The Critical Success Factors Of Erp Selection And Implementation: A Case Study In Logistics Sector

Volkan YILDIRIM
Istanbul Commerce University, Turkey

Ali Osman KUŞAKÇI
Ibn Haldun University, Turkey

Abstract:
Today's competitive business environment requires much greater interaction between customer and business. This means that the organization must be closely linked to both supplier and customer in order to produce goods and provide faster deliveries. In order to achieve this, the organizations need to have efficient planning and control systems in all the processes of the organization. In this case, information technology is one of the sources which organizations can apply. Especially, Enterprise Resource Planning (ERP) is just at the heart of daily operations of a company, which leads to efficient processes. In this study, how Enterprise Resource Planning (ERP), which enables such sources as workforce, machine and materials needed for the production of goods and services in organizations to be used efficiently, was founded and the problems that organizations face with during foundation were explained. In the study, qualitative analysis method was used. At the end of the study, problems during implementation of ERP system was determined and suggestions regarding to the solutions were presented.

Keywords:
ERP, logistics, software implementation, critical success factors

1. Introduction

Innovations in information and communication technologies (ICT) have made the mark in this era. The innovations in ICT have not only contributed to people's lives, but also helped to create a new business infrastructure and business understanding. Firms have developed new approaches with the developments in information and communication technology, and the use of enormous computation power has increased day by day. One of these developments affecting the conventional practices in operations management is Enterprise Resource Planning (ERP). ERP is a comprehensive software package that can incorporates in all business processes in any organization. Although the concept of ERP initially began to be used in production environments, today ERP systems span to a much wider area. They can collect all the basic operations of an organization under its own structure, regardless of the business domain or name of the implementing organization. ERP represents information systems that can help multiple processes work together in an organization, helping to improve planning in the creation of resource management. Furthermore, ERP is a software system that enables realization of supplies, provision of production, and planning of financial resources in an effective manner. A further benefit of ERP system is the creation of a business environment enabling an effective information flow through the operational entities in the organization. The fact that information provided by ERP is real-time is crucial for taking necessary steps while organizing production and distribution processes smoothly. In this context, ERP is an important factor that enables the transfer of knowledge locally. To sum up, ERP has positive impact in the organization that facilitates proactive planning, smooth communication between departments, intelligent operational competence. In figure 1, conceptual framework of an ERP system on organization's performance is depicted (Al-Masharl, M., 2003).
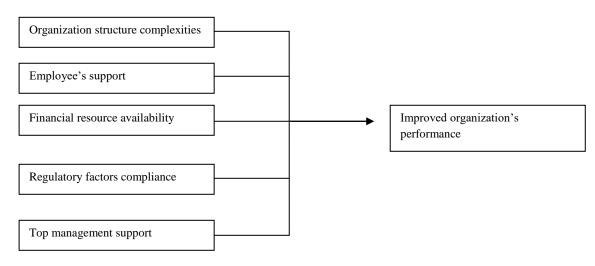
Figure 1: Conceptual Framework of ERP system (Njihia, Evans, Mwirigi, and Mugambi, 2014)

Logistics is an effective and efficient way to plan, implement, move, and store and control all kinds of flow of products, services and information from the starting point of the raw material to the end point where the product is consumed. Logistics sector has been experiencing a booming period in recent years. It has an important role in both growth potential and in achieving economic targets in Turkey. Turkey has a suitable basis for logistics sector with its suitable geographic structure, suitable cost structure and manpower (YASED, 2012: 138). Upon viewing logistics firms in Turkey, it is seen that 3000 organizations are active. Many logistics organizations effective in global markets have increased their practices as a result of investments in geographic regions close to Turkey. The share of logistics sector in Gross Domestic Product of logistics sector gazes around 15%. On the other hand, its share in public investments is seen as 46% (Afatoğlu, 2013: 21). Logistics exist as a sector the importance of which is gradually increasing in that of ensuring competitive advantage in Turkey. The year, 2017, was a historical year for Turkish logistics sector. In 2017, a lot of processes were made by overcoming decline in 2015 and 2016. The reason of improvement in logistics was specified as increases in exports. According to Global Competition Index prepared by World Economic Forum, Turkey ranked as 55 among 137 countries in 2016-2017 term. In 2017-2018 term, it rose to rank, 53. However, it never turned back its rank in 45 in 2013-2014 term.

The aim of this study is to highlight the importance of ERP in logistics sector. While doing this, a case study is conducted where an interview is designed and shared with the employees of a major Turkish logistics company. Both formal and semi-formal interviews are conducted and responses are collected. Finally, the obtained data are subjected to critical success factors and the results are evaluated.

In the first section of the study, ERP system was defined and a literature review regarding to the improvement in ERP system in 1960s was conducted in the second section. In the literature review regarding to the study, studies regarding to ERP system were analyzed, which was discussed in the third section. A suggestion was developed by combining each study and a case study was conducted regarding to the suggestion in logistics sector.

2. Literature review

The rapid progress of technology has created an environment of harsh competition. Thus, a challenging process awaits business organizations in order to achieve success in a competitive environment. Therefore, for pure and simple survival, organizations have to adapt to the new competition elements that have been evolving over time. A

practically effective adaption strategy is following the best practice. In this framework, organizations have moved away from the existing classical systems and aimed to create a system suitable for the structure of the company. The only way is that ERP system can ensure the plans within the enterprise resource (Umble, Haft, and et al., 2003).

In simple terms, ERP is a system that collects the organizational entities under a single umbrella and allows data sharing among horizontal and vertical structures in the firm. A conventional ERP system contains multiple modules such as Material Requirements Planning (MRP), Manufacturing Resources Planning (MRPII), Distribution Resources Planning (DRP), Customer Relationship Management (CRM), Total Quality Management (TQM), Supply Chain Management (SCM), and Human Resources Management (HRM). Within these systems, a single integrated system is designed. A chronological summary of ERP process is depicted in Figure 2.
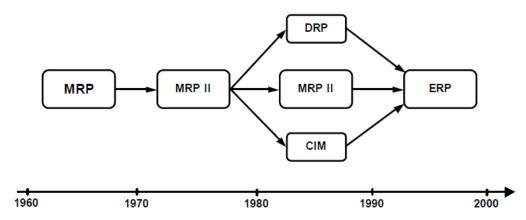
Figure 2: Chronological Development of ERP (Altınkeser, 1999)

According to the figure, MRP emerged as a computer-based approach to material supply and production in 1960s. MRP alleviates the computational burden faced while organizing the manufacturing process and thus, build a basis for today's ERP system. Then, in the 1970s, MRP II was developed to control all the export activities in the organization. All material movements are regularly followed by this system. In the 1980's, important developments in the field of product design and manufacturing were recorded through the agency of computers and CIM system became operational with this development. At the same time, DRP system was developed to ensure that organization can control product distribution channels, and these three systems were widely used at that time. Later, to create a more integrated structure in order to prevent disorganized operations ERP systems were introduced in the 1990s.

Enterprise Resource Planning (ERP) is a fully integrated business management system that covers the functional areas of enterprises such as Logistics, Production, Finance, Accounting and Human Resources. The implementation of this system requires considerably higher costs. Therefore, achieving corporate goals is very important when the time and resources used are taken into consideration. The complexity of the system leads to many difficulties in measuring productivity. In this respect, many studies are conducted in the literature.

Park and Kusiak (2005) stated that the successful integration and implementation of ERP software could not guarantee that the system would always work with full performance. Any ERP system can generate proper solutions for complex problems. Çelik (2011) tried to determine the effect of ERP systems on the accounting processes by conducting a questionnaire to firms that are traded in Borsa Istanbul. According to the research, the use of the ERP system has made significant changes in the production of decisions based on accounting information such as cost center separation, general production budgeting, financial analysis and product profitability analysis, and has had a positive impact. Rendulic (2013) showed the financial performance of ERP in logistics activities using data gathered from 52 large firms in the research conducted in Croatia. However, findings show that ERP does not directly contribute to the success of the firms. Ononiwu (2013) observed that strategic business value could not increase thanks to ERP system because the firms could not effectively use the software. Tian and Xin Xu (2015) observed three years (2001-2003) data collected from 2.127 firms in the manufacturing and service sectors and measured the performance of ERP over firm risks. They concluded that an ERP system in which the functional and operational

modules are planned and applied effectively is a very important assistant in reducing the operational risk of the company. Abukhader (2015) examined the use of ERP in private hospitals in Saudi Arabia. According to the study, 83% of the hospitals in the country use ERP. They reported that spending of 77% of hospitals that have implemented any ERP software decreased while their incomes increased. Bulut et al. (2015) examined the feasibility of ERP in order to make and mass production firms and found that ERP was more difficult to implement in order to make firms. They stated that the main reason for this was that ERP modules were not suitable. In such companies ERP has provided performance improvement but it has not provided any increase in total efficiency. As can be seen in literature survey provided, firms prefer ERP systems in order to facilitate access to information and strengthen communication links within the organization. Due to the high installation costs of ERP systems and the existence of hidden costs, the impact on the total cost of the firm is not always positive. However, efficient use of resources is inevitable due to the reduction of costs in the long run and the

3. Methodology

In this work, we analyzed a major international logistics company established in 2009. During the data gathering stage, interview participants were selected by intentional sampling method. In this context, both formal and semi-formal interviews were conducted with these employees. Participants in different departments in the organization provided that they are able to use ERP system integrated into the company. The aim of this research is to identify critical success factors and difficulties during the integration. After the interviews, obtained data are analyzed. As a result, the difficulties of using ERP systems are determined. Thus, the critical success factors associated with drawbacks of new integration, which are encountered while implementing an ERP system, have been examined.

Qualitative analysis is seen as one of the information production process aiming at understanding lifestyles, stories, behaviors, organizational structures of people and changes in communities (Strauss and Corbin, 1990). In contrary to quantitative analysis based on statistical data analysis, in qualitative studies responds are sought to the questions what kinds of meaning people ascribe to events and how they describe events (Dey, 1993). A qualitative study was defined as one of the ways of information production that individuals have developed to solve their own secrets and to discover down deep of communal systems that are shaped by their own efforts (Storey, 2007).

Content analysis, being a qualitative analysis method, aims at presenting a problem systematically and objectively. A number of problems are presented to researcher by content analysis regardless of what special aim of the study is and which discipline it is conducted in. Thanks to this method, responds are sought to the questions what the universe is, how much sample should be taken in the universe, whether studies will result in consistent results in replications, whether the study can be replicable and whether predictions are assessed or not (Holsti, 1969).

The stages of content analysis are given below.

- - Determining the aims,
- - -Defining the concepts,
- - -Determining the units of analysis,
- - -Determining the places where data regarding to topic are,
- - -Developing a logical structure,
- - -Ensuring the sampling plan,
- - -Determining coding categories,
- - -Data analysis.

Content analysis was the main tool we adopted. The main goal in content analysis is to reach concepts and correlations that enables us to explain the obtained data. Content analysis can be useful when the research requires gathering data via interviews. Attempts are made to clarify the subject by using the themes determined frequently in the basis of content analysis that is made before. In content analysis, the obtained data is detailed and regulated. At the end of this, these results are described and interpreted. In this work, the data obtained from interviews are grouped in appropriate situation and the results are interpreted.

4.Results

The interview stage is conducted with six top level employees. According to the content analysis findings of the interview, the following aspects related to the ERP implementation process have been identified in the case study.

Especially, the critical success factors are addressed while focusing on the difficulties encountered during the implementation process. The main difficulties faced by the employees in the logistics firm are shown in Table 1.

Table 1: The difficulties encountered by the participants

DIFFICULTIES	1	2	3	4	5	6	+
Errors made in the initial plan		+		+			2
The oppressive attitude of the boss	+		+		+	+	4
Inadequate number of staff at department		+		+	+		3
Resistance to the new system	+		+			+	3
Implementation of the system without knowing the business				+			1
Old work habits	+	+	+	+		+	5
Staff circulation	+				+	+	3
Breakdown between units	+	+	+	+	+	+	6
Inexperience of project leader		+	+		+		3
Inaccuracies and inadequacies in the training plan	+	+	+	+	+		5
Errors in data entry	+	+	+	+	+	+	6
Difficulties in designing reports	+	+	+	+	+	+	6
Not solving some problems by using software			+		+		2
Difficulty of using the program		+	+	+		+	4

As shown in Table 1, the difficulties that are determined by taking into consideration the previous content analysis encountered by the interviewees are gathered under 14 items in terms of the frequency of those difficulties. The main findings of content analysis can be summarized as follows.

Most of the interviewees stated that there were mistakes in the initial plan and there was lack of motivation because the targets determined in practice were not reached in time. Obviously, this problem is solvable. As mentioned before, there are critical success factors that should be considered before installation and implementation of the ERP system in order to get the best result. These critical success factors can also be used to solve the mistakes in the initial plan. For example; Slevin and Pinto (1987) defined a factor like "clearly defines vision, goal, business plan and performance measure" in 1987 so this factor can be thought for this situation in the interview. The organization should determine why it will use ERP system, how to implement it, how to achieve the targets efficiently. Thus, targets and gains can be provided by considering that factor in the beginning of implementation.

More than half of the staff stated that the boss followed a repressive policy. The participants who stated that company owner put pressure on the staff to get all reports in a short time. However, ERP system requires long time to install and to implement. In this context, it is possible to consider "top management support" as a critical success factor defined by Bingi, Sharma and Godla in 1999. Restructuring is a powerful tool in the rapid and efficient design of business processes in order to create competitive advantage for the organization. The development of approaches to strengthen communication between employees and managers through the transition of the institution to the new system and to spread the vision of the institution is an important critical success factor in the project life cycle of ERP projects.

Half of the participants mentioned the inadequate number of staff at department as the main difficulty has had to confront. They stated that this would lead to the failure of integrating an ERP system. Therefore, they worried that it would cause a decline in their performance. At this point, Bingi, Sharma and Godla (1999) address "Project management: the choice of project manager and team" factor under critical success factors and it can be taken into consideration to address this issue. Project management observes and quides the ongoing activities from the start to the end of the project. Effective project management requires the coordination of all units of the organization. Even if there is inadequate number of staff at department while implementing ERP system, the interaction between staff can provide useful synergy, and the lack of staff problem can be overcome.

Participants have mentioned the employees show resistance to the new system. Statements such as "system will be useless"; "the previous system was better than the new one"; and "it is wasting money and time" refer to the existing resistant approach to the change among the employees. Change management is a priority issue in ERP implementation. Resistance, complexity and other mistakes are unavoidable because a new ERP system revolutionizes the establish business flows and prescribes a wide-ranging, radical change process. In case the organizations do not attach sufficiently enough importance to change management, the expected returns from ERP implementation are barely achievable. In business process reengineering and technology implementation projects, effective change management is critical. It is necessary to adopt change management in order to successfully implement ERP system. The critical success factor "change management" is of essence to avoid this issue during ERP system implementation (Grover, Jeong, Kettinger and Teng, 1995).

At the initial stage of the ERP systems installation, process analysis is carried out. During this analysis, it is necessary to determine the current state of the business so that a smooth integration in the organization is possible. When the current situation is revealed, the complete set of business processes should be described. Training plays a facilitating role in the projects done in the field of management information systems. It is a frequent problem that users are not fully aware of the consequences of lack of training, changing business processes and how to implement them. These are the important causes of failure in ERP implementations. Training allows employees to learn more about functions while informing them about ERP. Comprehensive training in ERP implementation allows acquisition of necessary knowledge that employees can exploit in describing and resolving problems they encounter in the system flow. It helps adoption of a common language and ERP culture in the organization (Cooke and Peterson, 1998).

Participant whom we interviewed stated that they were not able to leave their old business habits. The workers have argued that it will take certain time until they get used to use the new system. Obviously, this fact again refers to the critical success factor related to resistance.

Half of the participants stated that the staff circulation is one of the difficulties they faced during the installation and implementation phases. It has been stated that when a worker leaves his or her job, the work done by another employee and it takes a long time to adapt to the new job. On the other hand, the training has caused some troubles as well.

According to the result of the research done, all participants stated that the breakdown between the units creates great difficulties in the installation of the system. According to the old system in operation, the units receive the information they need from the other units and accordingly there is no common database. On the contrary, it is said that a step taken in the new system has also affected other units, and the mistakes made by the employees who are unfamiliar with this issue cause the loss of time in the installation phase. Robinson and Dilts (1999) explained that one of the critical success factors called as communication and cooperation between units. Communication is the key component in the success of ERP projects. The lack of communication between the project team and the other units in the process of redesigning the processes and ERP installation is a vital problem, and creation of smooth communication channels, keeping it open and streaming the precise information has an enabling effect in solving it. Cooperation and participation are critical because of the attempts to integrate different functions of ERP systems. Therefore, a strong coordination has an important influence on achieving the goals of ERP system (Robinson and Dilts, 1999).

Furthermore, it has been stated that the project leader is inexperienced and cannot provide motivating leadership. In addition, the project leader was not able to communicate properly with the software company and some problems identified were not addressed properly.

According to the results of the research, participants stated that there were mistakes in the training plan given before and during the installation of the system and the trainings were inadequate. They argued that the purpose of the

trainings could not be precisely defined and the trainings were blocked at certain points by employees who did not know the system. Moreover, it is stated that the daily duration of the training programs is kept too long, so number of participants to the trainings remained limited.

All participants stated that some mistakes happened during data entry stage. Fixing these mistakes takes more time than a new entry. All departments used a common database, so it was noted that an erroneous entry in one department affected other departments. For instance, it was stated that some information was entered incorrectly on the stock cards. Although management wanted to correct them afterwards, the stock cards were deleted and re-created by the system. In order to achieve the expected benefits from ERP software, the data must be timely and adequately structured. The main causes of failure in organization are the difficulties in providing human and financial resources needed in the process of redesigning. The difficulties in determining the necessary data during the project phase often play a decisive role. For this reason, it is important to regulate data entry correctly at the beginning of the installation (Grover, Jeong, Kettinger and Teng, 1995).

One of the most important features of the ERP system is the reporting feature. According to the obtained reports, the operators make necessary evaluations and try to make decisions accordingly. Thus, it is necessary to put this information in the reports in the design phase. All of the participants stated that they had difficulties while creating reports during the design phase. Although there are a large number of reports within the system, the vast majority of these reports do not contain the desired information and it is difficult to make an evaluation based on the information in the reports.

According to the result of the research, participants highlighted that the installed software cannot solve some problems. Especially in the production department, they experienced troubles. Choosing the right ERP software means that the selected software can be adapted to the enterprise information and processes with minimal modification. The choice of the wrong software will lead to incompatibility between system architecture and the institution's strategic objectives and / or business processes. The selection of the software package that provides the most suitable solution for the needs of the organization is the most important factors of the ERP implementation phases. Some software may be suitable for large organizations, while some other software may be suitable for small size enterprises. Some packaged software has a worldwide standard and position where some others are good in local integration (Janson and Subramanian, 1996).

Employees who participated to the interview said that the program had a complicated structure and they had difficulties in using and adapting. Specifically, the employees in the foreign trade and procurement departments are mostly suffering. It is widely acknowledged that there will be some initial problems in almost every software implementation process. In ERP implementations, institutions should solve software problems with consultant and supplier cooperation (Janson and Subramanian, 1996).

5. Conclusion

Organizations must be able to make strategic decisions that are vital for survival. The field and role of the logistics has begun to change significantly in recent years. Logistics, in general, has played a supporting role for business functions such as marketing and production. In recent years, logistics has come to be known as a critical factor to emerge in a more prominent way to provide competitive advantage to businesses. Logistics, which was initially limited to transportation and storage, includes supply chain management, purchasing, distribution, inventory management, order management and processing, packaging, parts and service support, production programming, replicas, demand forecasting, waste recycling and disposal, and even customer service. In this context, a control system must be required in order to manage all process in the organization. In this field, ERP systems are of great use in order to provide the best business practices. This system makes the organization process easy. An ERP system is a management information system tool that plans all resources of the institution and aims to meet all information needs. ERP systems are one of the applications of today's advanced information technology that enable the organization to integrate in all needs.

The investment costs of ERP systems are high and installation requires a long process. Before deciding to implement ERP systems, companies should undertake a feasibility study. While doing this, they should take into account that there are many failed ERP projects in the market. Thus, if the project fails, the enterprises face with great losses and even face the danger of default.

As a large-scale project, it requires careful planning, expertise and experience. Obviously, we may not claim that every ERP system application will be successful. When certain critical success factors are observed the strategic goals of the firm can be achieved. ERP systems are, first and foremost, information technologies projects and they reflect the typical characteristics. However, given the targeted integration, there are also elements far beyond ordinary information technology projects, as the entire organization is focused on doing business. The greatest factor in the success of ERP implementation in an organization is the continuous and strong support of top management. Other important factors are the redesign of business processes and the compatibility between the system and the way they do business. The management of change is also extremely vital. Due to the high cost of ERP system implementations and their long-term spread, the continuity of the enterprise support to the project is a prerequisite for success. Selecting the most appropriate ERP system for their organizations, establishing a strategic road map for implementation, providing training for their employees, carrying out cultural exchange within the company are other contributing factors to the success of the ERP system.

Finally, logistic is an important trading tool between countries. Especially in Turkey, logistic field has developed in recent years in parallel with the steady growth in the sector and increasing foreign trade. Long production and business processes are involved in logistics sector. For this reason, ERP system is preferred to execute these processes within certain rules. The difficulties, which are mentioned above, can be reduced by using ERP. In briefly, ERP system can provide maximum productivity and eases the process flow. This work presents a case study that examines ERP system and its implementation in logistics sector, where both critical success factors and difficulties are analyzed and solutions are proposed.

References

Afatoğlu, A. 2013. Lojistiğin 2013 Atılımı. Turkishtime, Mayıs.

Al-Masharl, M. 2003. Enterprise Resouce Planning (ERP) Systems: A Research Agenda. Industrial Management &Data Systems (103:1), p.22.

Çakmak, Z., Taşkın E., Şaylan, O. 2013. Kurumsal KaynakPlanlaması (ERP) SistemindeKritikBaşarıFaktörlerininBelirlenmesineYönelikBirAraştırma. AkademikBakış Dergisi, Sayı:35, Mart-Nisan., s.18.

Dey, I. (1993). Qualitative Data Analysis: A User-Friendly Guide for Social Scientists. London: Routledge Publications.

Njihia, Evans and Mwirigi, Fred Mugambi, 2014. The Effects of Enterprise Resource Planning Systems on Firm's Performance. International Journal of Business and Commerce, Vol:3, No:8.

E.Umble, R.Haft, M.Umble, 2003. Enterprise resource planning: Implementation producers and critical success factors. Elsevier journal.

Altınkeser, H. 1999. Kurumsal Kaynak Planlaması. Yıldız Teknik Üniversitesi, Fen. Bil. Enst. Yüksek Lisans Tezi.

Park, K. and Kusiak, A. (2005). Enterprise Resource Planning (ERP) Operations Support System for Maintaining Process Integration. International Journal of Production Research, 43(19).

Çelik, M. (2011). KurumsalKaynakPlanlamaSistemlerininMuhasebeSüreçlerineEtkisineYönelikİMKB'deBirAraştırma, Muhasebe v eFinansman Dergisi. 52.

Holsti, O. R. (1969) Content Analysis for the Social Sciences and Humanities, Addison Wesley. Canada.

Rendulic, Darko. 2013. Association between Logistics and Financial Performance: The Case of Croatian "best-of-breed" Enterprise Resource Planning (ERP) Users. Doctoral disertation; Faculty of Economics at the University of Split.

Ononiwu, C. G. (2013). A Delphi Examination of Inhibitors of The Effective Use of Process Industry Enterprise Resource Planning (ERP) Systems: A Case Study of New Zealand's Process Industry. Electronic Journal Information Systems Evaluation, 16(2).

Tian, F. ve Xu, S. X. (2015). How Do Enterprise Resource Planning Systems Affect Firm Risk? Post Implementation Impact. MIS Quarterly.

Abukhader, S. M. (2015). ERP Implementation in The Private Hospital of Saudi Arabia. International Journal of Healthcare Management. 8(2).

Bulut, A., Stevenson, M. ve Hendry, L. C. (2015). The Applicability and Impact of Enterprise Resource Planning (ERP) Systems: Result Form a Mixed Method Study on Make-To-Order (MTO) Companies. Computer in Industry.

D.P. Slevinve J.K. Pinto, Balancing Strategy and Tactics in Project Implementation. Sloan Management Review, (Volume 29, Number 1, 1987), pp. 33-41.

Bingi P., Sharma M., Godla J. (1999). Critical Issues Affecting an ERP Implementation. Information Systems Management, (16:3).

V. Grover, S.R. Jeong, W.J. Kettingerve J.T. Teng, (1995). The Implementation of Business Process Reengineering. Journal of Management Information Systems, (Cilt 12, Sayı 1), ss.109-144.

D.P. Cooke ve W.J. Peterson. (1998). SAP Implementation: Strategies and Results. The Conference Board, Research Report 1217-98-RR.

A.G. Robinson ve D.M. Dilts.(1999). OR & ERP: A Match for the New Millennium?. OR/MS Today, (Cilt 26, Sayı 3, 1999): ss. 30-35.

M.A. Janson, and A. Subramanian. (1996). Packaged Software: Selection and Implementation Policies. INFOR, (Cilt 34, Sayı 2), ss. 133-151.

YASED (2012). 2023 Hedefleri Yolunda Bilgi ve İletişim Teknolojileri, Eylül.

Strauss, A., Corbin, J. (1990). Basics of Qualitative Research: Grounded Theory Procedures and Techniques. New Delhi: SAGE Publications.

Storey, L. (2007). Doing Interpretative Phenomenological Analysis. In E. Lyons ve A. Coyle (Eds.). Analysing Qualitative Data In Psychology. (p. 51-64). Los Angeles: SAGE Publications.