new products, lines of business, newly acquired business, and to accommodate increases in transaction volume and employees), business alliances, cost leadership, and external (supplier, customer) linkages. Organizational benefits include supporting organizational change, business learning, empowerment of staff, higher employee morale and satisfaction, and building common visions.

Al-Mashari et. al. (2003) refer to a benchmarking study by Deloitte & Touche (1999) that classified ERP system implementation benefits into tangible and intangible. Tangible benefits included inventory reduction, personnel reduction, and increased

productivity, while intangible benefits pertain to increased visibility of corporate data, new or improved business processes, and increased customer responsiveness.

A third way to categorize benefits that may arise from ERP implementation is provided by O'Grady (2001). Benefits that may arise from the use of the ERP itself in process automation, or from the use of the ERP's data to improve information and control.

II.6. Common Problems in ERP Applications and Suggestions for Solution

Enterprise resource planning systems have attracted many companies' interest over time. Therefore, companies have invested considerable resources in the implementation of enterprise resource planning (ERP) systems. At this point, the major questions to ask are "Is ERP a right decision for my company?", "Do we need an ERP system?","Which software must be chosen?", "Can my company succeed in an ERP integration project?"

ERP adaptation can be analyzed in three stages.

- Pre-Implementation: In this stage, ERP software is configured and adapted to company.
- Implementation: This is the transition process from go live to daily use.
- Post Implementation: This is the stage in which the company is measuring the efficiency. At this stage, the company can start planning new investments for its next technological step forward.

In this study the most common problems will be analyzed at all stages of an ERP project.

II.6.1 The Decision of Investment

Decision of investment must come from the top management. Otherwise, it only results in loss of time and this situation can cause demoralization among the

related project team. If a company decides to invest in ERP, then it must go under an organizational change. At this stage, project management begins.

A new team is in charge of the ERP implementation. In large enterprises; especially in holdings, an independent team must be organized and a professional project manager must be chosen.

II.6.2. Selection of the Wrong ERP System

ERP software market has been and continues to be one of the fastest growing segments of information technology (IT) industry. In recent years, globalization and competitive business environment have started forcing companies to invest considerable resources in the implementation of ERP systems. Organizations choose and install ERP systems for many tangible and intangible benefits and strategic reasons (Kremzar & Wallace, 2001). Although implementing an ERP system may be costly and time-consuming, its benefits are worthwhile. However, there are numerous examples where organizations have not been successful in obtaining the potential benefits that motivated them to make large investments in ERP implementations (Davenport, 1998).

Motwani, et.al (2002) emphasized that ERP adoption involves initiating appropriate business process changes as well as information technology changes to significantly enhance performance, quality, costs, flexibility, and responsiveness.

There is a growing consensus among ERP system implementers that selecting an inappropriate system is a major reason for ERP implementation failure. Due to the complexity of the business environment and the diversity of ERP alternatives, ERP system selection is a tedious and lengthy task. Given the considerable financial investment and potential risks and benefits, the importance of selecting a suitable ERP system cannot be overemphasized since it is a decision on how to shape the organizational business (Teltumbde, 2000).

Whenever a company decides on implementing ERP software, it starts to look for suitable products in the market. During the selection process companies should

constitute an ERP project team, collect the relevant information about ERP systems, identify the project characteristics, discuss and construct the objectives of the project, evaluate ERP systems, analyze and discuss the results and eventually make the final decision (Wei et al., 2005). As ERP systems are continuously evolving in terms of functionality and technology, ERP vendors regularly introduce new versions of their packages and new software, so there are many choices for customers (Kumar and Hillegersberg, 2000). It should be noted that all software may have some incompatibilities with the organization. However, one of these incompatibilities will be more acceptable to them when the facts of price, industry, country, after sale service of the vendor, upgrade capabilities, user-friendliness and similar factors are considered (Everdingen et al., 2000).

II.6.3. Unidentified Business Plan / Vision / Goals

No business improvement can be successful without defining the plan, vision and goals. ERP implementations require that key people throughout the organization create a clear, compelling vision of how the company should operate in order to satisfy customers, empower employees and facilitate suppliers for the next three to five years (Umble et al. 2003). A business plan that outlines proposed strategic and tangible benefits, resources, costs, risks and timeline is critical. This will help keep focus on business benefits. There has to be a clear business model of how the organization will operate during the implementation effort. There has to be a justification for the investment based on a problem and the change related directly to the direction of the company (Nah et al. 2001).

Strategic visioning and planning is imperative for an organization to understand why they are implementing an ERP system and what critical business objectives the system is expected to address. This understanding is critical to accepting the change and enabling the project team to make decisions that align with the stated strategic vision or plan. Without a clear understanding of the business plan or vision, employees may question the need for an ERP system, creating a negative attitude towards the system from the start. Furthermore, without this knowledge, the implementation team could make decisions that will hinder or even work against the vision / plan of the organization. Stressing the importance of business visioning or

planning for the ERP system, it is recommended that the ERP system implementation be viewed as a business initiative rather than an IT project (Umble and Umble, 2002; Davenport, 1998).

II.6.4. Organizational Fit of ERP System

A close fit between an ERP system's processes and the organization's processes reduces the need to modify the ERP system. In addition to reducing future maintenance and upgrading costs (Mabert et.al, 2003a), the implementation is more likely to be completed on time. Mabert et al. (2003a) state that modifications are a highly significant variable. The authors found that only 11% of on-time companies undertook major modifications, as compared to 53% of the late companies. A close fit between processes also reduces training requirements, since employees do not have to participate in extensive training for processes that they have been performing previously.

According to Hong and Kim's (2002) research result, the organizational fit of ERP really has a positive influence on implementation success. It is also indicated that organizational fit of ERP is actually a significant and non-negligible factor for implementation success of ERP.

II.6.5. Insufficient Management Support and Involvement

Management support and involvement in the project are some of the most important factors for success. It is very important in achieving project goals and reaching strategical targets. Thus, benefits of ERP for the firm must be reported to top management properly. Moreover, management support and involvement are critical for the success of the project, providing the power and quickening the decision making process. Therefore, these factors must be present at both top and middle levels during implementation, in terms of their own involvement and willingness to allocate valuable organizational resources to the project (Holland et all, 1999). Deficient top management support and involvement can eventually result in the failure of an ERP project.

Umble and Umble (2002) further recommend to include not only the top management, but also mid level managers. Lack of support and involvement from mid-level managers can quickly derail an implementation even if top management support and involvement is present. According to these authors, without management support and involvement, an ERP system implementation project may be “lost at sea”; meaning it is very likely to fail.

II.6.6. Inaccurate Data, Insufficient Data Management

In ERP systems, data has to be accurate. The integrated nature of ERP systems will cause trouble not only on one computer or one department, but throughout the entire structure, if any wrong data is fed into the system. Usage of the new system plays an important role on data management as well. Since it is almost sure that the new and the old legacy system will have fundamental differences, parallel usage of both systems makes it difficult to manage data reliably and there is no guarantee of compatibility of data between the two. System users have to be persuaded to use the new system.

II.6.7. User Resistance

Resistance of users to the new system is one of the most important problems. Users do not want to leave the system they have already been using. This problem can lead to failure of a project. Avoiding user resistance requires organizational groups in order to break down barriers to knowledge sharing. Asking the ideas of users and workers and getting their contribution to the project can be very useful. ERP systems integrate business processes across functions and units, thereby creating a divergence in the required knowledge of organizational members (Baskerville et al., 2000). Organizational members must understand more than just the piece of the whole that they have traditionally been required to know (Robey et al., 2002) and they must understand where and how their function fits in the entire process (Welti, 1999). Organizational culture’s influence on people should also be taken into account while struggling against user resistance (Jones et al., 2004).

Against the resistance of users, users' support should be gained to project. User involvement refers to the participation in the system development and implementation processes by representatives of the target user groups. System implementation represents a threat to users' perceptions of control over their work and a period of transition during which users must cope with differences between old and new work systems. User involvement is effective because it restores or enhances perceived control through involving them to the whole project plan. There are two areas for user involvement when the company decides to implement an ERP system: user involvement in the stage of definition of the company's ERP system needs, and user participation in the implementation of ERP systems (Zhang et al. 2003).

People have a natural tendency to be comfortable with the status quo and may be fearful of changes brought about by any new system, especially of one as pervasive as an ERP system. They may fear that the new system will make their jobs more difficult, reduce their importance, or even cost them their jobs. They are also afraid of failure because ERP systems may create a great deal of uncertainty in some people as to whether or not they will be able to perform their jobs as well as they did under the old system. Furthermore, some front-line staff may be uncomfortable with the realization that with better information, upper management can keep better track of what they are doing and the money they are spending.

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.

II.6.8. Inadequate Business Process Reengineering

One of the major issues to be considered should be business process reengineering. Reengineering can be 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).

It must be understood that ERP implementation would require new business process reengineering that will result in standardization and improvement in efficiency of operation. ERP adoption should not be used just to enhance the existing systems, but also to change them for the better.

Business process reengineering can be thought as one of the most important factors and the hardest job in ERP implementation. Resistance against changes and using traditional ways of doing jobs are the most common problems encountered in ERP implementation. An ERP implementation should involve the analysis and reengineering of current business processes, rather than designing an application to make best of bad processes (Scheer and Habermann, 2000). Lack of reengineering at both individual and organizational levels can be an obstacle to success.

II.6.9. Inadequate Organizational Change Management

An ERP system implementation involves a tremendous amount of change in an organization. Business processes will often be integrated with other parts of the organization. This will require the employer to change their daily routine and interact even more with other departments. Other business processes may be automated, or even eliminated if they become redundant, such as re-keying of data into another system. The impact of these changes can be more far-reaching than just a technological change; ERP implementations create cultural and structural changes which require a carefully planned transformation. (Al-Mashari et.al. 2003).

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 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.

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

Having recognized how important the critical change management is to the success of an ERP implementation, some consulting firms have added change management consulting to their practices (Caruso, 1999).

II.6.10. System Integration Problems

ERP is comprised of a comprehensive system covering all processes of a company. However, no single application can do everything a company needs. Sometimes companies have to use special additional systems that meet their unique needs best. These products have to be integrated along with all the homegrown systems with the ERP suite and the interfaces of these systems must be built on ERP system. A special software called middleware needs to be bought from third parties. Unfortunately, middleware is not available for all the different software products that are found in the market. Middleware vendors usually concentrate only on the most popular packaged applications and tend to focus on the technical aspects of application interoperability rather than linking business processes.

Integration software also poses other kinds of problems when it comes to maintenance. It is a nightmare for information system personnel to manage this software whenever there are changes and upgrades in either ERP software or other software that are integrated with the ERP system. For every change, the IT department will have to think about which link is going to fail this time.

II.6.11 Inadequate Project Management

Project management is further emphasized by Stein (1999) who suggests that the number one reason why IT implementations fail is poor management and planning of the project. According to many researchers (Al-Mashari et al.,2003; Strathman and Roth, 2002, Umble et al., 2003), an excellent project management can carry an ERP implementation to success. Umble et al (2003) explain that project

management requires a disciplined approach that defines project scope and objectives, and that involves a detailed implementation plan. These authors also recommend an aggressive but achievable implementation schedule to be established in order to minimize the risk of project scope losing its boundaries.

ERP implementation projects involve all business functions and require 1-2 years of effort. Organizations should have an effective project management strategy to control the implementation process in order to avoid overrunning budgets and ensuring implementation on schedule.

II.6.12. Lack of Communication

Lack of communication between the users and the implementation staff is an important problem. It can create problems at all levels of the project. Literature lists various projects which failed because of lack of communication. According to Nah et al. (2003), clear and effective communication at all levels of an organization is necessary before and during the implementation of enterprise resource planning.

Communication includes the formal promotion of ERP project teams and advertisements on the project's progress to the rest of the organization (Holland and Light, 1999). In order to avoid failures in communication, an open and honest information policy committed to the users can satisfy their need for information (Ngai et al.,2008).

II.6.13. Project Team

The implementation team is important because it is responsible for creating the initial, detailed project plan or overall schedule for the entire project, assigning responsibilities for various activities and determining due dates. The team also makes sure that all necessary resources will be available as needed.

The ERP team should consist of the most capable people in the organization (Buckhout et al.,1999; Bingi et al., 1999; Rosairo, 2000; Nah et al., 2001). Building a cross-functional team is also critical. The team includes a mix of consultants and

internal staff; so the internal staff can develop the necessary technical skills for design and implementation (Sumner, 1999). Both lack of business and technical knowledge can lead to failure. Team members need to be assigned full time to the implementation. As far as possible, the team should be co-located together at an assigned location to facilitate working together.

The most common problem about project team is oblivious to project. The team should be given compensation and incentives for successfully implementing the system on time and within the assigned budget. Also, the team should be familiar with the business functions and products so they know what needs to be done to support major business processes.

Another problem is that the morale of project team may be lost. Potential long hours will require support and recognition for the employees to continue with the project. For Bingi et al. (1999), motivating the implementation team is just as critical as selecting the team. Furthermore, employee retention is a significant issue as the employee may either burnout due to the long hours, or find more lucrative employment working on other ERP system implementations with the knowledge obtained from the implementation and it can cause another important problem, losing employees.

II.6.14. Deficient Training and Education

ERP implementation requires a critical mass of knowledge to enable people to solve problems within the framework of the system. If employees do not understand how a system works, they will invent their own processes using those parts of the system they are able to manipulate.

The full benefits of ERP cannot be realized until the end users operate the new system properly. To make the end user training successful, the training should start early, preferably well before the implementation begins. Executives often dramatically underestimate the level of education and training necessary to implement an ERP system as well as the associated costs. Top management must be fully committed to spend adequate money on education and end user training and

incorporate it as part of the ERP budget. It has been suggested that reserving 10–15% of the total ERP implementation budget for training will give an organization an 80% chance of implementation success (McCaskey, 1999).

Bingi et al. (1999) explain that the education portion relates to the employees understanding how their activities impact the rest of the organization. Mistakes may be magnified through the company due the ERP systems' integrated nature. Umble et al.(2003) state that if employees do not understand how the integrated system functions, they may even invent their own processes, which more than likely will not be integrated properly with the rest of organization.

The role of training to facilitate software implementation is well documented (Nelson, 1987; Santhanam et al., 1994). Frequently lack of user training and understanding failure of how enterprise applications change business processes are posited as responsible for many ERP implementation problems (Wilder et al., 1998; Crowley, 1999).

The implementation budget must cover the education and training costs as well; this is an important issue mostly ignored by decision makers. Trainings have to begin well before the implementation process begins, and shall continue well after it is over. Full gains from the new system cannot be perceived without the proper usage of end users; and to use it, they must know how to do what with the new system at hand.

Even though education and training will teach a lot, the best way to learn something is to use it. Monitoring the usage of new system helps defining problems. Regular meetings arranged for system users provide exchange of experience and identification of problems.

II.6.15. Inadequate Legacy Systems

Sometimes ERP system operates side by side with some type of inefficient legacy systems. Installation of an ERP system is considered to be an opportunity to correct problems associated with older legacy systems. A study by Oliver, et al.

(2002) indicated that among organizations that have adopted ERP, there existed dissatisfaction with existing legacy systems. These systems were considered to be old and outdated. They were described by Oliver, et al. (2002), to be “ageing, unworkable, costly, inadequate, inefficient, outmoded, expensive, poorly coordinated, inflexible, disparate, limited, old, idiosyncratic, redundant, cumbersome and technologically inferior”. As can be seen by the depth of thoughts that had been shown about these legacy systems, organizations were more than glad to have an opportunity to discard them for a more efficient system.

II.6.16. Inadequate Consulting Services

The use of outside consultants is common for ERP projects (Dolmetsch et al., 1998). Their experience, knowledge of the modules, technical and organizational insight and experience with similar software applications (Piturro, 1999) and manage implementations (Thong et al., 1994) play a major role in diminishing risk.

Consulting is a very important factor. The skill shortage is so deep that it cannot be filled immediately. Finding the right people and keeping them through the implementation is a major challenge. ERP implementation demands multiple skills — functional, technical, and interpersonal skills.

Consultants with specific industry knowledge are fewer in number. There are not many consultants with all the required skills. For a successful project, it is important that consultants of the solution partner must be experienced.

II.6.17. Insufficient Testing

System testing has proven to be the key element for success for some companies and a direct cause of failure for others (Gargeya and Brady, 2005) These authors argue that “after months or years of development, it may be feasible to assume that both team members as well as executive management tired of dealing with the project and just want it to be completed. The result of this myopic thinking, however, is that testing is reduced and ignored, and ‘red flags’ are disregarded.”

Careful testing and trial runs of the system before the 'go live' date helps avoid additional potential problems. Testing process and scenarios must be prepared before implementation. This can decrease problems at a later stage.

When implementing ERP software, organizations usually need at least a little software development. No matter how good an ERP system fits the organization, there is always some need for development of software. In order to ensure compatibility of business processes and the implemented system, the necessary code needs to be written; applications need to be developed, tested, installed and tested again. A careful troubleshooting has to be done should any problems arise; in integrated systems a small bug can create domino effect within the whole organization.

II.7. The Textile Sector and ERP

Textile sector is very important for world economy especially for the developing countries. At the starting period, the sector was based on the largely on labor, at present, it is predominantly capital based. For competition advantage, the sector not only needs labor but also requires machines and hardware that work with advanced technology.

In recent years, there has been a serious development and change in the world economy. Developing countries and less-developed countries have become the production center of ready wear and the developed countries have become the market of these countries. There is a huge improvement in textile sector. Many factors affect this situation for example (Ener, 2002):

- After globalization, production capacity of the textile industry passed on to Asian countries.
- Central Asia is advantageous because of cheap labor and energy resources. So, textile investors prefer this area.

- New technological improvements increase the efficiency largely in textile industry. A part of these improvements result from information technologies and the other part from the new machines used in the production.
- The consumption of textile products increase with population and revenue growth.

Textile companies for competition at the global market must produce the most value with the minimum input and minimum costs. Creating new markets, product differentiation and coping with competitive prices are very important as well. While executing this concept, companies must manage relations with its business partners, customers and sales-distribution channels. In order to achieve this, management sometimes has to change. It is one of the most important factors that contribute to the reorganization process. Obtaining and using information effectively are critical success factors. Achieving this aim depends on organizing controlling and planning activities effectively and efficiently.

Compared to custom written software, which have many specific functions but require a lot of effort and expenditure for customization, packaged software, which are already integrated with main functions, are user friendly and can be implemented easily are far more advantageous. Therefore, especially, after 2005, to survive intensive competition in the market using enterprise resource planning systems have become a necessity in creating a competitive difference for textile companies. For that reason, big investments for enterprise resource systems have begun to increase gradually.

II.7.1. The Structure

Textile sector has uses in various areas from clothing to space industry and they have a large product range that is continuously revolving. (Öztürk, Mert, 1998)

The clothing sector is both a labour – intensive, low wage industry and a dynamic, innovative sector, depending on which market segment one focuses upon.

ERP software developed for textile sector are planned to operate according to international standards and increase the profitability and competitive power. With their special functions ERP systems provide information and systems needed by the company and they take their place in the market as a solution that can integrate all production processes.

Different software programs developed for textile firms can have different characteristics, but fundamentally, all of them have the same standard processes anticipated costs, final costs, preparing, and marketing models, following patterns, input orders, material requirement accounts, shipping, quality control, etc. Enterprises can solve many problems from anticipated cost to price quotations, from completed order information to planning, from manufacturing process (cutting, sewing, embroidery,…) to real cost and shipping with manufacturing automation systems on enterprise resource planning.

In this sector, customer expectations change quickly and the sector is effected from fashion and trends. So, understanding the market and its processes as well as the competitors is important to be able to predict fluctuations in orders and to understand customer profiles and demands. When taking orders, knowing which product, which color, which size, which quantity will be produced, which accessories, which texture will be used, which percent will be dyed are the most important pieces of information for the enterprise. And a quick answer must be given to customer.

In our day, profit margins are cut, to be able to compete. To attain this goal, companies need to adopt their processes as quickly and fluently as possible to the changing market conditions.

Also, textile sector is the one of the sectors where international relations are very important. Many producers have facilities at various countries and a large part of the firms work for the international market (Cebeci, 2006). So, textile companies must not only be local, but also global players. These companies must develop an effective information sharing platform independent of geographic boundaries.

In this sector, time is very important. All processes from input phase to product shipment must be efficient and fast. Inventory planning must be done very well for minimum costs. In addition orders must be managed effectively, manufacturing planning must be right and efficient. These are some of the success factor in textile sector.

In selecting ERP software, companies must set up some rules. The major needs in textile sector are various: All processes from material supplying to manufacturing planning, from human resources to finance, from project management to supply chain must be supported by the software solution selected. An ERP system that serve characteristic needs of textile sector must be selected (Cebeci, 2006).

II.7.2. Necessity

Textile manufacturing revolves around three actors: customers, banks and suppliers. A customer gives a sales order to the company which forms the basis for production planning. Raw material is purchased and dispatched to the mills, and then receipts and payments are made through banks. Before the ERP deployment, most of the work was done manually which result in inaccuracies, incorrect and missing entries. ERP enables accountability, accuracy, and transparency without breaking the existing workflow.

There are many slacks in use of manpower, energy, fuel, textile material and other processing materials in textile industry. Management of the manufacturing resources plays a vital role in any textile industry, because it helps to optimize the usage of manufacturing resources. It reduces the wastage of the raw materials. Higher quality of product is obtained by using it.

Controlling of the different textile mills in different locations can be made easy by using enterprise resource planning system. ERP eliminates the old standalone computer systems in finance, human resources, manufacturing and warehouse, and replaces them with a single unified software program divided into software modules that roughly approximate the old standalone system. It provides software for textile industries of all kind, from vertically integrated companies which require system

wide control over the entire production cycle to companies specialized in a single stage of the production process. It helps planning, in order to optimize and schedule production orders.

Enterprises in textile industry must overview their manufacturing process to harsh competitive requirements. In addition, they must move from inefficient work and unprofitable business areas to efficient and profitable areas. Decision about this large investment depends on seasonable and trustable management reports.

Textile sector must know its customers well at the corporate and personal levels and they also must know their customers' customers. Within this business environment, information of downward sales and general market disposition must be analyzed. For instance, activation of the sale records can increase the sales.

By using an ERP sales module, information about products sold can be given to sales representatives. While sales representative is meeting with the customer, representative can access this information instantly.

ERP is highly significant also for the textile industry. Businesses must understand what is available and how it can be utilized in the best way. In addition, those that work in the textile industry must be good at having enough supplies so as to create the items that need to be shipped out to customers. These customers can be individuals or other companies, but failing to keep up with orders can be detrimental either way. By paying attention to textile trends and issues and watching out for ERP issues, those that work in these businesses can keep their companies moving smoothly. This makes both business owners and customers satisfied, resulting in higher sales and a better bottom line for the company, as well as a higher degree of satisfaction for the customer.

II.8. ERP Problems in Textile Industry

The main benefit of ERP systems for companies is the ability to integrate and automate business processes, and therefore to share and use real-time information within their organization and with suppliers as well as customers (Gupta, 2000; Nah

et al., 2001; Themistocleous et al., 2001; Spathis et al., 2003). When properly implemented, ERP systems can offer great benefits which sometimes exceed the expectations of adopting companies (Davenport, 1998; Scott and Vessey, 2002). It is, however, evident that a complete ERP system implementation does not always guarantee expected benefits, improved business values, business performance improvements and positive payback, especially in an industry like textile that has difficult processes, and is resistant to change. ERP system developers make assumptions about management philosophy and business practices and design their systems to deal with common situations. It is unfortunate that there may be no 'typical firms' in the real world.

The product structure of textile sector is distinctive from other sectors. Various cloth types can be manufactured using different methods. At dying departments, various patterns and models can be produced as well. Infinite product with variant size and style can be developed in textile. Therefore, adapting an ERP system, developed for assembly sector unto textile sector is very difficult. The reason for these difficulties that in assembly sector manufacturing is standardized, whereas in textile it is made on orders instead of inventory.

As mentioned earlier, textile manufacturing revolves around three actors—customers, banks and suppliers. A customer gives a sales order to the company and these forms the basis for production planning. Then, raw material is purchased and dispatched to the mills. Receipts and payments are made through banks. An unsuccessful ERP implementation can bring about both incorrect and missing entries. The ERP problems in textile industry and other industries are generally similar. But textile sector has some different processes. Therefore, in an implementation, these can cause problems.

Following the business dynamics, making production processes fluent and using the inventory processes effectively require experience and expertise. Both consultants and users must be experienced for that reason. Nevertheless, unqualified and cheap labor is a general problem in ERP implementation projects, but it is a typically encountered problem in textile sector. Compared to the other sectors, human resources in this sector are weak in general. If human resources are weak in a

company for ERP usage, then the key users in the firm should be trained and/or new employees should be hired. An ERP project requires the workers who have computer knowledge and who work systematically. But in textile companies, there are a few employees who have these capabilities. Under those circumstances, firms may select some employees who can achieve to use the system and can train with patience or can employ new employees.

Data at textile companies are very complex. There are lots of details, and each of them must be recorded in the system. Therefore, implementation process can be painful; it requires dedication and can be depressive. At this stage, it is important that support of top management is ensured. In other words, top management must recognize the seriousness of ERP project.

Textile companies routinely juggle material performance characteristics and customers' item specifications with the product complexity of seasonal lines, brand or trade show collections, styles, quality grades, color-ways, size and color matrices, finishing variables, put-up and delivery options. Bill of materials and manufacturing orders add another layer of complication with size and color assortments for every item style. Besides, technology is critical simply for keeping track of all these item variables, along with managing production routings, handling distribution, or ensuring backward traceability to sources and suppliers. Still, the right business management solution can also integrate multidimensional item coding with production, distribution and accounting processes to streamline tracking and financial processes and speed production planning. It can increase supply chain visibility, and provide the insight for effective item management as well.

One of the most important factors in textile industry is variant structure because textile products live with trends, many variable and variant products. Variant structure can be described as which products will be produced from which colors and size. Which cloths and accessories? How many meters of cloth will be dyed in total? An ERP system must answer to these questions quickly. If the ERP package has no variant type production support, it is very difficult to enter data or obtain reports efficiently. This is a significant problem for textile ERP implementation. In decision making stage, this function must be looked for in textile companies. It is very

difficult to form a bill of material, materials requirement plan, purchasing orders, production plan, etc., by using a classical ERP package. Even most of the firms that are close to repetitive production cannot use the advantages of this type of production, because most of the firms in textile industry produce fashion goods with changing properties such as color, pocket type, button instead of zip, for every year and season (Cebeci, 2009).

II.9 ERP Market in Turkey

Over the past 15 years, businesses have changed enormously with increasing client pressure for faster service, wider choices, and even lower prices. The globalization of the economy has accelerated and, as a result, many organizations have been redrawn. A number of Information Systems have been developed in order to reply to the challenges of the modern economy. When ERP systems first emerged in the early 1990s, manufacturers in a wide variety of industries enthusiastically adopted them. Many of these companies were struggling with issues like globalization, acquisition consolidation, process standardization, and changes in customer expectations. The ERP implementations were often viewed as a component of a much larger business process reengineering and organizational transformation project. Indeed, the very strong growth of this market from 1995 onwards led to a rate of ERP facilities often estimated at more than 50% today.

The enterprise resource management software market includes the functional markets of financial applications, human capital management, payroll, procurement, order management, financial performance and strategy management applications, project and portfolio management, and enterprise asset management applications.

Financial modules represented the bulk of Enterprise Resource Planning spending with many Turkish companies opting to automate their accounting processes. A growing number of businesses have begun migrating from legacy custom developments or entry-level business administration systems to integrated enterprise applications, and ERP remained the core of these new enterprise application system implementations.

However, many more establishments are wary of adopting integrated ERP offerings, choosing to use standalone accounting applications instead. Many small Turkish companies keep two sets of financial accounts, one for their own internal use and another for official reporting. They do so in an effort to lower their taxable income and thus may not want to migrate to more advanced software applications, as this might be used as proof of illegal bookkeeping.

II.9.1 The Biggest Vendors' Profiles

The biggest Vendors' profiles as determined by a market analysis report of IDC (2008) is as follows:.

- SAP: SAP employs approximately 60 people in Turkey. In 2007, the vendor's revenue was in excess of $36 million, a major improvement over its 2006 total that approached $25 million. The majority of SAP's 2007 revenue came from license and maintenance sales (82%), while the rest was generated by IT services. The revenue grew year by year. This translated into a 33.8% market share and first place in the Turkish enterprise application system market.

- Logo Business Solution: Founded in 1984 as a small software house, Logo was listed on the Istanbul Stock Exchange in 2005. The vendor employs over 200 people across its 3 offices in Turkey plus 2 international sales offices in Frankfurt, Germany and Dubai, UAE. Employee headcount has the following approximate breakdown: 36% R&D and Product Development, 30% Support and Consultancy Services, 11% Sales and Marketing, and 23% Management, Internal services, Financial and Administrative staff.

- Oracle: The vendor has tailored its marketing and sales to specific industries and oriented sales teams accordingly. In terms of priority, the main industries are public services, financial services, telecommunications, and manufacturing. Oracle has also been aggressively marketing Siebel CRM, which as a standalone solution, is beyond the scope of this study.

- Likom: Founded in 1984 as a custom application development house, Likom released its first packaged accounting solution in 1989. Over the years, the

company continued to extend its product coverage and began to work on integrated solutions and released its first ERP solution, Gusto, in 1998. In 2000, Likom launched its Presto solution, followed by Presto Plus in 2006. The company currently employs approximately 120 staff across its Istanbul, Ankara, and Izmir offices. In 2007, Likom generated total revenue of nearly $8 million. Approximately two-thirds of this came from license and maintenance sales, while the rest was generated by IT services. Based on this performance, Likom ranked fourth in the Turkish enterprise applications market in 2007 with 5.9% share.

- Microsoft: Microsoft Dynamics took fifth place in the Turkish enterprise application systems market in 2007 with total revenue of $4.85 million or 5.6% share, up 11% from $4.36 million in 2006. The company employs around 200 people in its Middle East and Africa regional headquarters in Istanbul. Microsoft maintains a fully indirect enterprise application system sales model in the country, counting 43 certified partners as of 2007. To further enlarge its Turkish Dynamics business, the vendor continues to place greater importance on developing capabilities of existing partners in terms of both vertical know-how and technology coverage, rather than expanding their absolute numbers. The aim is to gain higher service margins and overall customer satisfaction, while also avoiding channel conflicts. The approach seems to be paying off, as average deal sizes have grown substantially compared to 2006 due to a greater number of licenses being sold per customer, and more new engagements arising out of prior customer references.

PART III

SURVEY

III.1. INTRODUCTION

This study is about problems in Enterprise Resource Planning systems in textile industry. The aim of this part of the study includes;

- Analyzing the Enterprise Resource Planning applications in textile industry,
- Determining problems in implementing ERP software,
- Offering some general solution alternatives,
- Making suggestions for successful projects in textile industry,
- Contributing to theory and helping implementations in the sector.

For this study, textile companies which have used ERP successfully for years in selection, implementation and post-implementation processes are researched. In this research, companies are classified according to some factors like characteristics of their system, selection criteria, selection reasons and expectations. Among the participating companies surveyed, some use their in-house ERP system and others use packaged ERP software. In this way, failure factors and problems in each ERP using method have been determined.

The companies that consider these factors will be successful in their ERP project and all processes within the ERP system. They will also provide a competitive advantage in their industry.

III.2. METHODOLOGY

III.2.1. Scope

The scope of this study is limited to textile companies in Turkey that use ERP systems.

III.2.2. Survey

This part includes research methodology, design of the survey, data collection and analysis of these data.

There are twenty seven questions in the survey. The first two questions are about the member of team who answered the survey; and the next seven questions include information about the company and size of their ERP project. Next ten questions determine the expectations and main aims (general and sectoral) of the company. Next six questions aims to learn to happened problems and the final one includes the ideas of the company.

III.2.3. Population and Sample Size

III.2.3.1. Companies Using Software Developed In-house

Finding out textile companies that use ERP software developed in-house was very cumbersome. We had to rely on word-of-mouth information acquired during our work experience in the textile sector.

III.2.3.2. Companies Using Packaged Software

The textile companies which use packaged ERP systems were easier to identify. For this, first ERP products in sale in the Turkish market was identified via an Internet search. The references of their vendors were a big clue in finding out the

companies that use ERP software in Turkey. The web sites of consulting firms, their success stories and references were another source. Picking out textile firms from among these provided the basic population. Various seminar notes, activity news of ERP vendors, several interviews, and articles retrieved from the Internet served as a control list, to ensure we have not missed out anything.

As a result, a list consisting of 30 textile companies was prepared but two of these could not be reached because their web sites did not work. For the remaining 28, their e-mails and phone numbers were found. The questionnaire was sent to them by e-mail. If no response was received, the survey was sent again in two weekly intervals. After the third and fourth e-mail, they were phoned and requested to reply in voice.

At the end of trials taking a total of two months, only 6 companies had responded. Of these, three of them use packaged ERP software and the others has developed and used in house ERP system.

No doubt, a total of six responses are very small for a sample but when one considers that the total population is just 30 and that members of the project team are very difficult to reach, these answers were deemed useable.

The survey was answered by project managers, IT managers and functional consultants. All answers are assumed true and confidential.

III.3. SURVEY RESULTS

In this part, the general information of the firms that have had a successful ERP project and general structure of them will be given.

III.3.1 General Information about Companies

All companies that answered the questions in the survey are in the textile industry and all of them are in production.

As seen in Table IV.1, four of the six companies have between 100 and 199 employees. Other two of them have over 500 employees.

Table III.1. The number of employees

The number of employees	Number of companies
100 – 199	4
500 -	2

As seen in Table IV.2, one of the companies use Dynamics AX, one of them use Baan, one of them use Oracle and the other three of them use their in house software system.

Table III.2. Existent ERP systems of the companies

Program	Number of companies
Dynamics AX	1
Baan	1
Oracle	1
In house	3

According to the answers, five of the companies started to use ERP system over three years ago and one of them started to use between 1 and 3 years ago. Table IV. 3.

Table III.3. ERP Exposure Time

Exposure Time	Number of companies
1 - 3 years	1
Over 3 years	5

The ERP application time is shown at Table IV.4.

Table III.4 Application time

Application Time	Number of companies
7 - 12 months	1
13 - 18 months	3
19 - 24 months	2

Table III.5 shows the number of active ERP users at companies. According to answers, many companies have over 76 ERP users.

Table III.5 Number of ERP users

The number of ERP users	Number of companies
1 - 25 employees	1
26 - 50 employees	1
over 76 employees	4

III.3.2 Investigation about Company History before ERP Project Decision

Some of the questions in the questionnaire were about the situation before ERP usage. Expectations, requirements, selection criteria, common and sectoral problems of companies under study were tried to be determined. All companies gave similar answers.

When the main aims and criteria of companies were examined, it is seen that data transfer across different brands of legacy software is a big problem for most of the companies and many of them want to eliminate this problem. Table III.6 shows that measurement of budget and existing performance has the lowest priority with 16,67 %.

When requirements of textile companies were asked, three of the six companies showed “proper order tracking” as their main priority. Textile industry is based on orders. Therefore, mistakes and lack of attention on orders can cause considerable financial loss. Many customers may not give a second chance to a producer in textile sectors. Other answers are tabulated in Table III.7.

Table III.6 Main Aims and Criteria

Main Aims and Criteria	**Number of companies**
Income and expense analysis per product/customer	2
Cost control	3
Increasing coordination among departments	3
Standardizing business processes	4
Decision making based on data	2
Data consistency	4
Flexible business process adaptation	3
Decreasing paper work	4
Decreasing inventory problems	4
Developing supply chain management	3
Efficient cash management	2
Determining procurement standards and procedures	2
Customer data segmentation and analysis	2
Budgeting and existing performance measurement	1
Building a common database	3
Decreasing costs	4
Avoiding data transfer problems between different software	5
Efficient reporting	3

Table III.7 Requirements in the textile company

Necessities as textile company	**Number of companies**
Proper order tracking	3
Efficient production based on order	1
Minimizing problems with customers	1
Avoiding record repetition	1
Using a flexible software adaptable to dynamic business processes	1
Abitility to use detailed info on like color, size, lot, etc.	1
Proper costing	1
Timely knowledge and control of operations	1
Demand prediction	1
Answering questions about variant structure quickly	2

As a part of the study, general and sector-specific problems prior to Enterprise Resource Planning system usage were asked. Problems that can cause financial loss took the highest rate with 50 %. Additionally, two of the companies said usage of different types of software for each department could cause serious errors and time wasting. Other important problems, as shown in Table III.8, were excess stock, high variance from customer deadline, excessive number of workers, loss of time and effort in attaining special customer requests.

Table III.8 General and sector-specific problems before ERP

General and sector-specific problems before ERP	**Number of companies**
Excessive stock	1
High variance from customer deadline	1
Excessive number of workers at production planning department	1
Loss of time and effort in attaining customer requests	1
Use of different software at each department	2
Cost of managing the system	3
Faulty and inadequate reporting	3
Erroneous costing	3
Mistakes and confusions in order tracking	3
Too much variety and variability	3

The expectations of companies from ERP system are tabulated in Table III.9. As can be seen, 66,67 % of companies expect to form a structure that will enable an effective and error free reporting system. 50% of companies anticipate to allow corporate flexibility and effective control of business processes. Effective communication and increasing customer satisfaction are other expectations from Enterprise Resource Planning systems. In addition, expectations can change in accordance with special business needs. For example, one company mentioned an expectation to support electronic trade from ERP system. This is a special choice of this company.

Table III.9 Expectations from ERP system

Expectations from ERP system	**Number of companies**
Forming a common language (effective communication)	2
Reaching the desired data from right and single source	2
Effective and correct reporting	4
More efficient control of processes	3
Saving time and money	1
Increasing efficiency	1
Minimizing losses	1
Software contribution to improved processes	2
Increasing customer satisfaction	2
Increasing corporate flexibility	3
Operating system independence	1
Ability to meet customers and vendor needs	2
Electronic trade support	1

III.4 ANALYSIS

In this part, the problems and solutions will be discussed. All textile companies that have answered the questions make production. Many answers are nearly the same for all. But three of them have preferred a packaged ERP software and the other three have developed their own ERP systems in accordance with their requirements. All six companies indicated their project was hard but successful. For that reason, I will separate the companies to two groups: packaged ERP software users and in-house developed ERP software users.

When the problems at decision stage in Table III.10 are considered, similar problems can be seen. High costs are the most important matter for all companies. In all cases, the companies that developed their software in-house indicated that high costs were the main reason in preferring to develop their own software.

Table III.10 Problems at decision stage

Problems in decision stage	**Packaged**	**In-house**
High costs	✓	✓
Software strong in one aspect but weak in another		✓
Lack of ERP that suits the sector		✓

Additionally, according to companies that developed their software in-house, the packaged ERP software does not meet expectations of textile industry, so they preferred to build their own software rather than buying it ready made.

The companies that preferred to buy packaged software indicated that negotiation with vendors and intermediate sellers helped to overcome the problem of high costs. They also said that top management support was important at every stage of the project. Companies that preferred to use packaged software said they have analyzed many demos and case studies. They have decided that developing software in-house is more expensive than adopting a packaged software. The answers of groups can be seen in Table III.11.

Table III.11 Solutions of Groups

Solutions	**Packaged**	**In-house**
Negotiating with vendors and intermediate sellers	✓	
Top management support	✓	
More detailed demos and case studies	✓	
Performing requirement analysis with key users		✓
In-house software development		✓

The problems at implementation stage can be seen in Table III.12 below. Problems in both groups show similarity but there are certain differences, too. For instance, while companies that preferred packaged software do not indicate any problem about indefinite targets, inadequate support of top management, confidence problems among project team members or inadequate testing, such problems become important for companies that build their own software in-house. In contrast, companies that preferred packaged software experienced some other problems like errors in designing business processes. Other problems mentioned showed a similar character in both groups. The common problems are some of the most critical reasons for failure of many ERP projects.

Companies that preferred packaged software had analyzed external sources and consulting firms. So, they enlisted additional problems related to consulting and

consultants during the project. According to these firms, consultants had not enough experience, and there was not enough testing to prevent troubles at later stages.

Table III.12 Problems at implementation

Problems at implementation	**Packaged**	**In-house**
Indefinite targets		✓
Inadequate support of top management		✓
Resistance of users	✓	✓
Inexperienced consultants	✓	
Ambiguities in roles and responsibilities of project team	✓	
Inadequate communication	✓	✓
Change of project team members while project is running		✓
Faulty design of business processes	✓	✓
Inadequate and wrong analysis		✓
Confidence problem between members' of project team		✓
Inadequate participation of project team members	✓	
Inadequate training	✓	
Isufficient testing	✓	✓
Slowness in decision making	✓	

The solutions found to above problems are listed in Table III.13. Companies that preferred packaged software tried to solve their problems with effective and intensive communication between their consulting firm and their own project team.

Companies that built their own software said their problems were centered around reengineering, communication and testing. The solution suggested to these problems were pilot application implementation, devoted and patient work; meetings and overtime working with project team and users.

Table III.13 Solutions

Solutions	**Packaged**	**In-house**
Effective and intensive communication with consulting firm	✓	
Pilot application implementation		✓
Devoted and patient work		✓
Meetings and overtime working		✓

When problems at post-implementation stage are concerned, groups have not given satisfactory answers because they had not measured these effectively but they tend to agree on performance and support problems after implementation. When they can measure these results, they can give detailed answers. However, this may be the subject for another study.

PART IV

CONCLUSION

Enterprises must arrange their business process flow and must use their sources effectively for coordinating customer expectations and adapting to changing market conditions like global competition, technology, economic conditions, decreasing profit margins, etc. Organizations are suggested to follow the best practices under these situations. One of the most effective solutions developed for this purpose is Enterprise Resource Planning systems.

Today, ERP systems are used by all types of companies from large multinational companies to small or middle sized local ones. However, ERP implementation decision is a serious one.. So, this decision is given after thorough investigation at all points.

An ERP implementation is a huge commitment from the organization, causing millions of dollars and can take up to several years to complete. Problems are fatal but finding the right solutions and right answers to questions make an ERP project successful. When integrated successfully, the benefits of ERP systems can be enormous. A well-designed and properly integrated ERP system allows the most updated information to be shared among various business functions, thereby resulting in tremendous cost savings and increased efficiency.

The overall purpose of this study was to determine the problems and failure factors encountered in implementing Enterprise Resource Planning systems in textile industry.

Textile is a dynamic sector and it has various complex processes. Textile companies are looking for Enterprise Resource Planning solutions to fit their specific needs.

Both generic and textile specific packages have been utilized in the industry However, our survey and analysis in Part III shows that the problems encountered in designing and implementing Enterprise Resource Planning systems are similar in nature to other sectors. Although some of them can change according to special requirements of the company under study, cost seems to be the most important factor for all companies. Its importance starts at decision stage and continues at all levels of the project. The barriers to implementation in textiles seem similar to other industries, too.

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Appendix. Survey Questions

ANKET SORULARI

1. Projedeki göreviniz nedir?
   ( ) Proje yöneticisi
   ( ) Anahtar kullanıcı
   ( ) Fonksiyonel danışman
   ( ) Teknik danışman

1. Projedeki göreviniz nedir?
   ( ) Proje yöneticisi
   ( ) Anahtar kullanıcı
   ( ) Fonksiyonel danışman
   ( ) Teknik danışman

2. Şirketinizdeki çalışan sayısı nedir?
   ( ) 1 - 19
   ( ) 20 - 49
   ( ) 50 - 99
   ( ) 100 – 199
   ( ) 200 - 499
   ( ) 500 –

3. Hangi ERP yazılımını kullanıyorsunuz?
   ( ) SAP
   ( ) Axapta
   ( ) Oracle
   ( ) Diğer.....

4. Ne zamandır ERP yazılımı kullanıyorsunuz? (Canlı kullanıma geçtiğiniz andan itibaren)
   ( ) 1 yıldan az süredir
   ( ) 1 yıl – 3 yıl arası
   ( ) 3 yıl ve üzeri

5. ERP uygulama süreniz ne kadar sürdü?
   ( ) 1 - 3 ay
   ( ) 4 - 6 ay
   ( ) 7 - 12 ay
   ( ) 13 - 18 ay
   ( ) 19 - 24 ay

6. Planlanan uygulama süresi neydi?
   ( ) 1 - 3 ay
   ( ) 4 - 6 ay
   ( ) 7 - 12 ay
   ( ) 13 - 18 ay
   ( ) 19 - 24 ay

7. Şu an aktif ERP kullanan yaklaşık kaç kullanıcınız var?
   ( ) 0 – 25
   ( ) 26-50
   ( ) 51- 75
   ( ) 76 ve üzeri

8. 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 ve üzeri

9. Herhangi bir modül için erteleme yapıldı mı?

( ) Evet

( ) Hayır

10. Kaç farklı lokasyonda ERP kullanılıyor?

( ) 1

( ) 2

( ) 3

( ) Daha fazla

11. Proje başlangıcında ana hedefiniz ve kriterleriniz nelerdi?

( ) Gelir ve giderlerin ürün / müşteri bazında analizi

( ) Maliyet kontrolü

( ) Departmanlar arasındaki koordinasyonu arttırmak

( ) İş süreçlerinin standartlaştırılması

( ) Veriye dayalı karar alınması

( ) Verilerde tutarlılık sağlanması

( ) Değişen iş süreçlerine uyumda esneklik

( ) Kağıt işinin azaltılması

( ) Stok problemlerinin azaltılması

( ) Tedarik zinciri yönetiminin geliştirilmesi

( ) Nakit yönetiminin sağlanması

( ) Satınalma standart ve prosedürlerinin belirlenmesi

( ) Müşteri bilgilerinin tutulması, segmentasyonu ve analizi

( ) Bütçe ve gerçekleşen performansların ölçüm ve analizi

( ) Ortak bir veritabanı yapısının oluşturulması

( ) Maliyetlerin azaltılması

( ) Birden fazla programın kullanılmasından doğan iletişimsizliği aşmak

( ) Etkin raporlama ve analiz

( ) Diğer (Lütfen yazınız)

12. Tekstil sektöründeki bir firma olarak ihtiyaçlarınız nelerdi?

( ) Siparişlerin sağlıklı takibi

( ) Sipariş bazlı üretimde verimli çalışabilmek

( ) Termin tarihlerine bağlı kalınması

( ) Müşteri ile yaşanan sıkıntıların en aza indirilmesi

( ) Mükerrer kayıtların engellenmesi

( ) Dinamik iş süreçlerine uyum sağlayabilecek esneklikte bir yazılım kullanabilmek

( ) Renk-beden-parti gibi malzeme takip kırılımlarının istenilen şekilde kullanılabilmesi

( ) Doğru maliyetlendirme

( ) Operasyonun nasıl ilerlediğinden anında haberdar olunabilmesi ve kontrol edilebilmesi

( ) Taleplerin ne yönde değişebileceğini öngörmek

( ) Varyant yapısı ile ilgili sorulara hızlı cevap verebilmek

13. Bir ERP yazılımı kullanma ihtiyacınız nereden kaynaklandı?

( ) Müşteri memnuniyeti

( ) Hatalı üretimin önüne geçilmesi

( ) Stok fazlası üretimin önüne geçilmesi

( ) Fiili maliyetlerin sağlıklı takip edilmesi

( ) Nakit akışının sağlıklı takibi

( ) Eski sistemin günümüz yazılım teknolojilerinin gerisinde kalması

( ) Yeniden organizasyon yapılması

( ) Üst yönetim kararı

( ) Birden fazla programın kullanılmasından doğan iletişim ve entegrasyon sorunları

( ) Mükerrer girişlerin engellenmesi

( ) İş süreçlerinin iyileştirilmesi ve standartlaştırılması

( ) Etkin raporlama ve analiz

( ) Diğer (Lütfen yazınız)

14. ERP kullanmadan önce karşılaştığınız (genel ve sektörel) problemler nelerdi?

( ) Hammadde stoklarının fazla olması

( ) Müşteri termin tarihi hesaplamalarındaki sapmaların fazlalığı

( ) Üretim planlama biriminin çalışan fazlalığı

( ) Müşteri özel isteklerinin yerine getirilmesinde fazladan harcanan çaba ve zaman kaybı

( ) Her birim için farklı programların olması

( ) Sistemi yönetmenin maliyetli olması

( ) İstenilen raporların alınamaması

( ) Eski sistemin sorunlu olması

( ) Maliyetlendirmenin doğru yapılmaması

( ) Sipariş takibinde yaşanan karışıklık ve yanlışlıklar

( ) Çeşitliliğin ve değişkenliğin çok olması

( ) Diğer (Lütfen yazınız)

15. Bir ERP yazılımından beklentileriniz nelerdi?

( ) Firma içi ortak dilin konuşulması

( ) İstenen verilere tek ve doğru kaynaktan ulaşılması

( ) Sağlıklı ve doğru veriye ve raporlara en kısa zamanda ulaşmak

( ) İş süreçlerini istenilen seviyede takip edebilecek bir sistem olması

( ) Sorunsuz çalışan, istenilen raporların sağlanabildiği bir sistem olması

( ) Zamansal ve maddi tasarruf

( ) Verimlilik artışı

( ) Kayıpların en aza indirilmesi

( ) Yazılımın süreç iyileştirmeye katkıda bulunması

( ) Müşteri memnuniyetini arttırmaya yardımcı olması

( ) Kurumsal esnekliğe müsaade etmesi

( ) Yazılımın esnekliği ve adapte edilebilirliği

( ) İşletim sisteminden bağımsız oluşu

( ) Müşteri ve tedarikçi ihtiyaçlarını da karşılayabilmesi
( ) E-ticaret desteği
( ) Diğer (Lütfen yazınız)

16. Seçim sürecinde danışmanlık hizmeti aldınız mı?
( ) Evet
( ) Hayır

17. Kaç tane ERP yazılımı incelediniz, bunlar nelerdi?

18. Şu an kullandığınız ERP yazılımını seçme nedenleriniz nelerdi?
( ) Kullanımının yaygın olması
( ) Satış sonrası desteğinin güçlü olması
( ) Tamamen şirket ihtiyacına göre geliştirilmesi
( ) Maliyeti
( ) İşlevselliği
( ) İhtiyaçların ancak yeni geliştirilen bir ERP ile karşılanacağı düşüncesi
( ) Diğer (Lütfen yazınız)

19. Seçim sürecinde ne gibi sorunlarla karşılaştınız?
( ) Yüksek maliyet
( ) Yapılan demoların yetersiz kalması
( ) Bir yönü güçlüyken diğer yanlarının zayıf kalan sistemler
( ) Sektöre uygun ERP olmaması
( ) Çok fazla yeni geliştirme gerektirmesi
( ) Diğer (Lütfen yazınız)

20. Seçim sürecinde karşılaştığınız sorunları nasıl aştınız?

( ) Maliyet açısından tedarikçi ile anlaşmaya gidilmesi ile
( ) Üst yönetim desteği ile
( ) Aracı satış firmasıyla anlaşmaya gidilmesi ile
( ) Anahtar kullanıcılar ile ihtiyaç analizi yapılarak seçime gidilmesi ile
( ) Daha fazla görüşme ve daha detaylı demolar alarak
( ) Örnek çalışmaları inceleyerek
( ) Kendi yazılımızı geliştirerek
( ) Diğer (Lütfen yazınız)

21. ERP yazılımı kurulumu süresince ne gibi sorunlarla karşılaştınız?

( ) Başlangıçtaki ihtiyaç, amaç ve hedeflerin tam olarak konulamaması
( ) Üst yönetimin destek olmaması
( ) Kullanıcı direnci
( ) Proje ekibinin yetersiz olması
( ) Danışmanların yetersiz olması
( ) Ekip elemanlarının rol ve sorumluluklarının açıkça belirtilmiş olmaması
( ) İletişimsizlik
( ) Proje devam ederken proje ekibinde değişiklikler olması
( ) İş süreçlerinin doğru bir şekilde dizayn edilememesi / geliştirilememesi
( ) Analizin doğru yapılamaması
( ) Ekip elemanları arasında güven problemi
( ) Ekip elemanlarının katılımı konusunda yaşanan sıkıntılar
( ) Proje çalışanları ve danışmanların kendilerini projeye adamamaları
( ) Yeterli eğitim almama
( ) Yapılan testlerin yetersizliği
( ) Yetersiz danışman sayısı
( ) Karar alımlarındaki yavaşlık
( ) Proje uygulama stratejisindeki eksiklik /yanlışlıklar
( ) Diğer (Lütfen yazınız)

22. Kurulum süresince karşılaştığınız sorunları nasıl aştınız?

( ) Danışman firma ile sürekli görüşerek

( ) Pilot uygulama yaparak

( ) Önceden belirli senaryolarla kullanıcıların sistemi kullanması sağlanarak

( ) Özverili ve sabırlı bir çalışma ile

( ) Toplantılar ve fazla mesai ile

( ) Diğer (Lütfen yazınız)

23. Kurulum sonrası ne gibi sorunlarla karşılaştınız?

( ) Belirsiz sonuçlar

( ) Hedeflerin çoğunu yakalayamamış olmak

( ) İnsan kaynaklarının kaybı

( ) Sürüm yükseltme problemleri

( ) istem performansı ile ilgili problemler

( ) Kurulum sonrası destek alamama

( ) Diğer (Lütfen yazınız)

24. Proje boyunca tekstil sektörüne özel ne gibi problemlerle karşılaştınız?

( ) Dinamik süreçlerin olması nedeniyle birden fazla entegrasyon yapılması zorunluluğu

( ) Bazı kontrollerin kaldırılması zorunluluğu

( ) Değişkenliğin fazla olması

( ) Diğer (Lütfen yazınız)

25. Sizce projeniz başarılı mıydı?

( ) Evet

( ) Hayır

( ) Kısmen

26. Projenizin daha başarılı olabilmesi için başka ne yapılabilirdi?

( ) Dökümantasyona daha fazla önem verilebilirdi
( ) Proje planı daha sağlıklı yapılabilirdi
( ) Eğitime daha fazla ağırlık verilebilirdi.
( ) Danışmanlar daha özverili çalışabilirdi
( ) Proje ekibi daha özverili çalışabilirdi.
( ) Daha iyi bir takım kurulabilirdi.
( ) Daha deneyimli danışmanlarla çalışılabilirdi.
( ) Kullanıcıların daha aktif katılımı sağlanabilirdi.
( ) Daha iyi bir analiz çalışması yapılabilirdi.
( ) Diğer (Lütfen yazınız)

27. Lütfen size göre projenin başarılı olmasındaki bu faktörleri önemine göre numaralandırınız. (1- en önemli; 19: en az önemli)

( ) Üst yönetim desteği
( ) Uygun ERP versiyonu (istenen özelliklere sahip olunması)
( ) Proje kapsam yönetimi
( ) Proje ekibinin kalitesi
( ) Kendilerini projeye adamış çalışan ve danışmanlar
( ) İletişim
( ) Proje ekibi arasında güven
( ) İş süreçlerini yeniden yapılandırma
( ) Uygulama stratejisi
( ) Resmi proje planı ve zaman çizelgesi
( ) Varolan sistemle entegrasyon
( ) Önleyici problem çözüm tasarımı
( ) Kurulumun uygun yapılması
( ) Karar almada yetkili çalışanlar
( ) Uygun oranlarda danışman kullanımı
( ) Kullanıcı katılımı
( ) Değişim yönetimi
( ) Sistemlerde standart dışı uyarlama oranı
( ) Eğitimler

RESUME

Gülce Çifçi Gül was born in İstanbul in 1982. She has earned her Bachelor of Science in Mathematics at Trakya University in 2004. She has started her Master of Industrial Engineering degree in 2005. While studying in master degree, he has started to work at Şahinler Holding as software application tester. Now, she is still working as Axapta Application Consultant at an information technology company.