

T.C.
MARMARA UNIVERSITY
INSTITUTE FOR GRADUATE STUDIES IN
PURE AND APPLIED SCIENCES

126506

ASSESSMENT OF ERP IMPLEMENTATION
IN TURKISH COMPANIES

Ali BAŞÇİFTÇİ
(14.1.029.1998.0016)

THESIS

FOR THE DEGREE OF MASTER OF SCIENCE
IN
INDUSTRIAL ENGINEERING PROGRAMME

T.C. YÜKSEKÖĞRETİM KURULU
DOKÜMANTASYON MERKEZİ

SUPERVISOR
Prof.Dr. T.Erkan TÜRE

126506

İSTANBUL 2002

T.C.
MARMARA UNIVERSITY
INSTITUTE FOR GRADUATE STUDIES IN
PURE AND APPLIED SCIENCES

ACCEPTANCE AND APPROVAL DOCUMENT

ASSESSMENT OF ERP IMPLEMENTATION
IN TURKISH COMPANIES

Established committee listed below, on 11 March 2002 and 2002/06-57 by the *INSTITUTE FOR GRADUATE STUDIES IN PURE AND APPLIED SCIENCES*' Executive Committee, have accepted Mr.Ali BAŞÇİFTÇİ's Master of Science thesis, titled as "Assessment of ERP Implementation in Turkish Companies" in Industrial Engineering.

COMMITTEE

Advisor : Prof. Dr. T. Erkan TÜRE – Marmara University.....*Erkan Türe*
Member : Prof. Dr. Sami ERCAN – Marmara University.....*Sami Ercan*
Member : Asst. Prof. Dr. Serol BULKAN – Marmara University.....*Serol Bulkan*

Date of thesis' defense before the committee : 29 March 2002

APPROVAL

Mr.Ali BAŞÇİFTÇİ has satisfactorily completed the requirements for the degree of Master of Science in Industrial Engineering at Marmara University. Mr.Ali BAŞÇİFTÇİ is eligible to have the degree awarded at our convocation on ~~11.3.2002~~ ~~2002/11-70~~. Diploma and transcripts so noted will be available after that date.

İstanbul

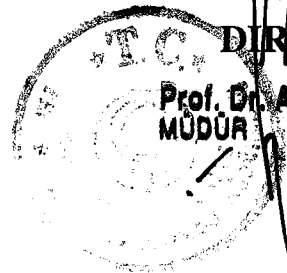

DIRECTOR
Prof. Dr. Adnan AYDIN
MÜDÜR

TABLE OF CONTENTS

	<u>PAGE</u>
ABSTRACT	iii
ÖZET	iv
CLAIM FOR ORIGINALITY.....	v
ABBREVIATIONS	vi
LIST OF FIGURES	vii
LIST OF TABLES	viii
I. INTRODUCTION.....	1
II. ENTERPRISE RESOURCE PLANNING SYSTEMS	2
II.1 EVOLUTION OF ERP SYSTEMS	2
II.1.1 Material Requirements Planning (MRP).....	2
II.1.2 Manufacturing Resources Planning (MRP II).....	4
II.1.3. Enterprise Resources Planning.....	7
II.1.3.1 Characteristics of ERP Systems.	8
II.1.3.2 Advantages and Disadvantages of ERP Systems.	8
II.2 IMPLEMENTATION OF ERP SYSTEMS.....	10
II.2.1 Critical Success Factors in ERP Implementation	11
II.2.1.1 Top Management Support.....	11
II.2.1.2 Project Management	12
II.2.1.3 Education and Training	13
II.2.1.4 Data Accuracy	13
II.2.1.5 Company-wide Support	14
II.2.1.6 Suitability of Hardware and Software.....	14
II.2.1.7 Software Vendor Support.....	14
III. SURVEY	15
III.1 SURVEY DESIGN AND APPLICATION.....	15
III.2 SURVEY RESULTS.....	16
III.2.1 Part A – General Information.....	16
III.2.2 Part B – Software Selection	16
III.2.3 Part C – Training and Services	18
III.2.3.1 Implementation Services	18
III.2.3.2 Training.....	19
III.2.3.3 Support Services.....	20

III.2.3.4 Custom Programming	21
III.2.4 Part D – ERP Software	22
III.2.4.1 Features of ERP Software	22
III.2.4.2 ERP Modules	23
III.2.5 Part E – Success Factors	24
III.2.5.1 Benefits of ERP.....	25
IV. A CLOSE LOOK AT TWO ACTUAL	
IMPLEMENTATION PROJECTS	27
IV.1 IMPLEMENTATION PROJECT OF FIRM A.....	27
IV.1.1 Part A – General Information	27
IV.1.2 Part B – Software Selection	27
IV.1.3 Part C – Training and Services	28
IV.1.4 Part D – ERP Software	30
IV.1.5 Part E – Success Factors	31
IV.2 IMPLEMENTATION PROJECT OF FIRM B.....	33
IV.2.1 Part A – General Information	33
IV.2.2 Part B – Software Selection	33
IV.2.3 Part C – Training and Services	34
IV.2.4 Part D – ERP Software	36
IV.2.5 Part E – Success Factors	37
IV.3 COMPARISON OF THE IMPLEMENTATION PROJECTS	
OF FIRM A AND FIRM B	38
V. CONCLUSIONS	40
REFERENCES	43
APPENDIX	44
BIOGRAPHY.....	51

ABSTRACT

ASSESSMENT OF ERP IMPLEMENTATION IN TURKISH COMPANIES

Enterprise Resource Planning (ERP) systems integrate all business operations in an overall system for planning, controlling and monitoring present and future challenges. While significant benefits can accrue from successful implementation of ERP systems, unsuccessful implementation would compromise the organization's effectiveness because changes made in organizational procedures, discipline, and focus would be difficult to reverse. ERP implementation, therefore, has to be properly managed. In this study, it was aimed to investigate how Turkish companies effectively implement ERP systems through a survey. The survey results reveal that performance of software vendors that are providing implementation and support services were much below the expectations of the respondents.

In addition, ERP implementation projects of two firms that are operating in Turkey were analyzed. One of the firms managed to install ERP in 6 months. The other firm started the implementation project in early 1999, it was expected that the project would be finished within a year, but it was still continuing in December 2001. The analysis reveal that performance of software vendor which has provided implementation and support services to both firms were much below their expectations. Company-wide support was evaluated as an important factor in the implementation, however the performance measure of that factor was much below its importance rate. Suitability of software was evaluated as low by the second firm, while the first firm evaluated it as above average.

Company-wide support is important for a successful ERP implementation since ERP is a company-wide system and the concerted effort of every department and every individual is required to make it work. Software vendor support is paramount, since lack of software vendor support could seriously impede the implementation process. Suitability of software is also important, the software should fit the organization's needs. The other important factors for the success of ERP implementation are top management support, project management, education and training, data accuracy, and suitability of hardware.

ÖZET

TÜRK FİRMALARINDA KURUMSAL KAYNAK PLANLAMA SİSTEMLERİ UYGULAMALARININ DEĞERLENDİRİLMESİ

Kurumsal Kaynak Planlama (ERP) sistemleri işletmelerin tüm işlemlerini bir sistem çerçevesinde planlama, kontrol, bugünün ve geleceğin fırsat ve tehditlerini izlemek amacıyla entegre eder. Başarılı uygulamaları önemli faydalar sağlarken, başarısız uygulamalar organizasyonların etkinliklerini tehlikeye sokabilmektedir. Çünkü, organizasyon prosedürlerinde, düzeninde ve odaklanılan alanlarda yapılan değişiklikleri tersine çevirmek güçtür. Bu sebepten dolayı kurumsal kaynak planlama sistem uygulamaları dikkatli ve uygun bir şekilde yönetilmelidir. Bu çalışmada, Türk firmalarının kurumsal kaynak planlama sistemlerini hangi etkinlikte uyguladıkları, bir anket çalışması ile incelenmesi amaçlanmıştır. Anket sonuçları, uygulama ve destek hizmeti veren yazılım danışmanlık firmalarının performanslarının, anketi cevaplayanların beklentilerinin altında kaldığını göstermiştir.

Ayrıca bu çalışmada, Türkiye’de faaliyet gösteren iki firmanın kurumsal kaynak planlama uygulama projeleri incelenmiştir. Bir firma kurumsal kaynak planlama sistemini 6 ay içinde kurmuştur. Diğer firma projeye 1999 yılı başlangıcında başlamıştır. Projenin bir sene içerisinde tamamlanması öngörülmüş olmasına rağmen Aralık 2001 itibariyle proje hâlâ devam etmekteydi. İnceleme, iki firmaya da uygulama ve destek hizmeti veren yazılım danışmanlık firmasının performansının, firmaların beklentilerinin altında kaldığını göstermiştir. Tüm firma çalışanlarının desteği, uygulama için önemli faktörler arasında değerlendirilmiştir. Fakat, bu alandaki performans değerlendirmeleri önem değerlendirmelerinin altında kalmıştır. Yazılım uygunluğu, ikinci firma tarafından düşük not ile değerlendirilirken, birinci firma ortalamanın üstünde değerlendirmiştir.

Tüm firma çalışanlarının desteği başarılı bir uygulama için önemlidir, çünkü kurumsal kaynak planlama sisteminin çalışması için her departmanın ve her çalışanın birlikte çabası gerekmektedir. Yazılım danışmanlık firmalarının desteği önemlidir, çünkü bu desteğin yokluğu uygulama sürecine engel teşkil edebilir. Yazılım uygunluğu da önemlidir, yazılım organizasyonun ihtiyaçlarına uygun olmalıdır. Kurumsal kaynak planlama uygulamalarının başarısı için önemli diğer faktörler olarak proje yönetimi, eğitim, veri doğruluğu, yazılım ve donanım uygunluğu sıralanabilir.

CLAIM FOR ORIGINALITY

ASSESSMENT of ERP IMPLEMENTATION in TURKISH COMPANIES

Installing Enterprise Resource Planning (ERP) is a major change for an organization. Besides representing major investments, unsuccessful implementation would compromise the company's effectiveness, since changes made in organizational procedures, discipline and focus would be difficult to reverse. Therefore, ERP implementation has to be properly managed. How Turkish companies effectively implement ERP is an issue of investigation, and this issue is investigated through a survey in this study. In addition, ERP implementation projects of two firms that are operating in Turkey were analyzed

The results of the survey reveal that implementation and support services are problematic areas since performance of the service providers about these areas were rated low, while these areas were considered as highly important by the respondents. Company-wide support, top management support and suitability of software which are described as critical success factors in ERP implementation also scored low by the respondents.

These results show the importance of selecting the right vendor and the right software for the implementation. The findings of this study can be used by the companies who are willing to implement ERP. The results point that the company-wide support and top management support should be scrutinized by the companies that have been implementing ERP software.

May, 2002

Prof.Dr. T. Erkan TÜRE

Ali BAŞÇİFTÇİ

ABBREVIATIONS

BOM	: Bill of Material
CRM	: Customer Relationship Management
CRP	: Capacity Requirements Planning
ERP	: Enterprise Resource Planning
IT	: Information Technology
MPS	: Master Production Schedule
MRP	: Material Requirements Planning
MRP II	: Manufacturing Resource Planning
RCCP	: Rough Cut Capacity Planning
SCM	: Supply Chain Management
TQM	: Total Quality Management

LIST OF FIGURES

	<u>PAGE</u>
Figure II.1 MRP system input-output relationship (Chung and Synder)	3
Figure II.2 MRP II(Gray and Landvater, 1989)	5
Figure II.3 ERP system (Heizer and Render, 2001).....	7
Figure III.1 Number of employees in the firms	16
Figure III.2 Implementation Services_importance vs. performance.....	19
Figure III.3 Comparison of Gaps in Implementation Services	19
Figure III.4 Support Services_importance vs. performance	20
Figure III.5 Comparison of Gaps in Support Services	21
Figure III.6 Custom Programming_importance vs. performance	21
Figure III.7 Comparison of Gaps in Custom Programming.....	22
Figure III.8 Features of ERP Software_importance vs. performance	23
Figure III.9 Comparison of Gaps in Features of ERP Software.....	23
Figure III.10 Comparison of Satisfaction Levels of ERP Modules	24
Figure III.11 Success Factors_importance vs. performance	25
Figure III.12 Benefits of ERP	26

LIST OF TABLES

	<u>PAGE</u>
Table III.1 Rank of Information Sources	16
Table III.2 Time Expectation vs. Achievement.....	17
Table III.3 Cost Expectation vs. Achievement.....	18
Table III.4 Satisfaction from Training.....	20
Table IV.1 Implementation Services_importance vs. performance : Firm A.....	28
Table IV.2 Support Services_importance vs. performance: Firm A	29
Table IV.3 Custom Programming_importance vs. performance: Firm A	30
Table IV.4 Features of ERP Software_importance vs. performance: Firm A.....	30
Table IV.5 Satisfaction from ERP Modules: Firm A	31
Table IV.6 Success Factors_importance vs. performance: Firm A	31
Table IV.7 Benefits of ERP: Firm A	32
Table IV.8 Implementation Services_importance vs. performance: Firm B	34
Table IV.9 Support Services_importance vs. performance: Firm B.....	35
Table IV.10 Custom Programming_importance vs. performance : Firm B	36
Table IV.11 Features of ERP Software_importance vs. performance: Firm B	36
Table IV.12 Satisfaction from ERP Modules: Firm B.....	37
Table IV.13 Success Factors_importance vs. performance: Firm B	37

I. INTRODUCTION

In today's fast changing business environment, globalization makes survival of the firms more difficult. The firms must integrate their functional operations and manage their resources efficiently in order to give quick response to changes and to protect/increase their competitive abilities. Enterprise Resource Planning (ERP) integrates all business operations in an overall system for planning, controlling and monitoring present and future challenges.

Successful implementation of ERP systems can provide firms with significant benefits such as better production scheduling, reduced costs, improved customer service, etc. However, the success rate is not very high. Implementing ERP in a company means a major change and challenge for that company. Once an ERP system is implemented, going back is extremely difficult. It is too expensive to undo the changes which ERP brings into the company. There are several failed ERP attempts, and companies lost not only the capital invested in ERP packages and big amounts of dollars paid to consultants, but also a major portion of their business. (Bingi, Godla and Sharma, 1999) In this respect, ERP implementation in Turkish companies is an issue that must be investigated.

In this study, evolution of ERP systems, characteristics, advantages and disadvantages of ERP systems are explained in the first part of Chapter 2. Implementation issues and critical success factors for ERP implementation are discussed in the second part of Chapter 2. The survey design and application are explained, and survey results are presented in Chapter 3. ERP implementation projects of two firms are discussed in Chapter 4. Important issues that must be focused during the implementation processes are discussed in Chapter 5.

II. ENTERPRISE RESOURCE PLANNING SYSTEMS

II.1 EVOLUTION OF ERP SYSTEMS

Manufacturing enterprises involved in manufacturing, sales and distribution activities have been using computers for 30 years to improve productivity, profitability and information flow across the enterprise. In the 1970s, the production oriented information systems were known by the name Material Requirements Planning (MRP). MRP translates the Master Schedule built for end items into time-phased net requirements for the sub-assemblies, components, raw materials planning and procurement. In the 1980s an enlarged version of MRP known as Manufacturing Resources Planning (MRPII) evolved. MRP II has certain extensions like Rough Cut Capacity Planning (RCCP) and Capacity Requirements Planning (CRP) for production scheduling on shop floor as well as feedback from manufacturing shops on progress of fabrication. In the early 1990s, MRP II was further extended into Enterprise Resources Planning (ERP) to cover areas like finance, human resources, distribution, project management etc. to handle global business needs of an integrated and networked enterprise. (Siriginidi, 2000)

II.1.1 Material Requirements Planning (MRP)

Material Requirements Planning (MRP) is defined as a technique for determining the quantity and timing for the acquisition of dependent demand items needed to satisfy master schedule requirements. (Monks, 1987)

Material requirements plan translate a master production schedule (MPS) into time-phased net requirements, and the planned coverage of each requirement, for each component inventory item needed to implement this schedule. The primary inputs and outputs of the MRP system are reflected in Figure II.1. (Chung and Snyder, 2000)

Master Production Schedule (MPS) specifies what end items are to be produced and when. It disaggregates the aggregate production plan. While the aggregate production plan is established in gross terms such as families of products, the master production schedule is established in terms of specific products. The planning horizon should be long enough to cover the production cycle-the time it takes to produce a product. (Heizer and Render, 2001)

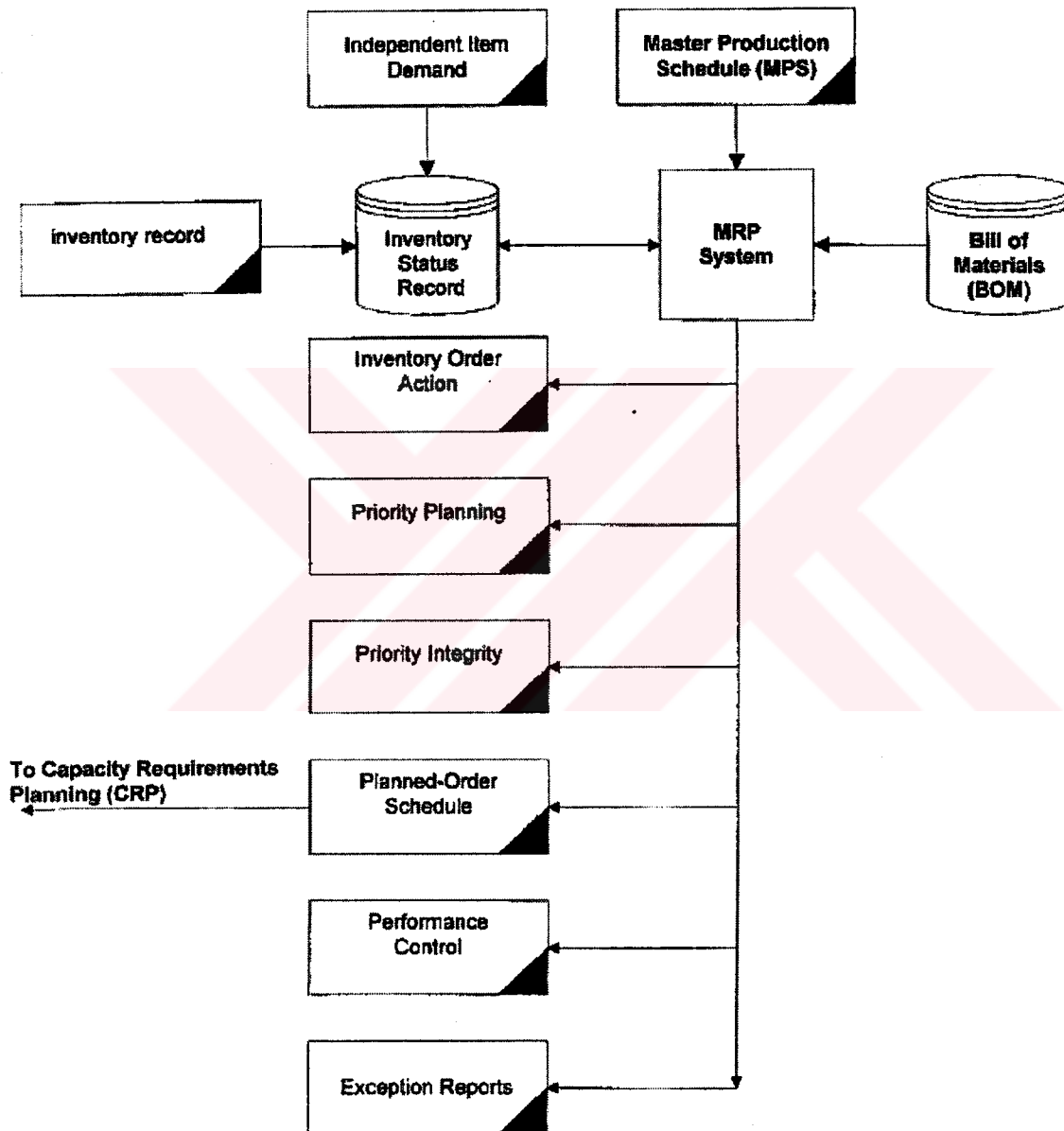


Figure II.1 MRP system input-output relationship (Chung and Synder)

Inventory Status Record gives information on the on-hand quantities, gross requirements (such as spare part requirements), scheduled receipts, and planned order releases for the items. In addition, the inventory status records include planning

information such as lot sizes, lead times, safety stock levels, and scrap allowances. (Monks, 1987)

A bill of material (BOM) is a list of quantities of components, ingredients, assemblies, sub-assemblies and materials required to make a product. BOM data must be accurate and up-to date for valid outputs from MRP. (Heizer and Render, 2001)

The most visible outputs of MRP system are the actual and planned order releases that go to purchasing and in-house production shops. They result from exploding end-item requirements into components via BOMs and then using the inventory status records to determine net requirements and release dates. MRP system helps keeping priorities valid by making due dates and requirement dates coincide. MRP system also provides simulated results of a proposed master schedule, information about predicted shortages, delays, and scrapped orders. (Monks, 1987)

Outputs of MRP system are used for capacity requirements planning (CRP). CRP is a technique for determining what personnel and equipment capacities are needed to meet the production objectives embodied in the master schedule and the material requirements plan. (Monks, 1987)

MRP system can provide valuable measures of performance such as cost, quality and vendor activity. It can collect data on material receipts by vendor and measure lead time variability, forecast error, and preferred suppliers. (Monks, 1987)

MRP system reflects centralized computing, and limited interaction between users and data, and rigid functions with low level integration in a firm. MRP needs to be integrated with major functions in the firm so that business data are stored only once, are up-to-date, and reliable, and can be shared by a wide range of users. (Chung and Snyder, 2000)

II.1.2 Manufacturing Resources Planning (MRP II)

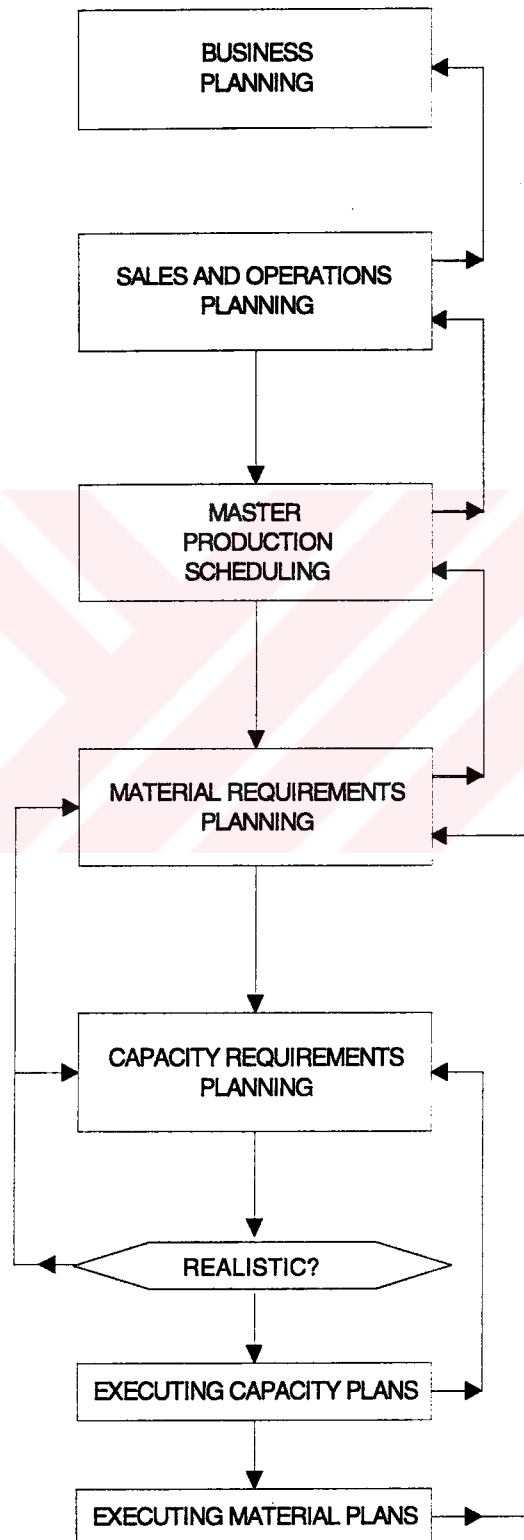
In the 1980s MRP II became the application of information and manufacturing technology which plans resources to improve the efficiency of a manufacturing enterprise through integration effort. (Chung and Snyder, 2000) The elements of the standard MRP II system are reflected in Figure II.2. (Gray and Landvater, 1989)

Logic of MRP II is explained briefly as follows : (Wallace, 1990)

“The logic of MRP II is quite simple; it’s in every cookbook. The sales and operations plan says that we’re having Thanksgiving dinner on the third Thursday in November. The master schedule is the menu, including turkey, stuffing, potatoes, squash, vegetables, and all

the trimmings. The bill of material says, "Turkey stuffing takes one egg, seasoning, bread crumbs, etc." The routing says, "Put the egg and the seasoning in a mixer." The mixer is the workcenter where the processing is done.

In manufacturing, however, there's a lot more volume and a lot more change. There isn't just one product, there are many. The lead times aren't as short as a quick trip to the corner store, and the workcenters are busy. Thanksgiving won't get rescheduled, but customers sometimes change their minds. The world of manufacturing is a world of constant change, and that is where MRP II comes in"



FigureII.2 MRP II (Gray and Landvater, 1989)

Business planning defines the business mission of the company; its markets, capabilities, financial objectives, and strategic goals. The business plan is expressed in monetary terms, and lays out the long-term direction for the company. (Gray and Landvater, 1989)

Sales and operations plan states how the business plan will be executed. It is stated in units by product family. The sales plan states planned rates of sales, the production plan states planned rates of output. (Gray and Landvater, 1989)

Master production schedule is a detailed statement of what products the company will build, stated by individual item rather than families. The master production schedule for items within a family of products is constrained by the production plan for family. It takes into account existing customer orders, forecasts of anticipated orders, current inventories, and available capacities. (Gray and Landvater, 1989)

Material requirements planning breaks down the master production schedule into individual schedules for purchasing, fabricating, and assembling all component items. Capacity requirements planning translates MRP schedules into capacity requirements for each workcenter, labour resource, tool, etc. (Gray and Landvater, 1989)

The execution systems for material planning and capacity planning provide the tools to control material and capacity. MRP plans priorities; plant scheduling and supplier scheduling control priorities. CRP plans capacities; input-output control controls capacities. (Gray and Landvater, 1989)

Feedback from vendors, planners, foremen, and others communicates problems in executing the plan, and provides the method for closing the loop on the system. Feedback is necessary when the plans cannot be executed, and must be revised. (Gray and Landvater, 1989)

By integrating all of these planning and execution elements, MRP II becomes a process for effectively linking long-range aggregate plans to short term detailed plans. From top to bottom, it ensures that all activities are in lockstep. The reverse process, feedback, goes from bottom to top on an exception basis-conveying unavoidable problems in order to maintain valid plans. (Wallace, 1990)

One of the drawbacks of the MRP II system is isolated integration. Linking activities such as purchasing, inventory control and sales is performed in isolated planning and scheduling by simply retrieving, storing, and interchanging data in the

system only when needed. The isolated integration of MRP II represents inadequate business solutions. (Chung and Snyder, 2000)

MRP II systems have been procured separately without regard for the need to communicate across the traditional functional areas. This has been one of the major causes for “islands of automation”. Incompatible computer systems, computer hardware differences, incompatible protocols, and other software-related obstacles to integration yields islands of automation. As long as all the functional areas are not integrated in the organization with technology, MRP II cannot be considered as an enterprise wide system. (Chung and Snyder, 2000)

II.1.3. Enterprise Resources Planning

ERP is defined by Deloitte & Touche as “packaged business software systems that allow companies to: (1) automate and integrate the majority of their business processes, (2) share common data and practices across the entire enterprise, and (3) produce and access information in a real-time environment.” (Heizer and Render, 2001)

An ERP system is an enterprise wide information system that integrates all aspects of a business. It promises one database, one application, and a unified interface across the enterprise. (Bingi, Godla and Sharma, 1999)

ERP systems utilize a central database to assist the flow of information between the manufacturing, purchasing, finance, logistics, and human resources functions of companies. Figure II.3 depicts the information flow between centralized ERP and the functions of a company. (Heizer and Render, 2001)

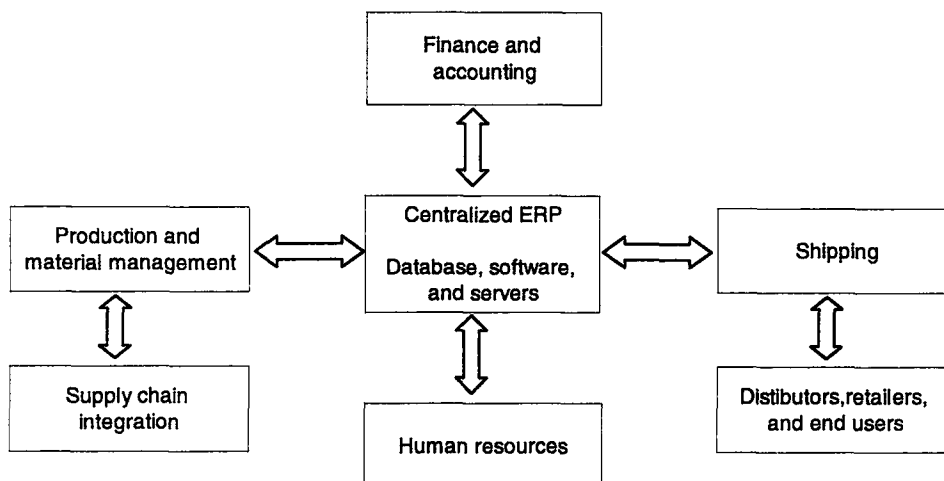


Figure II.3 ERP system (Heizer and Render, 2001)

II.1.3.1 Characteristics of ERP Systems.

a. Business process integration: ERP systems integrate the business processes of an organization as a whole instead of just in some functional units. From the shop floor activities to performance monitoring in the headquarters, a seamless integration has been achieved through ERP implementation, which makes the various computer hardware and software platforms compatible with one another. (Frank and Palaniswamy, 2000)

b. Centralized database: A centralized enterprise database is the nerve center of an ERP system. ERP systems integrate primary business applications. All the applications in an ERP suite share a common set of data that is stored in a central database. Therefore, people from a functional department can easily access other departments' information directly from their workstation. (Tarn, Yen and Zheng, 2000) Once data are entered into ERP system, it could be shared across an entire value in a firm. (Chung and Snyder, 2000)

c. Client/server architecture: The current ERP systems have an open client/server architecture. In a client server environment, the server stores the data, maintains their integrity and consistency, and processes the requests of the end user from the client desktops. The load of data processing and application logic is divided between the server and the client. (Gupta, 2000)

d. Real-time processing: ERP systems provide real-time, or near real-time, processing, which is vital to customer responsiveness. With the sharing of common data, specific departments such as customer service and marketing departments can immediately answer questions regarding product availability and order status by directly accessing the information from production and inventory management, departments. (Tarn, Yen and Zheng, 2000)

II.1.3.2 Advantages and Disadvantages of ERP Systems.

In information system development, design activities may easily consume up to 50 percent of the development effort. However, with application software packages such as ERP software packages, most of the design work has been accomplished in advance. Vendors supply ongoing maintenance and support for the system, upgrade services to keep the system in line with ongoing technical and business developments. (Laudon and Laudon, 2000) Successful implementation of ERP systems may provide significant benefits such as:

- Improved cost control,
- Reduced cycle times,
- Increase in on-time delivery rates,
- Reduction in inventory,
- Lower administrative costs,
- Reduction in operations costs,
- Reduced paper documents by providing on-line formats for quickly entering and retrieving information,
- Savings due to centralization, ie parts and supplies demand which are used in more than one facility may be aggregated and lower cost contracts for them may be negotiated,
- Improved information access and management throughout the enterprise,
- Elimination of redundant data and procedural operations,
- Enhanced decision making based on real time data,
- Faster response and follow up on customers,
- Quick response to changes in business operations and market conditions
- Improved customer satisfaction,
- Increased competition power.

Application software packages as well as ERP packages are geared to the most common requirements of all organizations to maximize market appeal. Problems arise if an organization has unique requirements, which the package does not address. Package software developers anticipate this problem by providing features for customization that do not alter the basic software. Customization features allow a software package to be modified to meet an organization's unique requirements without destroying the integrity of the package software. Required customization and additional programming may become so expensive and time-consuming that they eliminate many of the advantages of software packages. (Laudon and Laudon, 2000)

II.2 IMPLEMENTATION OF ERP SYSTEMS

Enterprise Resource Planning creates myriad interconnections among various business processes and data flows to ensure that information in one part of the business can be obtained by any other unit, to help people eliminate redundant activities, and to make better management decisions. Massive organizational changes are required to make this happen. Information that was previously maintained by different systems and different departments or functional areas must be integrated and made available to the company as a whole. Business processes must be tightly integrated, jobs must be redefined, and new procedures must be created throughout the company. (Laudon and Laudon, 2000)

ERP systems purport to replace legacy systems based on outdated mainframe technology and function-specific cobol-coded software. But the legacy systems that must be replaced are the primary control systems of the organization. Typical legal systems contain millions of lines of code in thousands of computer programs. Employees use and rely on these systems everyday, as well as customers and suppliers. The prospect of successfully and rapidly transforming the nervous system of the organization, retraining the employees, and redesigning the fundamental business processes, all at once, while carrying on business as usual is remote. The older legacy systems were never designed at a single time; rather, they evolved over decades responding to the needs of the organization. The prospect of replacing these evolved systems with a single new one, and getting it right on the first try is extremely small. (Laudon and Laudon, 2000)

Because of the centrality and size of existing legacy systems, one implementation path is to work around and with existing legacy systems. ERP systems are in modular forms therefore they can be implemented one piece at a time. For instance, human resource modules can be installed first, then finance, then accounting, and then production. This building block approach usually leaves existing legacy systems intact, or worked around, and disruptions to organization life can be localized. Although this building block approach enhances the success rate and survivability ERP efforts, it can also lead to disconnected islands of automation, and increases in the cost and use of middleware programs that connect enterprise

packages to the legacy systems. It simply delays the day when a fully connected ERP emerges. (Laudon and Laudon, 2000)

II.2.1 Critical Success Factors in ERP Implementation

Sum, Ang, Yeo (1997) identified critical success factors in MRP implementation as top management support, project management, education & training, data accuracy, company-wide support, software vendor support.

II.2.1.1 Top Management Support

Top management support in MRP implementation has three main facets: showing interest, providing the necessary resources, and showing leadership. Showing interest entails active involvement on the part of top management. By sitting in meetings and spending more time with the people, top management would have a better idea of the progress and problems faced, and would be in a better position to help resolve them. Top management can also demonstrate its commitment by dropping in at meetings where their presence, though not solicited, would be a morale booster.

Willingness to provide the necessary resources is an indication of top management's commitment to the MRP project. The implementation could be seriously handicapped if some of the critical resources (e.g., people, funds and equipment) are not available (top management may either overlook the problem or be unwilling to provide the resources), Top management should be also be willing to give the people "time"— if necessary, they should free key project members from their usual responsibilities, in particular the project leader, so that they have more time for the implementation project.

Top management is also expected to set the overall direction of the project by formally forming an executive steering committee to track, review and monitor its progress. MRP implementation is an ongoing process and post-implementation changes must be judiciously monitored. Usually, it is the people rather than the technical problems that are the principal causes of failures. Success of any system relies ultimately on its understanding and acceptance by the people. Certainly, top management, through the steering committee, must create an awareness of how successful MRP implementation can contribute to organizational effectiveness.

Finally, top management is capable of providing leadership only if they themselves are convinced of the potential of MRP. They must be role models and be strong believers themselves, having faith in the implementation before they can motivate. (Sum, Ang and Yeo, 1997)

II.2.1.2 Project Management

Companies should have a project management strategy. This means having a formal project team and a formal plan to manage the implementation process. While many companies have formal plans, these plans are usually not followed. The important thing is to execute the plans, and then compare the actual with the planned so that appropriate actions can be taken accordingly. Having a realistic time frame is equally important. If the target completion time is unrealistically short, the pressure to rush things through would result in the implementation being carried out in a haphazard manner. On the other hand, if the implementation dragged on for too long, people would tend to lose faith and / or patience, resulting in low morale.

Conducting periodic project status meetings in which each team member reports progress and problems is an invaluable means for evaluating the progress of the MRP implementation. These meetings also serve as a feedback forum in which members can share with each other the sentiments (both positive and negative) of the people. An effective way in which members can involve the people outside the project team in the MRP implementation is through informal sub-groups. These informal subgroups usually coalesce only if the department's project team representative makes a conscious effort to discuss the MRP implementation issues with key members of the department. Involving key users would help to strengthen their commitment to the MRP system and help in its diffusion process.

Selecting the right project leader is also important. The project leader should champion the project. He should have several qualifications: (1) a good understanding of the organizational needs and the match between these needs and the MRP system, (2) managerial capabilities (as he has to direct and motivate team members), (3) appropriate level of authority to carry out his duties effectively, and (4) communication capabilities. (Sum, Ang and Yeo, 1997)

II.2.1.3 Education and Training

Training should not be limited merely to training the people in their specific areas. Rather, the people should be taught the logic and overall concepts of MRP. In this way, the people can have a better understanding of how their areas are related to other areas within the company. They would then be able to use the system more intelligently-and, hence, more effectively.

In-house training should be preferred since it allows MRP training to be combined with other operational procedures in the company. In-house trainers should play a major role in training as they can better relate the MRP features and capabilities to the actual operational issues facing the organization. Outside consultants/trainers can effectively complement their in-house trainers through their experience and exposure to other MRP users. User manuals on MRP packages should be comprehensible and clear.

The main reason for education and training is to increase the expertise and knowledge level of the people within the company. But education and training is also an important tool that can be employed to influence the attitude of the people. Concept training shows the people why the change (to an MRP system) is necessary, while functional training (specific hands-on training) helps overcome the fear for computers. People at managerial levels have two kinds of fear when MRP is being implemented (the fear that they are computer illiterate, and the fear that they would lose power if manpower is reduced due to computerization), and that education can help overcome such fear. (Sum, Ang and Yeo, 1997)

II.2.1.4 Data Accuracy

The level of data accuracy can be measured as the percentage accuracy of inventory records, bill-of-material (BOM) records, and shop floor control data. Self-discipline is the key to maintaining data integrity. Not only must accuracy levels of individual items be maintained, but there must be an acute awareness of individual accountability for data accuracy. Since the MRP modules are intricately linked to one another, inaccurate data input into one module will adversely affect the functioning of the other modules. (Sum, Ang and Yeo, 1997)

II.2.1.5 Company-wide Support

The human aspect of the MRP implementation can be managed by cultivating trust on the part of the people, who must be given time to “adopt” and accept the system. Formal project milestones are an effective tool to remind the people of the stages of MRP implementation progress. The initial resistance encountered often subsides when benefits materialize and the people begin to look forward to having a higher degree of automation. Besides educating the people on the benefits of MRP, one way to convince them is to show them the benefits. A pilot project may be effective in convincing those who are still sitting on the fence.

Right from the outset of the implementation, it should be clear that making MRP work is a common goal. Every person and department is responsible / accountable for the overall system. An MRP is an integrated company-wide system and the concerted effort of every department and every individual is required to make it work.

It is also important to invest in human resources. Selecting the right people to take on the key roles in the implementation, as well as preparing the people in terms of providing them with the necessary education and training, are important. (Sum, Ang and Yeo, 1997)

II.2.1.6 Suitability of Hardware and Software

MRP system chosen should be easily up-gradable and customizable. There should be continual upgrades incorporating improved features. On the other hand, transition to these upgrades should be possible without undue perturbation to the existing computer system configuration. If each upgrade requires a significantly different computer configuration to run it, then the software is not a suitable candidate for implementation. (Sum, Ang and Yeo, 1997)

II.2.1.7 Software Vendor Support

The lack of software vendor support could seriously impede the MRP implementation process. The vendor should not only be competent in IT, but be knowledgeable in the sector the company operates in as well. Its staff should also possess good interpersonal skills and be able to work with people. Software vendors should be carefully selected since they play a crucial part in shaping the ultimate outcome of the implementation. (Sum, Ang and Yeo, 1997)

III. SURVEY

III.1 SURVEY DESIGN AND APPLICATION

While preparing the survey questions, results of a satisfaction survey which was applied in United Kingdom and published in the article “The MRP/ERP user satisfaction survey 1999” (Tinham, 1999) were taken as reference. The aim of such referencing was to benchmark the results of that survey with the results of our survey. Questions about the success factors and benefits from the ERP system were also added though these topics were not covered in the survey mentioned above. Survey questions are attached in Appendix.

After the survey was prepared, it was converted into html format to place it on the web page and allow the respondents use the internet to transmit their responses. An Access database file was prepared to store the responses and a program was coded to link the survey page with the database file.

The survey, program and database file were located in a Windows2000 server. Link of the survey was e-mailed to 50 firms who have implemented ERP softwares. The responses were collected through the web page and stored in the database file. The response rate was 16%.

The survey was mailed to another 50 firms with a stamped envelope which was addressing the Marmara University Engineering Faculty. The responses rate was 10%. The responses were entered into the computer through the web page. Survey responses are analyzed with MS-Excel spreadsheet program

III.2 SURVEY RESULTS

III.2.1 Part A – General Information

Number of employees in the participating firms who replied the survey were less than 200 staff (50 %), 200-500 staff (25 %) and over 500 staff (25%). (Figure III.1) Revenue figures of the firms were below 30 million USD. Of these firms, 90 percent have ISO 9000 certificate, 50 percent adopt TQM philosophy and their techniques, 40 percent have e-commerce applications.

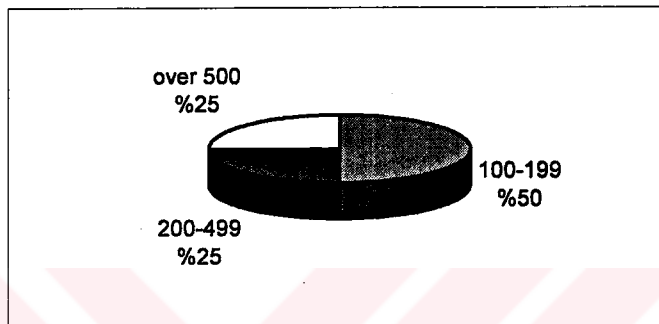


Figure III.1 Number of employees in the firms

III.2.2 Part B – Software Selection

Number of ERP users in the firms were 20 users (50 %), 30 users (25 %) and over 30 users (25%). In the software selection process, 75 percent of the firms made cost-benefit analysis. The most important sources when looking for ERP softwares were ranked as: first, software vendors; second, exhibitions and seminars; third, consultants, fourth IT journals; and others such as software guides and web sites. (Table III.1)

Table III.1 Rank of Information Sources

Rank	Information Sources
1	<i>Software vendors</i>
2	<i>Exhibitions and seminars</i>
3	<i>Consultants</i>
4	<i>IT journals</i>
5	<i>Others</i>

Before the implementation, 81.25 percent of the firms were expecting to implement ERP software within a year-18.8 percent in under six months. While 56.25 percent of the firms achieved to implement within a year, 25 percent of the firms implement in 12-18 months. (Table III.2)

Table III.2 Time Expectation vs. Achievement

Expectations		Achievement	
Duration	Percentage	Duration	Percentage
less than 6 months	18.8%	less than 6 months	33.3%
		6-12 months	66.7%
		12-18 months	-
		more than 18 months	-
6-12 months	62.5%	less than 6 months	10%
		6-12 months	50%
		12-18 months	30%
		more than 18 months	10%
12-18 months	12.5%	less than 6 months	-
		6-12 months	-
		12-18 months	50%
		more than 18 months	50%
more than 18 months	6.2%	less than 6 months	-
		6-12 months	-
		12-18 months	-
		more than 18 months	100%

Before the implementation, 50 percent of the firms were expecting cost of implementation less than 25% of the original hardware and software price, 25 percent of the firms were expecting cost of implementation in the range of 25-99% of the original hardware and software. 25 percent of the firms did not give response to the question about the cost of implementation. Actual implementation cost of 50 percent of the firms was less than 25% of the original hardware and software price. Actual implementation cost of 25 percent of the firms was in the range of 25-49% of the original hardware and software price, while 25 percent of the firms did not give response to the question about the actual cost of implementation. (Table III.3)

Table III.3 Cost Expectation vs. Achievement

Expectation		Achievement	
Cost as percentage of original hardware&software	Percentage	Cost as percentage of original hardware&software	Percentage
less than 25 percent	50%	less than 25 percent	75%
		25% - 49%	12.5%
		50% - 99%	-
		no response	12.5%
25% - 49%	18.8%	less than 25 percent	33.3%
		25% - 49%	66.7%
		50% - 99%	-
		no response	-
50% - 99%	6.2%	less than 25 percent	-
		25% - 49%	100%
		50% - 99%	-
		no response	-
no response	25%	less than 25 percent	25%
		25% - 49%	-
		50% - 99%	-
		no response	75%

III.2.3 Part C – Training and Services

III.2.3.1 Implementation Services

In this part, the users were asked about the importance and satisfaction of a range implementation services. Importance of the services was evaluated in a scale of 1 to 10, where 10 is very important. Users evaluated their suppliers' performance in a scale of 1 to 10, where 10 is very satisfied.

Supporting training programs and understanding of the users' business are at top of the importance ranking, followed by problem solving skills, project management skills, then, rated equally, software package expertise and technical IT skills. Next, and equally rated, were keeping to deadlines and overall project duration. Cost of implementation is at the bottom. Contrary to popular belief project time is a long way down users' concerns. (Figure III.2)

Gap analysis was carried to compare the importance evaluation of the users with their perceptions of the suppliers' performance. Gap is defined as the percentage of the difference between users' importance evaluation and their perceptions of the suppliers' performance on their importance evaluation.

The biggest gaps between users' perceptions of their suppliers' performance and that desired are in the areas they see as very important. Suppliers' training

programs was 38% down on users' expectations. Project management was 37% under-performance. Areas which users evaluated the performance as best, expertise in software and overall project duration were about 20% under-performance. (Figure III.2)

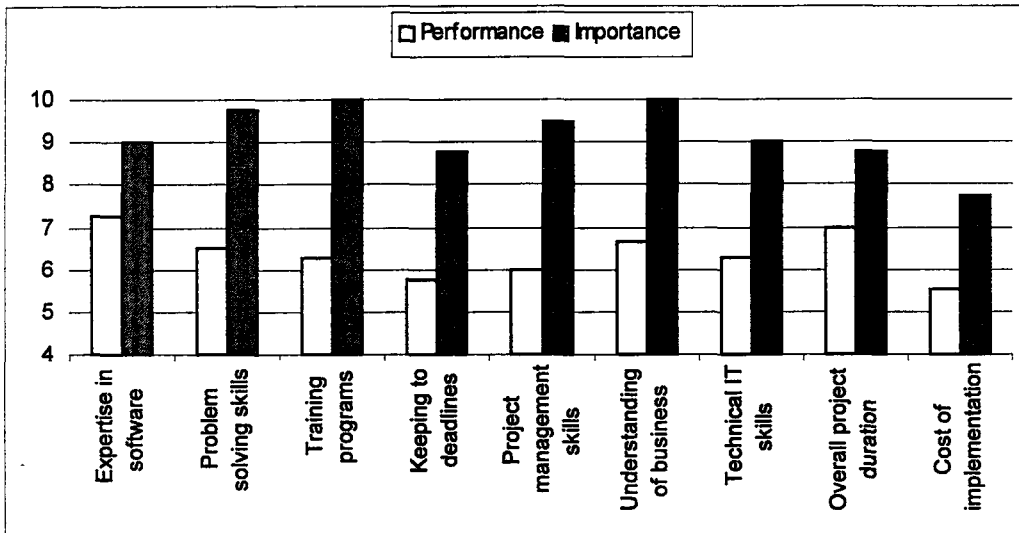


Figure III.2 Implementation Services_importance vs. performance

The comparison shows that Turkish users' gaps are quite greater than British users' gaps in the areas which British users' gaps are biggest. (Figure III.3)

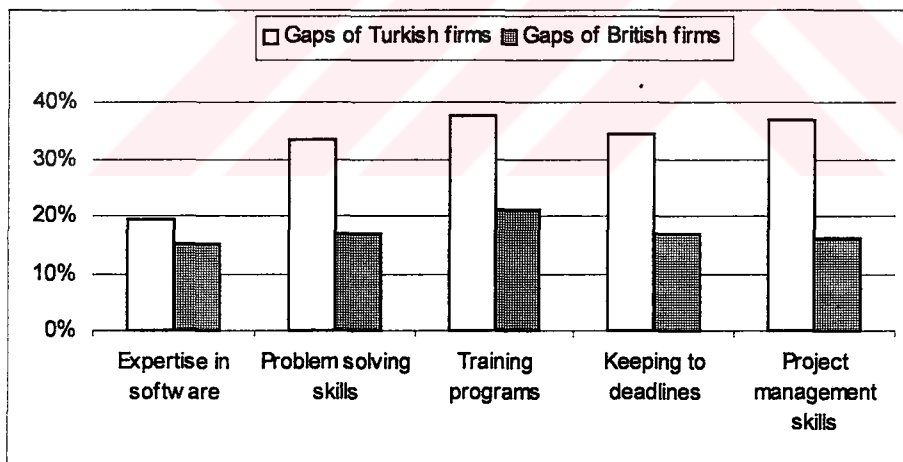


Figure III.3 Comparison of Gaps in Implementation Services

III.2.3.2 Training

All users bought supplier training geared specifically to their own processes. While 87.5 percent of users felt they were sold the amount of training they needed, 12.5 percent of users felt they didn't have enough training. As for users' satisfaction, on a scale of 1 to 10, where 10 is very satisfied, the relationship between staff and

trainers 8, technical application knowledge 6.5, availability of the trainer when needed 6.25 and their business knowledge 6.75. (Table III.4)

Table III.4 Satisfaction from Training

	Satisfaction
Relationship between staff and trainers	8
Technical application knowledge	6.5
Availability of trainer when needed	6.25
Trainer's business knowledge	6.75

III.2.3.3 Support Services

Users were asked to rank the importance of support services. Staff competence were at top of the importance ranking followed by helpdesk service, speed of problem solving, ease of reaching the right person-all equally important. Then followed commitment to the project, training services, business consultancy services, courtesy of staff and bottom of the ranking, 24 hours / 7 day service. (Figure III.4)

The biggest gaps between users' perceptions of performance and that desired are in the areas they see as very important. The gap between users' expectations and actual performance was 38% on speed of problem solving, 36% on helpdesk service, 35% on staff competence, 33% on ease of reaching the right person, and 32% on commitment to the project. Courtesy of staff was evaluated as best and almost fully met the desired level. (Figure III.4)

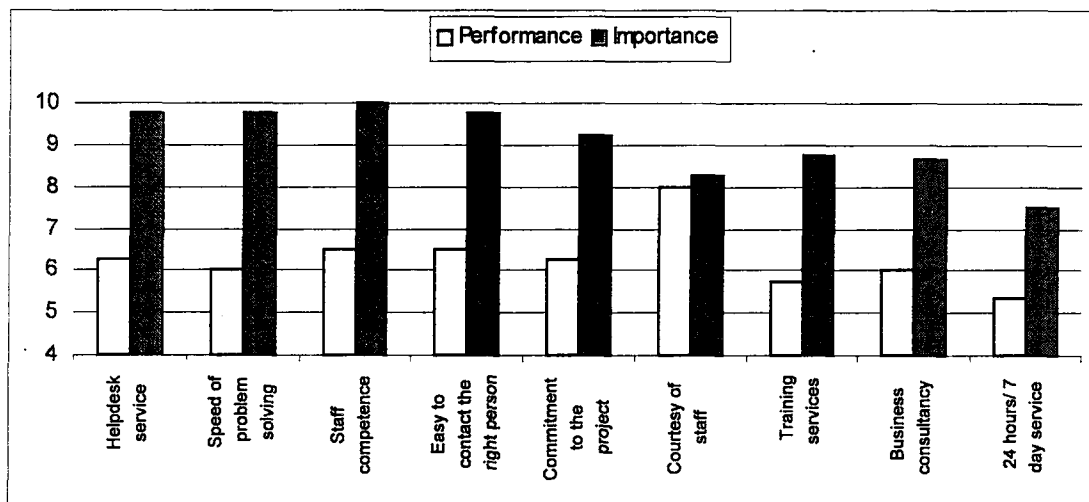


Figure III.4 Support Services_importance vs. performance

When we compare the gaps of Turkish users and British users in the areas which British users evaluated as very important in support services , it is seen that Turkish users' gaps are quite greater than British users' gaps. (Figure III.5)

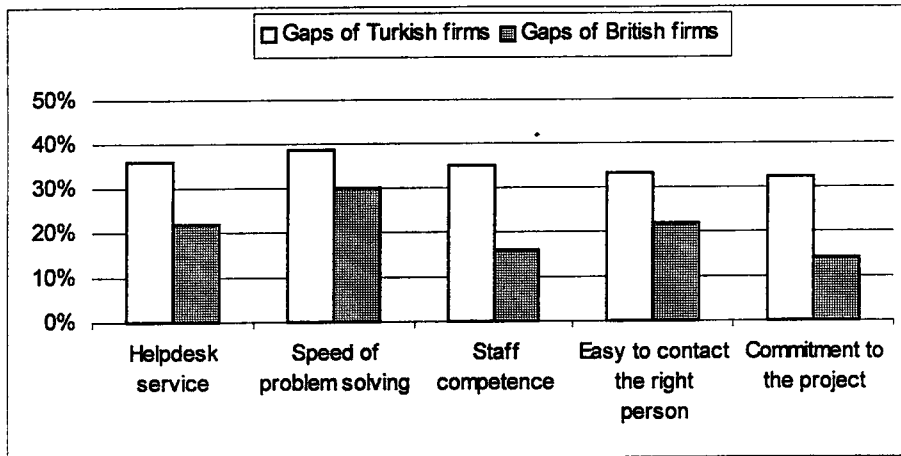


Figure III.5 Comparison of Gaps in Support Services

III.2.3.4 Custom Programming

In this part, the users were asked to rank the importance of custom programming services, and how well their providers performed against those rankings. At top of the importance list was technical competence of programmers followed by custom code to interface well with the core system, ability to meet deadlines, ease of use and programmer's understanding of the business. Next, and equally rated, were delivery of software which meet the requirements, easily maintained upgrade path and cost of the programming. (Figure III.6)

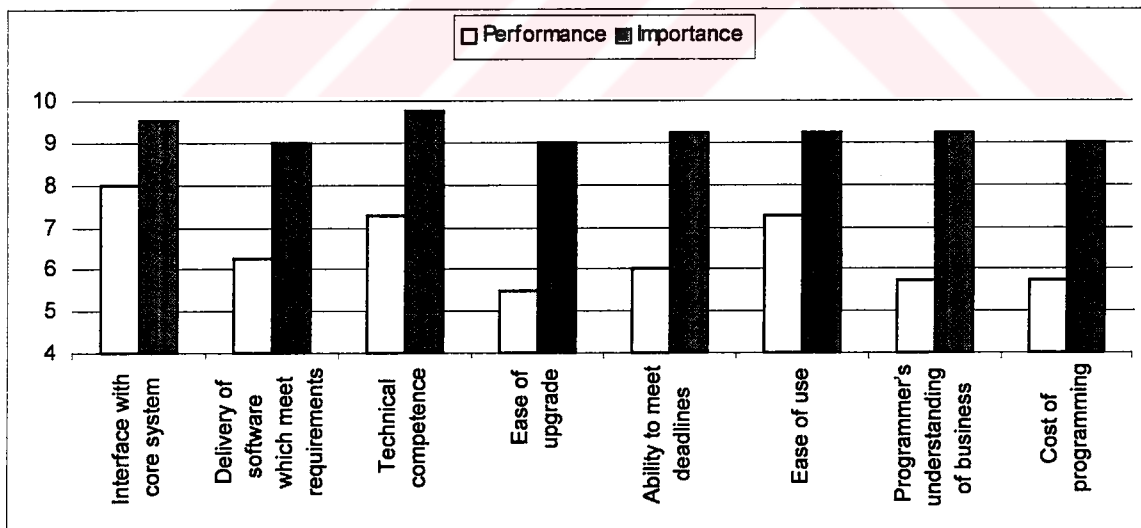


Figure III.6 Custom Programming_importance vs. performance

The gap between users' expectations and actual performance was 39% on easily maintained upgrade path, 38% on programmer's understanding of the business, 35% on ability to meet the deadlines, 31% on delivery of software which meet the requirements. (Figure III.6)

Comparison of the Turkish users' gaps and British users' gaps in custom programming services reveals that Turkish users' gaps are quite greater than British users'. (Figure III.7)

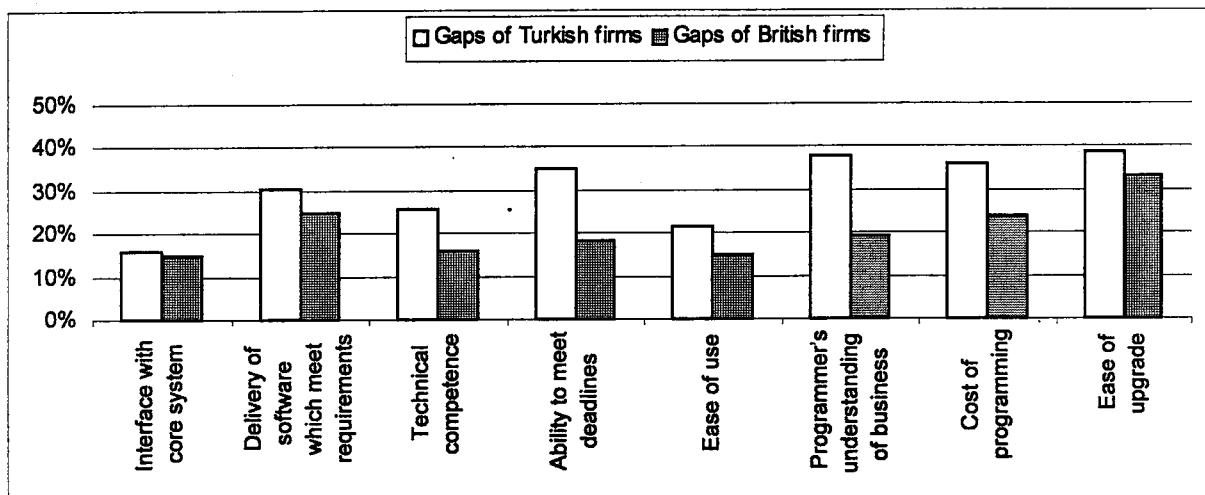


Figure III.7 Comparison of Gaps in Custom Programming

III.2.4 Part D – ERP Software

III.2.4.1 Features of ERP Software

In this part, the users were asked “ How important are the features of ERP systems to you?” and “How well does their ERP software perform?” All features are ranked as important. Robustness/reliability and ability to grow system as the business changes were at top of the importance ranking, followed by suitability to business and ease of adaptation to meet changing business processes. Next, and equally rated, were software functionality, ease of use, reports/data access and purchase cost. Running cost was also rated as important. (Figure III.8)

The gap between users' expectations and actual performance was 34% on purchase cost, 33% on ease of adaptation to meet changing business processes, 32% on access to reports/data, 30% on running cost, 26% on ease of use, and 21% on suitability of software. (Figure III.8)

The comparison shows that Turkish users' gaps in the areas-ease of use, access to reports/data, ease of adaptation to meet changing business processes and suitability to business-are greater than British users' gaps. (Figure III.9)

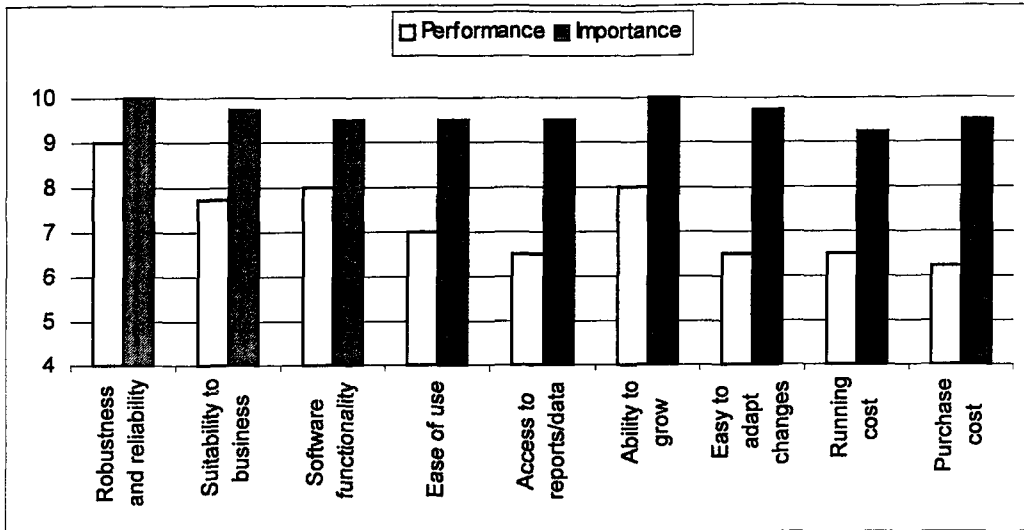


Figure III.8 Features of ERP Software_importance vs. performance

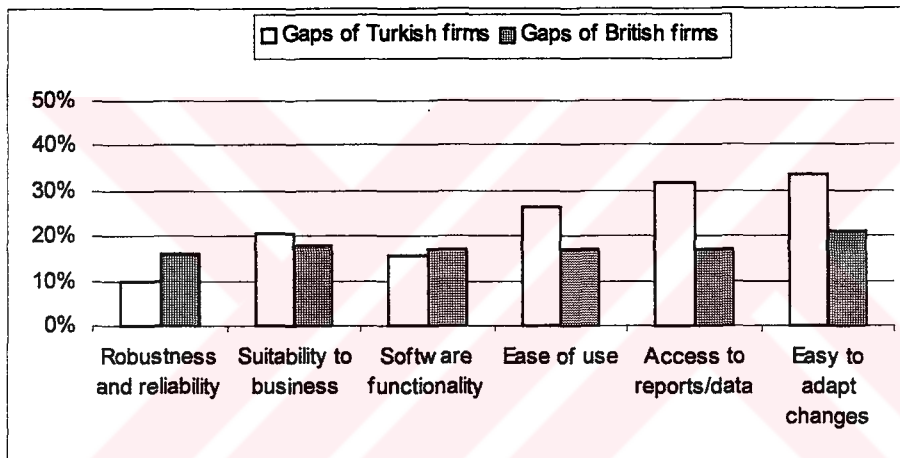


Figure III.9 Comparison of Gaps in Features of ERP Software

III.2.4.2 ERP Modules

All the firms who participated the survey have purchase orders processing; sales order processing; stock control and inventory management; and financials modules. Warehousing, distribution and logistics; MRP/MPS and manufacturing schedule; and workflow module users are 75% of the firms. Payroll and personnel module users are 37.5% of the firms. Only 25% of the firms use service and maintenance module.

As for users' satisfaction about the modules installed, on a scale of 1 to 10, where 10 is very satisfied, MRP/MPS and manufacturing scheduling scored 9, warehousing, distribution and logistics 8.5, stock control and inventory management,

and financials 7.75, and the workflow 7.67. Then sales order processing rated 7.25, purchase orders processing 7 and service/maintenance 6 out of 10. (Figure III.10)

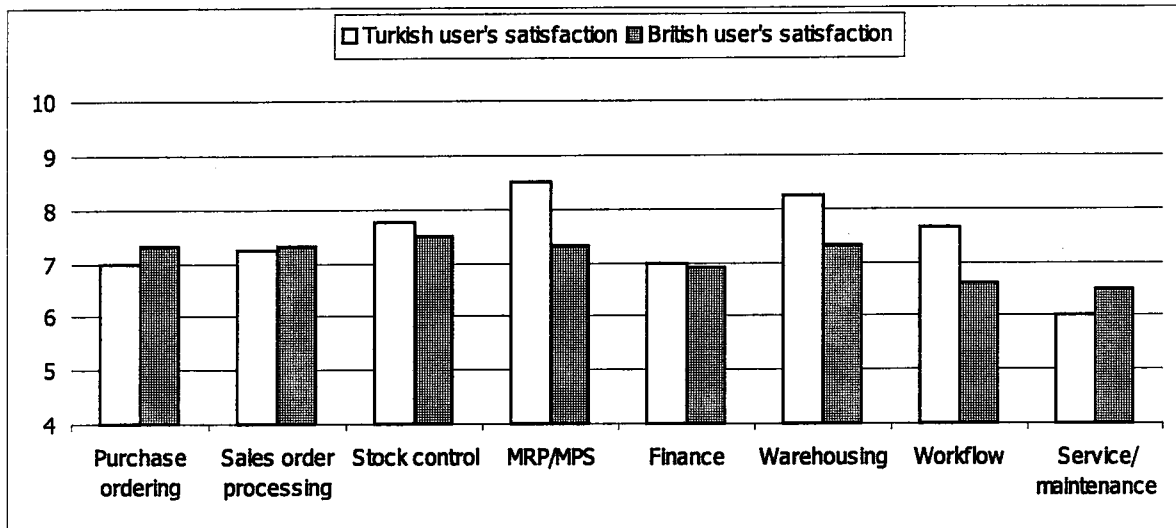


Figure III.10 Comparison of Satisfaction Levels of ERP Modules

Comparison of the satisfaction levels of British users and Turkish users about the ERP modules installed reveals that Turkish users are more satisfied with the MRP/MPS and manufacturing scheduling module; warehousing, distribution and logistics module; and workflow module. (Figure III.10)

III.2.5 Part E – Success Factors

In this part, the users were asked about the importance of success factors in ERP implementation, and the performance measures related to these factors. All success factors are ranked as important. Project management was at top of the importance ranking, followed by education and training, company wide support and suitability of software. Next, and equally rated, were top management support, data accuracy and software vendor support. Suitability of hardware was also rated as important. (Figure III.11)

When the users' performance evaluation about these factors are analyzed, it is seen that there is lack of top management support and company wide support despite they were evaluated as important for the success of the ERP implementation. The other big gaps between the importance and performance are in software vendor support and suitability of software. (Figure III.11)

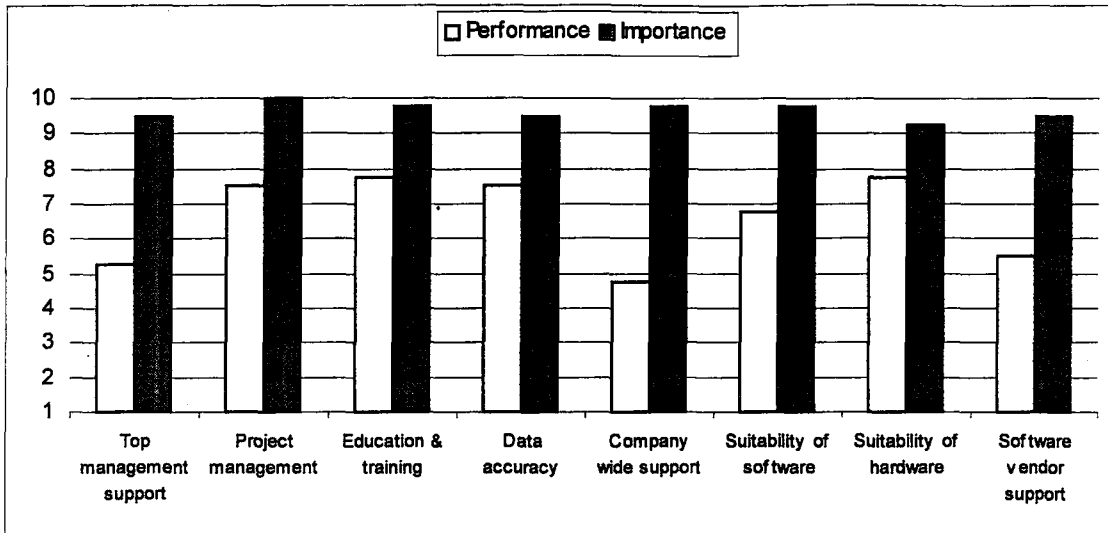


Figure III.11 Success Factors_importance vs. performance

III.2.5.1 Benefits of ERP

In this part, the users were asked for the benefits of ERP systems. Benefits are rated on a scale of 1 to 10, where 10 denotes the full utilization of the benefit. Firms benefit from better production scheduling, increase in on-time deliveries, reduced inventory levels, elimination of redundant data and operations and improved productivity. (Figure III.12)

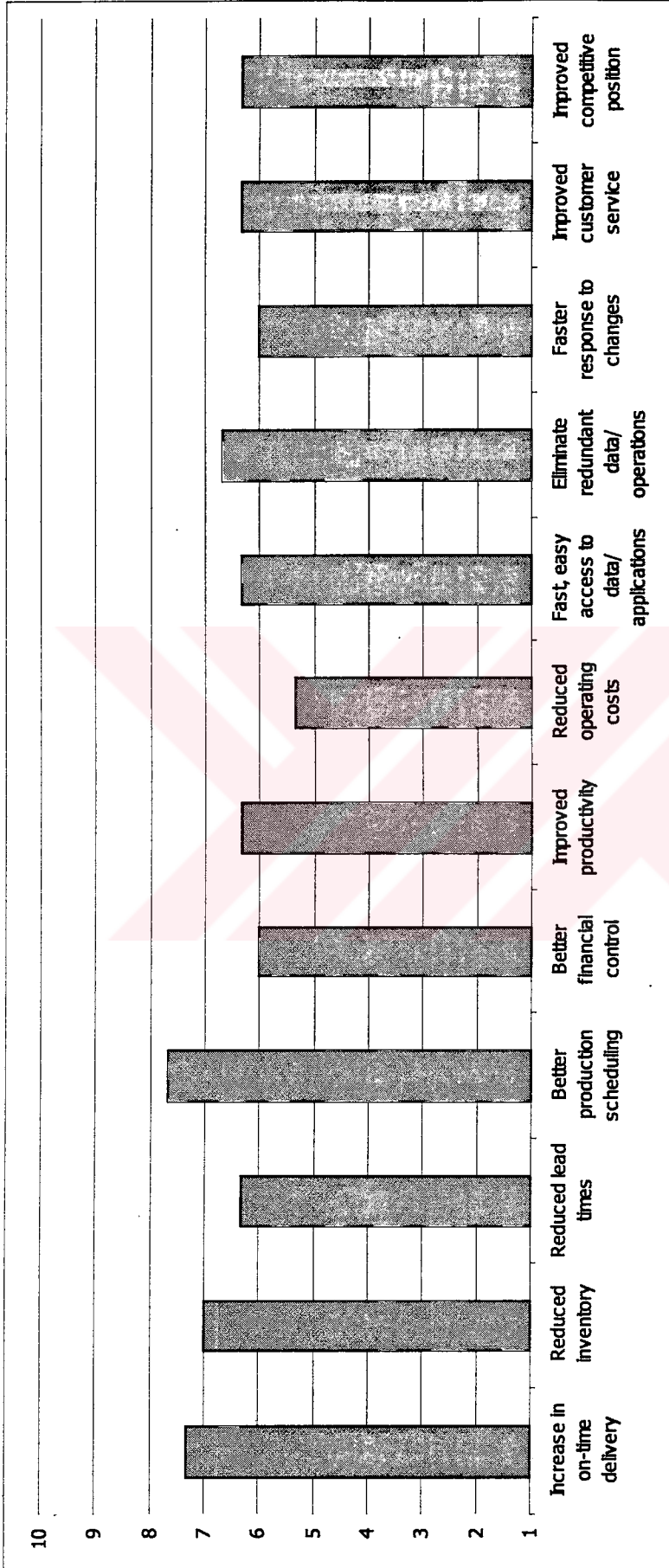


Figure III.12 Benefits of ERP

IV. A CLOSE LOOK AT TWO ACTUAL IMPLEMENTATION PROJECTS

ERP implementation projects of two firms that are operating in Turkey are analyzed in this section. Both firms selected the same ERP software (MFG/Pro) for implementation. Implementation and support services have been supplied by the same software vendor to both firms. One of the firms managed to install ERP in 6 months. The other firm started the implementation project in early 1999, it was expected that the project would be finished within a year, but it was still continuing in December 2001. Names of the firms are withheld to protect privacy.

IV.1 IMPLEMENTATION PROJECT OF FIRM A

IV.1.1 Part A – General Information

Operating in Sectors	: Tourism, textile, food, finance, energy and construction
Number of employees	: 800
ISO 9000 Certification	: Available
TQM adoption	: Adopted
E-commerce application	: NA
CRM application	: NA
SCM application	: NA

IV.1.2 Part B – Software Selection

ERP software	: MFG/Pro
Number of ERP users	: 30
Start of implementation	: February, 1999

In the software selection process, Firm A did not make cost-benefit analysis, it get information on software from software vendors, IT journals, exhibitions and

seminars. It tested 4 different ERP softwares and decided to implement MFG/Pro software of QAD Inc.

Before the implementation, the firm was expecting to implement ERP software within a year. It achieved to implement within 6 months. Before the implementation, it was expecting cost of implementation less than 25% of the original hardware and software price. Actual cost figures reveal that expectations about the costs were realized.

IV.1.3 Part C – Training and Services

IV.1.3.1 Implementation Services

In this part, the firm was asked about the importance and satisfaction of implementation services. All implementation service areas were evaluated as very important, 10 out of 10. (Table IV.1)

Table IV.1 Implementation Services_importance vs. performance : Firm A

	Importance*	Performance*	Gap
<i>Expertise in software</i>	10	10	0%
<i>Problem solving skills</i>	10	8	20%
<i>Training programs</i>	10	5	50%
<i>Keeping to deadlines</i>	10	10	0%
<i>Project management skills</i>	10	8	20%
<i>Technical IT skills</i>	10	6	40%
<i>Overall project duration</i>	10	10	0%
<i>Cost of implementation</i>	10	10	0%

*Scale of 10

The gap between the firm’s expectations and actual performance was 50% on training programs, 40% on technical IT skills, 20% on problem solving and project management. Expertise in software, keeping to deadlines, project duration and cost of implementation were evaluated as best performance. (Table IV.1)

IV.1.3.2 Training

Firm A bought supplier training geared specifically to its own processes. It felt that it was sold the amount of training it needed. As for the firm’s satisfaction, on a scale of 1 to 10, where 10 is very satisfied, the relationship between staff and trainers 8, technical application knowledge 8, availability of the trainer when needed 5 and their business knowledge 8.

IV.1.3.3 Support Services

The firm was asked to rank the importance of support services. Helpdesk service, speed of problem solving, staff competence, ease of reaching the right person and courtesy of staff were rated as very important. Management of upgrades, commitment to the project, training services, disaster recovery support, training services, business consultancy services were rated as important. (Table IV.2)

Table IV.2 Support Services_importance vs. performance: Firm A

	Importance*	Performance*	Gap
<i>Helpdesk service</i>	10	6	40%
<i>Speed of problem solving</i>	10	5	50%
<i>Staff competence</i>	10	6	40%
<i>Easy to contact the right person</i>	10	6	40%
<i>Commitment to the project</i>	7	6	14%
<i>Management of upgrades</i>	8	6	25%
<i>Courtesy of staff</i>	9	7	22%
<i>Training services</i>	7	6	14%
<i>Disaster recovery</i>	7	6	14%
<i>Business consultancy</i>	7	6	14%
<i>24 hours/ 7 day service</i>	5	6	-20%

*Scale of 10

The biggest gap between user's perceptions of performance and that desired are in the areas that were seen as very important. The gap between the firm's expectations and actual performance was 50% on speed of problem solving, 40% on helpdesk service, staff competence and ease of reaching the right person. Performance evaluation for 24 hours / 7 day service exceeded the desired level. (Table IV.2)

IV.1.3.4 Custom Programming

In this part, the firm was asked to rank the importance of custom programming services, and how well its providers performed against those rankings. Technical competence of programmers, ability to meet deadlines, ease of use, programmer's understanding of the business and cost of the programming were rated as very important. Easily maintained upgrade path, custom code interface well with the core system, and delivery of software which meet the requirements were rated as important. (Table IV.3)

Table IV.3 Custom Programming_importance vs. performance: Firm A

	Importance*	Performance*	Gap
<i>Technical competence of programmers</i>	10	8	20%
<i>Ability to meet deadlines</i>	10	7	30%
<i>Ease of use</i>	10	6	40%
<i>Programmer's understanding of business</i>	10	6	40%
<i>Cost of programming</i>	10	5	50%
<i>Ease of upgrade</i>	8	6	25%
<i>Interface with core system</i>	7	7	0%
<i>Delivery of software which meet requirements</i>	7	5	29%

*Scale of 10

The gap between the firm's expectations and actual performance was 50% on cost of programming, 40% on programmer's understanding of the business and ease of use, 30% on ability to meet deadlines, and 29% on delivery of software which meet the requirements. (Table IV.3)

IV.1.4 Part D – ERP Software

IV.1.4.1 Features of ERP Software

In this part, the firm was asked for how important features of ERP systems were to them, and how well the software performed. Robustness/reliability, suitability to business, ability to grow system as the business changes and ease of adaptation to meet changing business processes were rated as very important. Next, and equally rated, were software functionality, ease of use, reports/data access, purchase and running cost. (Table IV.4)

Table IV.4 Features of ERP Software_importance vs. performance: Firm A

	Importance*	Performance*	Gap
<i>Robustness and reliability</i>	10	9	10%
<i>Suitability to business</i>	10	7	30%
<i>Ability to grow</i>	10	7	30%
<i>Easy to adapt changes</i>	9	6	33%
<i>Software functionality</i>	8	7	13%
<i>Ease of use</i>	8	5	38%
<i>Access to reports/data</i>	8	6	25%
<i>Running cost</i>	8	6	25%
<i>Purchase cost</i>	8	7	13%

*Scale of 10

The gap between the firm's expectations and actual performance was 38% on ease of use, 33% on ease of adaptation to meet changing business processes, 30% on

ability to grow system as the business changes and suitability to business, and 25% on reports/data access and running cost. (Table IV.4)

IV.1.4.2 ERP Modules

Firm A has implemented purchase orders processing; sales order processing; stock control and inventory management; MRP/MPS, production scheduling; financials; workflow; and warehousing, distribution and logistics modules.

As for user’s satisfaction about the modules installed, on a scale of 1 to 10, where 10 is very satisfied, MRP/MPS production scheduling, finance, and warehousing, distribution and logistics scored 8, sales order processing, workflow, and stock control and inventory management 7 and purchase order processing 6. (Table IV.5)

Table IV.5 Satisfaction from ERP Modules: Firm A

	Satisfaction*
<i>Purchase order processing</i>	6
<i>Sales order processing</i>	7
<i>Stock control & inventory management</i>	7
<i>MRP/MPS production scheduling</i>	8
<i>Finance *</i>	8
<i>Workflow</i>	7
<i>Warehousing, distribution & logistics</i>	8

*Scale of 10

IV.1.5 Part E – Success Factors

In this part, the firm was asked about the importance of success factors in ERP implementation, and about the performance measures related to these factors. All success factors were rated as very important, 10 out of 10. Table IV.6)

Table IV.6 Success Factors_importance vs. performance: Firm A

	Importance*	Performance*	Gap
<i>Top management support</i>	10	3	70%
<i>Project management</i>	10	6	40%
<i>Education & training</i>	10	6	40%
<i>Data accuracy</i>	10	7	30%
<i>Company wide support</i>	10	3	70%
<i>Suitability of software</i>	10	7	30%
<i>Suitability of hardware</i>	10	7	30%
<i>Software vendor support</i>	10	5	50%

*Scale of 10

When the performance evaluation of these factors are analyzed, it is seen that there is lack of top management support and company wide support despite they were evaluated as very important for the success of the ERP implementation. The other big gaps between the importance and performance are in software vendor support, project management, education and training. (Table IV.6)

IV.1.5.1 Benefits of ERP

In this part, the firm was asked for the benefits of ERP systems. Benefits are rated on a scale of 1 to 10, where 10 denotes the full utilization of the benefit. Firm A benefit from increase in on-time delivery rates, reduced lead time, and elimination of redundant data and operations. (Table IV.7)

Table IV.7 Benefits of ERP: Firm A

	Benefit rate*
<i>Increase in on-time delivery</i>	7
<i>Reduced inventory</i>	6
<i>Reduced lead times</i>	7
<i>Better production scheduling</i>	6
<i>Better financial control</i>	4
<i>Improved productivity</i>	5
<i>Reduced operating costs</i>	5
<i>Fast, easy access to data / applications</i>	6
<i>Eliminate redundant data / operations</i>	7
<i>Faster response to changes</i>	5
<i>Improved customer service</i>	5
<i>Improved competitive position</i>	6

*Scale of 10

IV.2 IMPLEMENTATION PROJECT OF FIRM B

IV.2.1 Part A – General Information

Operating in Sectors	: Construction and mining
Number of employees	: 100
ISO 9000 Certification	: Available
TQM adoption	: NA
E-commerce application	: NA
CRM application	: NA
SCM application	: NA

IV.2.2 Part B – Software Selection

ERP software	: MFG/Pro
Number of ERP users	: 20
Start of implementation	: January, 1999

In the software selection process, Firm B made cost-benefit analysis, and get information on software from software vendors It decided to implement MFG/Pro software of QAD Inc.

Before the implementation, the firm was expecting to implement ERP software within a year. However, the implementation process did not finish by December 2001. Before the implementation, it was expecting cost of implementation in range 50-99 percent of the original hardware and software price. Actual cost figures were in the range 25-49 percent of the original hardware and software price.

IV.2.3 Part C – Training and Services

IV.2.3.1 Implementation Services

In this part, the firm was asked about the importance and satisfaction of implementation services. Expertise in software, problem solving skills, training programs, understanding of the business and technical IT skills were rated as very important, 10 out of 10. Project management skills, keeping to deadlines, overall project duration and cost of implementation were also rated as important. (Table IV.8)

Table IV.8 Implementation Services_importance vs. performance: Firm B

	Importance*	Performance*	Gap
<i>Expertise in software</i>	10	5	50%
<i>Problem solving skills</i>	10	4	60%
<i>Training programs</i>	10	4	60%
<i>Understanding of business</i>	10	4	60%
<i>Technical IT skills</i>	10	5	50%
<i>Project management skills</i>	8	4	50%
<i>Keeping to deadlines</i>	8	1	88%
<i>Overall project duration</i>	8	1	88%
<i>Cost of implementation</i>	8	1	88%

*Scale of 10

Gap analysis interprets that the service supplier's performance was very much below the expectations. The gap between the firm's expectations and actual performance was 88% on keeping to deadlines, overall project duration and cost of implementation, 60% on problem solving skills, training programs, understanding of the business. The gap was 50% on expertise in software, technical IT skills and project management skills. (Table IV.8)

IV.2.3.2 Training

Firm A bought supplier training geared specifically to its own processes. It felt that it was sold the amount of training it needed. As for user's satisfaction, on a scale of 1 to 10, where 10 is very satisfied, the relationship between staff and trainers 6, technical application knowledge 6, availability of the trainer when needed 7 and their business knowledge 6.

IV.2.3.3 Support Services

The firm was asked to rank the importance of support services. Helpdesk service, speed of problem solving, staff competence, ease of reaching the right person, commitment to the project, and disaster recovery support were rated as very important. Management of upgrades, courtesy of staff, training services, training services and 24 hours / 7 day service were rated as important. (Table IV.9)

Table IV.9 Support Services_importance vs. performance: Firm B

	Importance*	Performance*	Gap
<i>Helpdesk service</i>	10	6	40%
<i>Speed of problem solving</i>	10	5	50%
<i>Staff competence</i>	10	5	50%
<i>Easy to contact the right person</i>	10	5	50%
<i>Commitment to the project</i>	10	3	70%
<i>Disaster recovery</i>	10		
<i>Management of upgrades</i>	8		
<i>Courtesy of staff</i>	8	10	-25%
<i>Training services</i>	8	5	38%
<i>24 hours/ 7 day service</i>	7		

*Scale of 10

The gap between the firm's expectations and actual performance was 70% on commitment to the project, 50% on speed of problem solving, staff competence and ease of reaching the right person, 40% on helpdesk service, 38% on training services. Courtesy of staff exceeded the expectations. Disaster recovery support, management of upgrades and 24 hours / 7 day service areas could not be evaluated since these services were not delivered. (Table IV.9)

IV.2.3.4 Custom Programming

In this part, the firm was asked to rank the importance of custom programming services, and how well its providers performed against those rankings. All custom programming areas were evaluated as very important, 10 out of 10. (Table IV.10)

The gap between the firm's expectations and actual performance was 90% on ability to meet deadlines, 70% on programmer's understanding of the business, 60% on delivery of software which meet requirements, and 50% on cost of programming. Custom code interface with core system performance matched with the expectations. (Table IV.10) Since upgrade service was not delivered, its performance could not be evaluated.

Table IV.10 Custom Programming_importance vs. performance : Firm B

	Importance*	Performance*	Gap
<i>Interface with core system</i>	10	10	0%
<i>Delivery of software which meet requirements</i>	10	4	60%
<i>Technical competence</i>	10	7	30%
<i>Ease of upgrade</i>	10		
<i>Ability to meet deadlines</i>	10	1	90%
<i>Ease of use</i>	10	9	10%
<i>Programmer's understanding of business</i>	10	3	70%
<i>Cost of programming</i>	10	5	50%

*Scale of 10

IV.2.4 Part D – ERP Software

IV.2.4.1 Features of ERP Software

In this part, the firm was asked for how important features ERP systems were to them, and how well the software performed. All features of ERP systems were rated as very important, 10 out of 10. (Table IV.11)

TableIV.11 Features of ERP Software_importance vs. performance: Firm B

	Importance*	Performance*	Gap
<i>Robustness and reliability</i>	10	8	20%
<i>Suitability to business</i>	10	5	50%
<i>Software functionality</i>	10	10	0%
<i>Ease of use</i>	10	5	50%
<i>Access to reports/data</i>	10	3	70%
<i>Ability to grow</i>	10		
<i>Easy to adapt changes</i>	10	3	70%
<i>Running cost</i>	10	3	70%
<i>Purchase cost</i>	10	3	70%

*Scale of 10

The gap between the firm's expectations and actual performance was 70% on reports/data access, ease of adaptation to meet changing business processes, running and purchase cost. The gap was 50% on suitability to business and ease of use. (Table IV.11)

IV.2.4.2 ERP Modules

Firm B has implemented purchase orders processing; sales order processing; stock control and inventory management; financials; service and maintenance; payroll and personnel; workflow; warehousing, distribution and logistics modules.

As for user's satisfaction about the modules installed, on a scale of 1 to 10, where 10 is very satisfied, workflow, warehousing, distribution and logistics scored 8, finance, and stock control and inventory management 6, purchase and sales order processing, and service/maintenance 4, and payroll/personnel 1. (Table IV.12)

TableIV.12 Satisfaction from ERP Modules: Firm B

	Satisfaction*
<i>Purchase order processing</i>	4
<i>Sales order processing</i>	4
<i>Stock control & inventory management</i>	6
<i>Finance</i>	6
<i>Warehousing, distribution & logistics</i>	8
<i>Workflow</i>	8
<i>Payroll/personnel</i>	1
<i>Service/ maintenance</i>	4

***Scale of 10**

IV.2.5 Part E – Success Factors

In this part, the firm was asked about the importance of success factors in ERP implementation, and about the performance measures related to these factors. Top management support, project management, education and training, company wide support, suitability of software, software vendor support were rated as very important. Suitability of hardware is also rated as important. (Table IV.13)

TableIV.13 Success Factors_importance vs. performance: Firm B

	Importance*	Performance*	Gap
<i>Top management support</i>	10	6	40%
<i>Project management</i>	10	6	40%
<i>Education & training</i>	10	9	10%
<i>Company wide support</i>	10	2	80%
<i>Suitability of software</i>	10	4	60%
<i>Software vendor support</i>	9	4	56%
<i>Data accuracy</i>	9	6	33%
<i>Suitability of hardware</i>	8	7	13%

***Scale of 10**

When the performance evaluation of these factors are analyzed, it is seen that there is lack of company wide support despite it was evaluated as very important for the success of the ERP implementation. The other big gaps between the importance and performance are in suitability of software, software vendor support, top management support, and project management. (Table IV.13)

IV.2.5.1 Benefits of ERP

In this part, the firm was asked for the benefits of ERP systems. Since the implementation process is continuing, such benefits could not be identified by the firm

IV.3 COMPARISON OF THE IMPLEMENTATION PROJECTS OF FIRM A AND FIRM B

IV.3.1 Implementation Services

Gap analysis interprets that the service supplier's performance was very much below the expectations for Firm B, while the service supplier's performance was evaluated as satisfactory by Firm A. Training programs and technical IT skills were evaluated as low by both firms.

IV.3.2 Training

Both firms bought supplier training geared specifically to their own processes. Both firms felt that they were sold the amount of training they needed.

IV.3.3 Support Services

Both firms evaluated the support service performance as low. Commitment to project was evaluated as low by Firm B, while Firm A evaluated it as satisfactory.

IV.3.4 Custom Programming

Delivery of software which meet requirements was evaluated as low both firms. Ability to meet deadlines was evaluated as very low by Firm B, while Firm A evaluated it as quite satisfactory. The gap between the expectations and actual performance was 50% on cost of programming for both firms.

IV.3.5 ERP Software

Firm A think that the ERP software was suitable to its business, while Firm B think that the ERP software is not quite suitable to its business. Firm B has problems with report/data access. Both firms evaluated ease of using the software as low.

IV.3.6 Modules

Firm A is satisfied with sales and purchase order processing module while Firm B is not satisfied with it. Both firms are satisfied with warehousing, distribution and logistics, and workflow modules. In addition, Firm A is satisfied with stock control and inventory management, and finance modules.

IV.3.7 Success Factors

Both firms suffer from lack of company-wide support. Software vendor support was 50% down on expectations for Firm A. Software vendor support was 56% down on expectations for Firm B. Firm A thinks that top management support is important, however top management does not support them in the project. Firm B thinks that software is not suitable for its processes.



V. CONCLUSIONS

An ERP system is an enterprise wide information system that integrates all aspects of a business. It promises one database, one application and a unified interface across the entire enterprise. (Bingi, Godla and Sharma, 1999) Significant benefits such as better production scheduling, reduced inventory, reduced costs, improved customer service can accrue from the successful implementation of ERP systems.

Installing a new system such as ERP is a major change for an organization. Besides representing major investments, unsuccessful implementation would compromise the organization's effectiveness because changes made in organizational procedures, discipline, and focus would be difficult to reverse. Therefore, ERP implementation is a critical stage that has to be properly managed. (Sum, Ang and Neo, 1997)

Software vendor support is a critical success factor in ERP implementation. (Sum, Ang and Yeo, 1997) The survey results reveal that the respondents evaluated the implementation and support services provided by software vendors as important. However, the actual performance of the software vendors providing the services were graded low by the firms. Although the software expertise of the vendors is appreciated, training programs, problem solving and project management skills were evaluated as unsatisfactory. These results indicate the importance of software selection process. Companies that are willing to implement ERP should make a detailed analysis about the software vendors as well as the ERP package.

Company-wide support and top management support are also defined as critical success factors. (Sum, Ang and Yeo, 1997) The respondents rated top management and company-wide support as important in ERP implementation. However, the actual performance were rated low. Reason of low grades of top management performance is generally due to lack of showing interest and leadership on implementation. Reason behind the low grades of company-wide support is lack of a common vision on the ERP system and lack of a general concept of how ERP

work. A company that will implement ERP should scrutinize these issues and should consider the followings:

- It should review several softwares for the selection of the ERP software. Benchmarking the ERP applications of the companies operating in the same sector could be useful.
- After the selection of the software and the vendor, it should form a project team for the implementation. The team should consist of users and software consultants. The key project members should be free from their usual responsibilities.
- The project team should utilize project management techniques and conduct periodic meetings to follow up the progress in the project.
- An executive steering committee should be formed. The steering committee should track, review and monitor the progress in the project by requesting reports from the project team.
- Employees should be educated about general concept of how ERP work and benefits of ERP systems, before formal training about the software.
- In-house training should be preferred, since in-house trainers can better relate the ERP features to the actual operations.

Gaps between the importance and performance ratings were benchmarked with the results obtained from a survey conducted in United Kingdom. (Tinhnam, 1999) The benchmark results reveal that gaps in implementation and support services of Turkish companies are quite greater than British companies. Although the Turkish companies' expectations from software vendors are higher, performances of software vendors serving Turkish companies were below British software vendors. Comparison of the implementation projects shows that performance of the software vendors varies according to the firms. The software vendors should take the following issues into consideration.

- The software vendors should prepare orientation programs about the software for their new employees.
- They should provide their employees with training programs to improve their training skills.
- They should also train their employees about project management skills.
- They should standardize the consulting and training processes.

Summarizing, ERP systems are large and complex systems and warrant a careful planning and execution of their implementation. How a company implements an ERP system determines whether it creates a competitive advantage or becomes a corporate headache. The top contributor for a successful ERP implementation is strong commitment from top management. Top management plays a key role in managing the change ERP brings into an organization. Company-wide support is also important since ERP is a company-wide system and the concerted effort of every department and every individual is required to make it work. Software vendor support is paramount, since lack of software vendor support could seriously impede the implementation process. The other important factors for the success of ERP implementation are project management, education and training, data accuracy, and suitability of hardware and software.



REFERENCES

- [1] Bingi, P.; Godla, J.K.; Sharma, M.K.: "Critical Issues Affecting An ERP Implementation", *Information Systems Management*, 16/3 (1999) 7-15
- [2] Chung, S.H.; Snyder, C.A.: "ERP Adoption: A Technological Evolution Approach", *International Journal of Agile Management Systems*, 2/1 (2000) 24-32
- [3] Frank, T.; Palaniswamy, R.: "Enhancing Manufacturing Performance with ERP Systems", *Information Systems Management*, 17/3 (2000) 43-56
- [4] Gray, C.D.; Landvater, D.V.: "MRPII Standard System: A Handbook for Manufacturing Software Survival", Oliver Wight Ltd. Publication, Essex, (1989) 3-19.
- [5] Gupta, A.: "Enterprise Resource Planning: The Emerging Organizational Value Systems", *Industrial Management and Data Systems*, 100/3 (2000) 114-118
- [6] Jagannathan, R.: "ERP for Chartered Accountants", <http://www.erpfans.com>
- [7] Heizer J.H.; Render, B.: "Operations Management", 6 th Ed., Prentice-Hall, New Jersey, (2001)
- [8] Monks, J.G.: "Operations Management: Theory and Problems", 3 rd Ed., McGraw-Hill Inc., Singapore, (1987) 435-465.
- [9] Konicki, S.: "A Company Merges Its Many Units—Successfully", *InformationWeek*, 785 (2000) 174-177
- [10] Laudon, J.P.; Laudon, K.C.: "Management Information Systems", 6 th Ed., Prentice-Hall, New Jersey, (2000)
- [11] Siriginidi, S.R.: "Enterprise Resource Planning in Reengineering Business", *Business Process Management Journal*, 6/5 (2000) 376-391
- [12] Sum, C.C.; Ang, J.S.K.; Yeo L.N.: "Contextual Elements of Critical Success Factors in MRP Implementation", *Production and Inventory Management Journal*, Third Quarter (1997) 76-82
- [13] Tarn, M.; Yen D.C.; Zheng, S.: "The New Spectrum of The Cross-Enterprise Solution: The Integration of Supply Chain Management and Enterprise Resource Planning Systems", *The Journal of Computer Information Systems*, 41/1 (2000) 84
- [14] Tingham, B.: "The MRP/ERP user satisfaction survey 1999", *Manufacturing Computer Solutions*, 5/7 (1999) 19-29
- [15] Wallace, T.F.: "MRPII Making It Happen: The Implementer's Guide to Success with Manufacturing Resource Planning", 2 nd Ed., John Wiley Inc., New York, (1990) 253-262.

APPENDIX

SURVEY



BÖLÜM A - GENEL BİLGİLER

A1. Firma adı	
A2. Firmanın faaliyette bulunduğu sektör	
A3. Cevaplayan kişinin adı	
A4. Cevaplayan kişinin çalıştığı pozisyon	
A5. Firmanın yıllık cirosu (dolar olarak)	
A6. Firmada çalışan kişi sayısı	

A7. Kuruluşunuzun ISO 9000 belgesi var mı?	Evet	Hayır
A8. Kuruluşunuzda toplam kalite yönetimi uygulanıyor mu?	Evet	Hayır
A9. Kuruluşunuzda e-ticaret uygulaması var mı?	Evet	Hayır
A10. Kuruluşunuzda müşteri ilişkileri yönetimi (CRM) uygulamaları var mı?	Evet	Hayır
A11. Kuruluşunuzda tedarik zinciri yönetimi uygulaması var mı?	Evet	Hayır

BÖLÜM B - ERP YAZILIMI SEÇİMİ

B1. Kullandığımız ERP yazılımı	
B2. ERP kullanıcı sayısı	
B3. ERP implementasyonuna başlangıç tarihi	
B4. ERP yazılımı seçiminde fayda-maliyet analizi yaptınız mı?	Evet Hayır
B5. ERP yazılımı seçiminde bağımsız danışmanlardan hizmet aldınız mı?	Evet Hayır
B6. ERP yazılımı seçerken yararlandığınız kaynakları işaretletiniz.	<input type="checkbox"/> ERP firmaları <input type="checkbox"/> İnternet <input type="checkbox"/> IT dergileri <input type="checkbox"/> Danışmanlar <input type="checkbox"/> Yazılım rehberleri <input type="checkbox"/> Fuar, sergi ve seminerler <input type="checkbox"/> Diğer _____
B7. İmplementasyon projesi başlangıcında implementasyon için gerekeceğini tahmin ettiğiniz süre	<input type="radio"/> 6 aydan az <input type="radio"/> 6-12 ay arası <input type="radio"/> 12-18 ay arası <input type="radio"/> 18 aydan fazla
B8. İmplementasyon için geçen süre	<input type="radio"/> 6 aydan az <input type="radio"/> 6-12 ay arası <input type="radio"/> 12-18 ay arası <input type="radio"/> 18 aydan fazla

B9. İmplementasyon projesi için *tahmin ettiğiniz maliyeti gerçekleştiren* maliyetle karşılaştırınız.

- Gerçekleşen maliyet tahmin ettiğimiz maliyetin üzerinde
- Gerçekleşen maliyet tahmin ettiğimiz maliyetle aynı
- Gerçekleşen maliyet tahmin ettiğimiz maliyetin altında

BÖLÜM C - EĞİTİM ve HİZMETLER

C1. İmplementasyon hizmetlerine verdiğiniz *önemi* değerlendiriniz. (10_ çok önemli, 1_önemsiz)

ERP yazılım uzmanlığı	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Problem çözme becerileri	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Eğitim desteği	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Son teslim tarihlerine uyma	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Proje yönetim becerileri	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Kullanıcının işini kavrama	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Teknik IT becerileri	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Toplam proje süresi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
İmplementasyon maliyeti	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10

C2. Danışmanlık firmalarından aldığınız implementasyon hizmetlerini değerlendiriniz.(10_ mükemmel, 1_çok kötü)

ERP yazılım uzmanlığı	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Problem çözme becerileri	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Eğitim desteği	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Son teslim tarihlerine uyma	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Proje yönetim becerileri	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Kullanıcının işini kavrama	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Teknik IT becerileri	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Toplam proje süresi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
İmplementasyon maliyeti	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10

C3. Aldığınız eğitimlerle ilgili olarak size uygun olan seçeneği işaretleyiniz.

- Eğitimler süreçlerimize göre tasarlandı.
- Standart eğitim modülleri kullanıldı.
- Başka şirketlerin eğitimini aldık.

C4. Aldığınız eğitimlerle ilgili memnuniyetinizi 10 üzerinden değerlendiriniz.

Çalışanlarımızla eğitici arasındaki ilişki	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Teknik uygulama bilgisi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Gerektiğinde eğiticiye ulaşabilme	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Eğiticinin iş süreçlerinize ait bilgisi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10

C5. Aldığınız eğitimlerle ilgili olarak size uygun olan seçeneği işaretleyiniz.

- İhtiyaç duyduğumuz kadar eğitim verildi.
- Yeterli miktarda eğitim verilmedi.
- İhtiyacımızdan fazla eğitim verildi.

C6. Destek hizmetlerine verdiğiniz önemi değerlendiriniz. (10_çok önemli, 1_önemsiz)

Yardım masası hizmeti	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Problem çözme hızı	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Destek hizmeti verenlerin yeterliliği	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Doğru kişiye ulaşma kolaylığı	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Projeye bağlılık	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Upgrade yönetimi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Destek hizmeti verenlerin kibarlığı	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Eğitim hizmetleri	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Afet kurtarma desteği	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Yönetim danışmanlık hizmeti	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
24 saat/7 gün hizmet	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10

C7. Aldığınız destek hizmetlerini 10 üzerinden değerlendiriniz. (10_ mükemmel, 1_çok kötü)

Yardım masası hizmeti	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Problem çözme hızı	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Destek hizmeti verenlerin yeterliliği	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Doğru kişiye ulaşma kolaylığı	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Projeye bağlılık	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Upgrade yönetimi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Destek hizmeti verenlerin kibarlığı	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Eğitim hizmetleri	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Afet kurtarma desteği	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Yönetim danışmanlık desteği	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
24 saat/7 gün hizmet	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10

C8. "Custom" programlarla ilgili kriterlere verdiğiniz önemi değerlendiriniz. (10_çok önemli, 1_önemsiz)

Custom program kodlarının arayüz ile ana sisteme bağlanması	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Müşteri beklentilerini karşılayan program teslimi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Programcılarının teknik yeterliliği	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Upgrade kolaylığını muhafaza etmesi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Son teslim tarihlerine uyulması	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Kullanım kolaylığı	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Programcılarının iş süreçlerinize ait bilgisi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Custom program maliyeti	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10

C9. "Custom" programlarla ilgili menüyetinizi 10 üzerinden değerlendiriniz. (10_mükemmel, 1_çok kötü)

Custom program kodlarının arayüz ile ana sisteme bağlanması	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Müşteri beklentilerini karşılayan program teslimi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Programcılarının teknik yeterliliği	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Upgrade kolaylığını muhafaza etmesi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Son teslim tarihlerine uyulması	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Kullanım kolaylığı	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Programcılarının iş süreçlerinize ait bilgisi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Custom program maliyeti	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10

BÖLÜM D - ERP YAZILIMI

D1. ERP sistemlerinin özelliklerine verdiğiniz önemi değerlendiriniz. (10_çok önemli, 1_önemsiz)

Güvenilir ve sağlam olması	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
İşinize uygun olması	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Yazılımın fonksiyonelliği	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Kullanım kolaylığı	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Raporlara ve verilere ulaşım	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
İş değişikliklerinde sistemin büyüebilmesi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Değişen iş süreçlerine kolay uyarlanabilmesi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Çalıştırma maliyetleri	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Satınalma maliyeti	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10

D2. İmplement ettiğiniz ERP sisteminin özelliklerini 10 üzerinden değerlendiriniz. (10_ mükemmel, 1_ çok kötü)

Güvenilir ve sağlam olması	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
İşinize uygun olması	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Yazılımın fonksiyonelliği	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Kullanım kolaylığı	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Raporlara ve verilere ulaşım	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
İş değişikliklerinde sistemin büyüebilmesi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Değişen iş süreçlerine kolay uyarlanabilmesi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Çalıştırma maliyetleri	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Satınalma maliyeti	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10

D3. Aldığımız modülleri seçerek memnuniyet derecenizi 10 üzerinden değerlendiriniz. (10_ mükemmel, 1_ çok kötü)

<input type="checkbox"/>	Satınalma siparişi yönetimi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
<input type="checkbox"/>	Satış siparişi yönetimi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
<input type="checkbox"/>	Stok kontrol ve envanter yönetimi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
<input type="checkbox"/>	MRP/MPS, üretim planlama	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
<input type="checkbox"/>	Finans, muhasebe	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
<input type="checkbox"/>	Depo, dağıtım ve lojistik	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
<input type="checkbox"/>	İş akışı (workflow)	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
<input type="checkbox"/>	Personel ve bordro	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
<input type="checkbox"/>	Servis ve bakım	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10

D4. İmplement ettiğiniz ERP yazılımını **fonksiyonellik** açısından değerlendiriniz.

- Beklentilerimizin altında.
- Beklentilerimizle örtüşüyor.
- Beklentilerimizin üzerinde.

D5. ERP yazılımınız üzerinde yapılan değişikliklerle ilgili olarak size uygun olan seçeneği işaretleyiniz

- Çok önemli değişiklik yapılmadı.
- Birkaç değişiklik yapıldı.
- Önemli ve uygun değişiklikler yapıldı.

BÖLÜM E - BAŞARI FAKTÖRLERİ

E1. ERP sisteminin firmanıza sağladığı faydaları 10 üzerinden değerlendiriniz. (10_ mükemmel, 1_ çok kötü)

nanında teslim edilen siparişlerde artış	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
k miktarlarında düşüş	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
tim ve tedarik sürelerinde düşüş	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
tim planlamada iyileşme	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
ansal kontrolde iyileşme	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
imlilik artışı	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
time maliyetlerinde düşüş	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
i ve uygulamalara hızlı, kolay erişim	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
eksiz veri ve işlemlerin elimine mesi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
işikliklere daha hızlı cevap verebilme	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
şteriye hizmet kalitesinin artması	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
tabet gücünün artması	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10

E2. ERP implementasyonu başarı faktörlerine verdiğiniz önemi değerlendiriniz. (10_ çok önemli, 1_ önemsiz)

Üst yönetimin katılım ve desteği	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Proje yönetimi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Eğitim	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Veri doğruluğu	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Çalışanların katılım ve desteği	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Yazılım uygunluğu	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Donanım uygunluğu	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Yazılım / danışmanlık şirketi desteği	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10

E3. ERP implementasyonu başarı faktörlerini firmanızdaki implementasyon süreci için 10 üzerinden değerlendiriniz. (10_ mükemmel, 1_ çok kötü)

Üst yönetimin katılım ve desteği	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Proje yönetimi	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Eğitim	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Veri doğruluğu	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Çalışanların katılım ve desteği	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Yazılım uygunluğu	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Donanım uygunluğu	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10
Yazılım / danışmanlık şirketi desteği	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6	<input type="radio"/> 7	<input type="radio"/> 8	<input type="radio"/> 9	<input type="radio"/> 10

E4. Genel olarak ERP sisteminizden memnuniyetinizi 10 üzerinden değerlendiriniz. (10_ mükemmel, 1_ çok kötü)

1 2 3 4 5 6 7 8 9 10

BIOGRAPHY

He was born in Sandıklı, Afyon, 1975. Graduated from Marmara University Engineering Faculty Industrial Engineering Program in 1998. . He attended to industrial engineering graduate program in Marmara University Institute for Graduate Studies in Pure and Applied Sciences in 1998. He has been working as research assistant in Marmara University Engineering Faculty since 1998.

