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**ERP (Enterprise Resource Planning)
and its Use in Turkey**

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Abstract

The systems of ERP (Enterprise Resource Planning) are advanced technologies that have recently emerged and become an indispensable part of the businesses in the competitive and speedy present day environment. The ERP systems were recently included in the working processes of businesses in Turkey and in the rest of world and they focus on the aims of competitiveness and sustainable growth.

The applications of the ERP systems in Turkey, which enable the management of all the working processes and information systems of businesses in an integrated way and which are considered as integrated computer-supported software, are the main subject of this study. In this study, the conceptual framework of the ERP systems, the theoretical information related to its development process, the practitioner companies in Turkey, and information about the analysis of the sector and market as compared to the world and Turkey, are shared. The advantages of ERP, the reasons leading to establish the system are discussed as another topic. In this study, Metehan Ortakarpuz's master's degree thesis which was completed in 2009 and called "ERP and the Use in Turkey", was used.

Keywords: ERP (Enterprise Resource Planning), Sector Analysis, Turkey

Introduction

Although quality, efficiency, and cost were linked as the three main criteria to achieve sustainable competitive advantage, reacting quickly, was also added as new criteria to these. In order to provide all these criteria, scarce sources should be used effectively. These sources are raw materials, labor, machinery, equipment, and financing. Effective and efficient use of these sources is only possible with the production planning and control activities.

Including developing technology to the business structure enabled aforementioned sources to be planned and managed more effectively. In this respect, the advanced information technology, Enterprise Resource Planning-ERP, which has emerged in the recent years and has been used widely, becomes prominent.

In order to be outstanding all across the company through integration, ERP is the best way to use the different functions, methods and tools of a company. ERP is a planning and communication system that integrates all the functions of a business using the information technology. The enterprises use ERP to integrate business processes in various functions and change them into automation.

The development of ERP has continued related to technological developments and institutional needs in a modular structure. It is known that it will continue developing. The decisions made in accordance with the needs of businesses, which choose the accurate system and success and failure measurement are also subjects that should be investigated in ERP.

In this study, the development, modular structure and set up of the ERP systems, are discussed and the ERP sector in the world and in Turkey are analyzed. With the analysis and comparisons, some inferences are obtained about the ERP utilization in Turkey.

Enterprise Resource Planning - ERP

ERP System

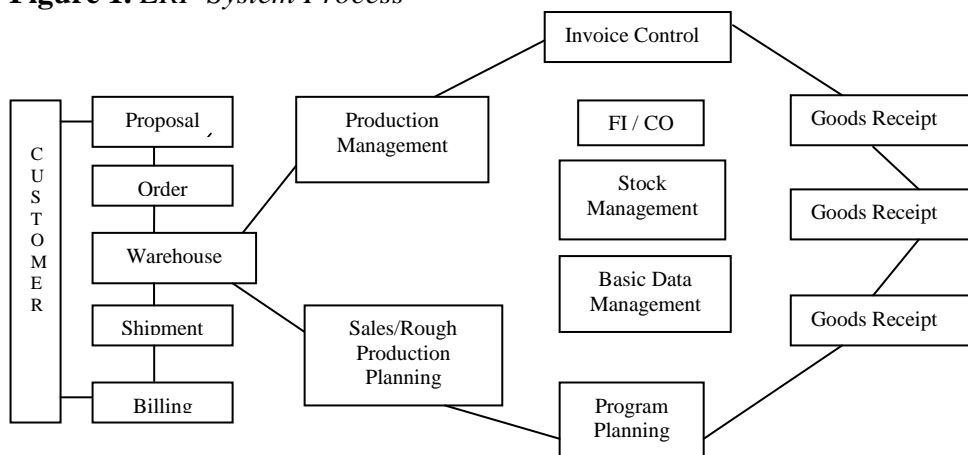
Even if there are many definitions of the Enterprise Resource term which differ according to the point of view, this term can be defined as a commercial software package which integrates the ongoing information flow in the business.

As stated by Klaus et al. (2000), it is possible to see Enterprise Source Planning in three different ways; (1) ERP is a commercial commodity that can be bought and sold as computer software, (2) ERP is a development aim which collects all the processes and data of the organization under a large comprehensive and integrated structure, (3) a key element of an infrastructure that offers solutions for work process (Yegül 2002: 3).

The ERP system is a management system that plans all the resources of business and is only possible with information technology and meets the whole information need. In other words, ERP is a fully integrated computer aided business management system. The ERP system combines the software and

processes of all the departments on a single data based software system. ERP software is a series of software applications that allow information sharing across the entire organization (Duzakin and Sevinc, 2002: 194). Organizations use ERP packages to integrate business processes with various functions. ERP systems help the businesses to convert an entire business process into an automation system instead of converting only some functional units. A continuous integration of all the activities, from workshop activities to performance monitoring activities, of the managers and the conditioning of various computer hardware and software platforms with each other has been achieved by the help of ERP applications.

Figure 1. ERP System Process



Source: Yaman 2002: 7.

The aim of the ERP system is to improve the collaboration and interaction between functions such as accounting, finance, logistics, production planning, inventory management, purchasing, production, marketing, quality management, human resources, maintenance/repair and customer relationship management. Thus, these functions are allowed to obtain the highest competitive advantage. Figure 1 gives a clearer idea about the ERP System process.

One of the important features of the ERP system is that the factories of the business which are located in different regions (domestic and oversea), their suppliers and distribution centers plan their resources coordinately. In order to plan the resource use effectively and efficiently, a company with one or more national and international factories, facilities and warehouses needs ERP. In this context, which customer will get his order from which distribution center or which factory will produce the order, how the factories and distribution centers will use machines, equipment, labor, energy and information, etc. coordinately and jointly are all determined. In other words, in order to meet the order by the customer as soon as possible with the intended quality and cost; capacity, distribution, production and supply resources of related enterprises should all be considered (Somar 2004: 19).

In the same way, having different factories or producing different types of goods in the same factory requires a flexible resource planning approach. ERP

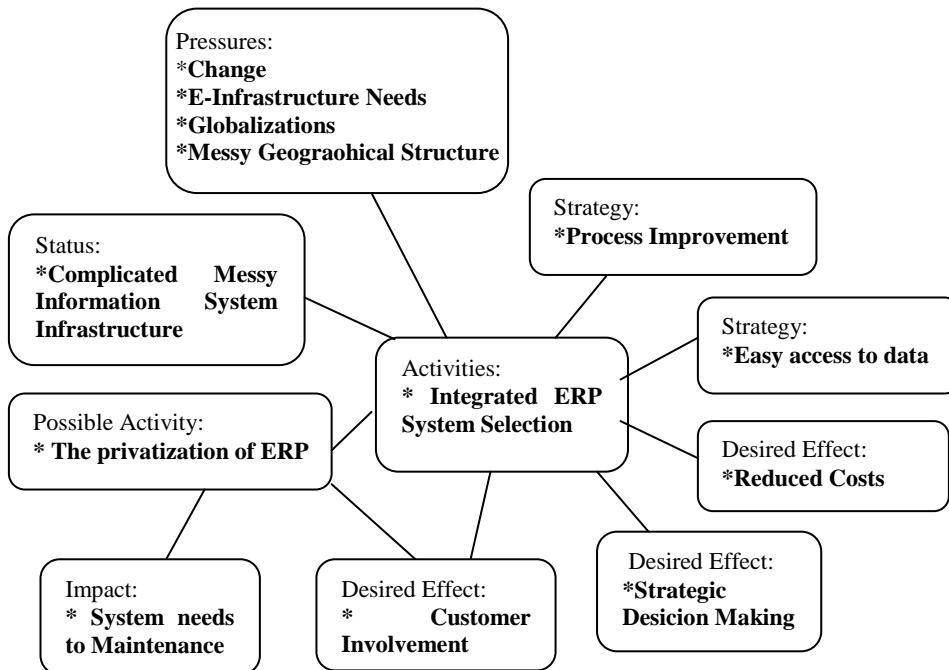
has a structure to cope with these differences. Inter-factory integration is achieved in accordance with the flexibility principle on the basis of the factory (Yaman 2002: 8).

Business efficiency depends on the rapid flow of information throughout the entire supply chain from the customer to the producer and the producer to the supplier. The ERP system which will provide this requires a dense functionality in all fields, such as sales, accounting, engineering, scheduling, inventory management, production, purchasing, quality management, distribution planning and overseas transport.

Causes That Leads to Set Up ERP System

There are many factors that compel ERP system applications. Factors such as obtaining a single organization resource which will meet the information needs of the business, reaching the same data at the same time and the integration of the business systems in one platform are some of the leading factors.

Figure 2. *Reasons of ERP Set up and Expectations*



Source: Duzakin and Sevinc 2002: 27.

However, the ERP system is not only preferred because of its ability to integrate the business systems within the company, it is also preferred because of having the ability to combine the in-house processes with the company shareholders via the internet.

In Figure 2, the factors that lead companies to set up ERP and the expectations of the organizations from ERP after setting it up, are summarized under the light of the above-mentioned information.

It is necessary for the ones, who support the system set up long before the installation of the system, to understand the reasons why the ERP system application will be used and the demands of the companies clearly.

The Benefits of ERP Systems to Businesses

Tom Davenport, a world-recognized expert of Information Systems (IS), has revealed the benefits of ERP in his study in 2000 as follows (Bayraktar and Efe 2005: 695):

Benefits in Terms of Business Process

- Automation of the background (back office) process.
- Coordination between the functional business processes.
- Coordination between the geographically remote units and easy monitoring of all the units by administrators.
- Ensuring the terminology unity which prevents assigning a different meaning to the same term by the different units of the same company.

Technical Benefits

- Understanding the information technology infrastructure and consistent practice logic which makes working in this structure easier. Consistent information and interface.
- The existence of a system that eases the information technology infrastructure management.
- Even if it is a useable alternative, getting rid of setting up your own integrated system that is expensive and risky.

On the other hand, the recent ERP systems connect processes, people, suppliers and customers. A business using the ERP system is thought as an institution that integrated its units from human sources to accounting, sales, production, distribution and supply chain management firmly. The benefits of such integration are as follow (ERP Report 2007):

- React more quickly to competitive pressures and market opportunities.
- More flexible product configuration.
- Stock reduction.
- Increased coordination within business.
- Production performance increase.
- Business management using proper strategies.
- Efficient and effective use of business resources.
- Enabling the usage of materials, labor, machinery-equipment, production and distribution sources such as information jointly and efficiently.
- Enabling a close cooperation and information communication environment between a distribution center, production and supplier.
- Increased customer satisfaction.

- Possibility of a single access to the needed information by the help of information integration.
- Improvement of the quality of information seamlessly.
- Decreased direct transaction costs.
- Increased product delivery time.

There is a central coordination between the various functions, units, businesses and the activities in the countries that use the ERP system. An administrator could monitor the activities of the factory in a different country from his seat comfortably and affect these activities. There is no need for the production managers to worry about taking orders from the customers, monitoring the logistics and service after sale.

With the WRP system, consolidated and integrated information is obtained and resources are used more effectively. Thus, more added values are achieved with less resource use.

Statistical and daily updates are done automatically and immediately and financial and stock books are always available. ERP does not only provide the preparation of the accurate reports, it also keeps these automatically and administrators reach the reports just with one click.

As the customer order is only on a single system, all modules and subsystems could be monitored. In a well-designed and applied ERP system, customers could see the actual status of the order in any case.

By the help of the ERP system application, bookkeeping, journal entries and such other financial and accounting activities are done automatically and month end closings show not the days, but only the hours. Shortly, information is always actual and ready and the end-users always have the chance to reach the needed information any time.

ERP systems aim to decrease the supply period and costs across the business. With proactive thinking, the problems are foreseen and the necessary precautions are taken in advance. The impact of a decision, which will be given at any point in the company, on the whole company is foreknown. The impact of a change of method on the global performance could be evaluated beforehand. Each staff reaching the information needed whenever they want also simplifies the management structure.

Thanks to the highest-level information integration brought by the opportunity to reach current information in the fastest way, organizations react simultaneously to the market, customer and business world formations. Inventory control and supply/demand balance fit together (Sener 2004: 44).

An ERP system could affect a company's decision to choose another company as a partner. Some companies will want to work with suppliers using the same ERP technology.

The results obtained by some companies, which are using an ERP system, show the benefits of this system clearly. Earthgrains Co. (a baker who wholesale in St. Louis) indicated that after using this, the delivery time of the application product increased by 99%, better information management was achieved and the customer satisfaction rose. In the same way, in a company called Par Industries, the ERP system helped the administration produce

according to the existing customer orders rather than the forecast. The delivery time rate increased from 60% to over 95%, the delivery time decreased from 6 weeks to 2 weeks for customers and the parts repair decreased from 2 weeks to 2 days. After the implementation of the ERP system, the IBM Storage Systems department reprised the products in 5 minutes rather than in 5 days. ERP also helped to decrease the transportation time from 22 days to 3 days and the needed time for credit control from 20 minutes to 3 seconds (Bayraktar and Efe 2005: 698).

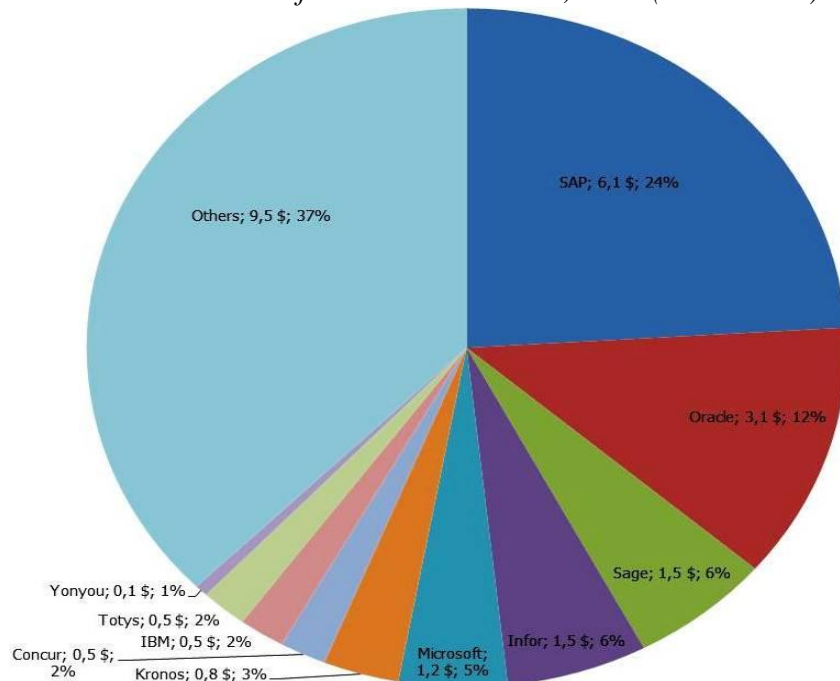
ERP Sector and its Use in Turkey

ERP Sector Analysis in the World and in Turkey

The ERP sector in the world has reached a volume of 25.4 billion USD in 2013. The distribution of companies who got a share of the cake is given in Figure 3. Although the ERP industry grew by 3.8% in 2012, the average rate of growth will occur in the future between 3.5% and 5% and the sector in 2017 is estimated to reach USD 32.6 billion USD (Gartner 2013). Despite this growth trend, this sector worldwide is in a period of stagnation.

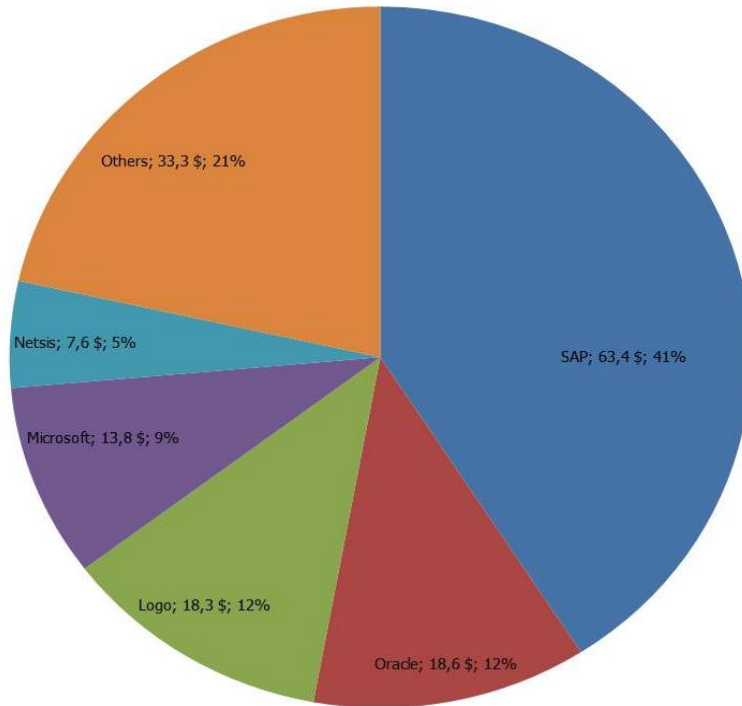
The supplier companies who produce package or private ERP software worldwide are: SAP, Oracle, Sage, Microsoft, PeopleSoft, Infor, IAS-Canias, Kronos, IBM, Kronos, IFS, Invensys (Baan), J.D. Edwards, MFG, Lawson, Concur, Totys, Yonyou, Great Plains/Solomon, CDC Software, Comcash ERP, CresColud, Edible Software, Epicor, Evosys, Godesys, Abas, NetSuite, Odoo, Plex Systems, Produce Pro, QAD, SYSPRO, Tyler Technologies, Unit 4.

Figure 3. *Worldwide ERP Software Market Share, 2013 (million USD)*



Source: Gartner Reports 2013.

Figure 4. *Turkey Enterprise Application Sector Distribution 2012 (million USD)*



Source: ERP Committee (2013) Turkey Enterprise Solution Directory.

The size of the ERP sector in Turkey is around 155 million USD according to 2012 data. The average annual growth rate of the sector differs from 10% to 15%. With this growth momentum, the expectation for 2016 is 260 million USD. The market share of the companies of this sector in 2012 are given in Figure 4.

The national and international supplier companies offering ERP solutions in Turkey are: SAP, Oracle, Microsoft Dynamics, Netsis, IAS-Canias, Logo, Infor, Abas, IFS, AGC, Akdata, CPM Master, BMI-DinamoERP, Inspark, Bilgiyön, ERPS, Pronic, Seryum, Exact Software, Axis, Birleşik Uzmanlar Bilişim, ETG, BI-TALENT, Omni, Pargesoft, Mikro, Ems Yazılım, Nebim, Aktek, Natica, Bizcon, QAD, Detaysoft, FIT, Itelligence, Sentez Yazılım, Set, Teknosol, Uyumsoft, Workcube, Yapıtaş. While some of these offer their own enterprise resource planning solutions, some others work in partnership with international companies and some use both strategies together.

ERP Use in Turkey

The studies by the Turkish Statistical Institute-TUIK have been analyzed for the sectoral and size distribution of enterprises in ERP utilization in Turkey. Every year, a study on "Survey of Information Technology Usage at Enterprises" is conducted and one of the reports is on "The Initiative that uses Enterprise Resource Planning (ERP)". In order to have the values which will represent the mass obtained from the sample studies by TUIK, a weighting method has been used. Micro enterprises (with 0-9 staff) were left out of the sample scope of the study, small (with 10-49 staff), medium (50-249 staff) and

big (250 and over staff) enterprises were investigated. According to data from TUIK, the ERP utilization rates of the enterprises in Turkey were given according to economic activities and number of staff in Table 1.

Table 1. ERP Utilization at Economic Activity and Size Groups of Enterprises in Turkey

Economic activity (NACE Rev. 2) and size group	2012 ERP Utilization %	2013 ERP Utilization %	2014 ERP Utilization %	3 Years Average %
General	17,8	18,7	14,3	16,9
Manufacturing (Section C)	21,7	22,7	14,2	19,16
Electricity, gas and steam, water supply, sewerage and waste management (Section D, E)	32,6	31,6	29,0	31,0
Construction (Section F)	10,4	11,3	4,0	8,6
Wholesale and retail trade; repair of motor vehicles and motorcycles (Section G)	21,3	22,4	23,8	22,5
Transportation and storage (Section H)	14,2	16,3	12,2	14,2
Accommodation and food service activities (Section I)	9,4	10,4	9,5	9,8
Information and communication (Section J)	28,1	30,6	23,3	27,3
Real estate activities (Section L)	15,8	16,0	9,5	13,8
Professional, scientific and support activities (Division 69-74)	11,0	14,9	13,1	13
Administrative and support activities (Section N)	12,4	11,6	7,4	10,5
Repair of computers (Group 95.1)	35,8	30,8	44,0	36,9
Size Group				
10-49 (Small Enterprises)	14,1	14,9	10,8	13,3
50-249 (Medium Enterprises)	32,6	31,9	25,7	30,0
250+ (Big Enterprises)	51,2	57,8	51,9	53,6

Source: Developed with the 2012-2013-2014 data obtained from TUIK.

According to the ERP Utilization in 2012-2013-2014, the average is 16,9%. According to the 2012 TUIK data, the total number of small, medium and big enterprises (micro ones excluded) is around 115.900 (TÜİK 2012: 1). According to this, the number of enterprises using ERP is 19.587. When the enterprises were grouped according to their sizes the ERP utilization rates differ. 53% of 4.156 big enterprises, 30% of 22.088 medium enterprises and 13,3 of 89.656 small enterprises in Turkey use ERP. This data shows that the interest for ERP in big enterprises is fifty fifty and it is one of three in medium sized enterprises. This proportion decreases to one seventh in small enterprises. When the sectoral distribution of the enterprises is considered, it is seen that the enterprises in the computer, information and communication sector gives more importance to ERP with a one in third proportion. While one out of five enterprises use ERP in the manufacturing sector, this rate is around one out of ten in the service sector.

Institutional Supports for ERP Projects in Turkey

There are support programs conducted by public enterprises in order to support initiatives, manufacturing, exports and similar fields in Turkey. Some

of these programs also support the activities in the scope of information management. The programs supporting ERP are ordered as follows:

TURQUALITY: the companies under the TURQUALITY® Support Program are supported for the license of the software products which they will purchase or rent in the scope of information management such as Customer relationship management (CRM), Computer Aided Design (CAD), Enterprise Resource Planning (ERP), Supply Chain Management (SCM), Customer Relationship Management (CRM), Enterprise Performance Management (EPM), Retail Management and so on and their annual maintenance-update cost and the cost for engaging these software, improving and consulting for maintenance, training and outsourcing in international markets and the expenses for consultancy claims by the consulting companies supported by Ministry are supported by 50%.

KOSGEB: KOSGEB provides 50% support for the companies which aim to manage their companies with ERP, an integrated management system from supply to distribution, buying to stock, selling to transportation processes. In this context, the companies prepare a report indicating the problems they will encounter if they do not use the ERP system and present it to KOSGEB. The commission of KOSGEB analyzes the Project and accepts it accordingly.

DEVELOPMENT AGENCIES FINANCIAL SUPPORT PROGRAM: The license cost for Computerized design (CAD), enterprise resource planning (ERP), supply chain management (SCM), customer relationship management (CRM), corporate performance management (EPM), retail management and so on, engaging the new software and the activities to improve the organizational structure of the enterprise, production capacities, product range, R & D, advertising, promotion, development of marketing talent and with the added value they provide so that competitiveness in order to increase the levels are supported. The support is 50% of the Project and this is around 40.000 and 400.000₺.

The Evaluation of ERP Utilization in Turkey

When comparing the ERP utilization field and rate of developed countries and Turkey, a big difference is seen. While in the rest of the world this sector is in a period of stagnation, in Turkey it is still developing. In the information sector of Turkey hardware companies are seen more often but the number of companies investigating software are increasing rapidly. While Germany has 205 enterprises in the information sector, Turkey has only 50 independent software companies.

The saturation in the developed countries have forced the ERP manufacturers in the global market to use new technologies and come to the fore in the competition called "replacement market". Technology tools integrated with ERP (Social ERP) defined as cloud computing, mobile apps, in memory, special networks have started being used. When ERP utilization in Turkey is considered, the mentioned new technologies have no meaning for most of the enterprises (Trovarit 2014: 1).

What should the enterprises, which have not completed their institutionalization or have an uncertain process or which cannot be fully

defined and implemented or do not have the infrastructure and human source with utilization culture and consciousness, do to use an integrated system?

How can the ERP projects, which have lots of risks and fails at the end, be saved from turning into an unsuccessful project?

How should the enterprises, using software that has limited functions and a narrow frame (traditional financing and including accounting based functions), decide on their new software need which emerges in parallel with their development and sector needs?

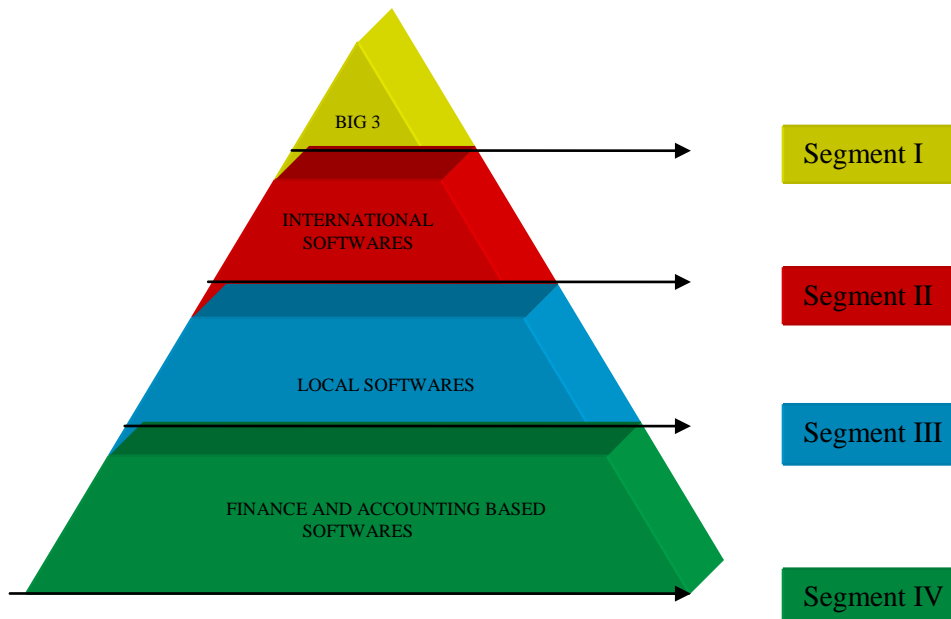
In fact, these questions are confronted a lot during ERP usage in Turkey even if their answers were given theoretically.

When the ERP decision and evaluation segmentation is considered, it is seen that there are 4 different segments (Figure 5). According to this, the enterprises with a system of 500 staff and 100 users are in SAP, Oracle-JD Edwards and Microsoft Dynamics users are in Big 3 segment (segment 1).

While small and medium enterprises which use traditional finance and accounting based solutions are in segment IV, local ERP software users are in segment III and other international software users are shown in segment II.

While the enterprises in segment IV feel to change their software because of dissatisfaction from product and support services, changing needs, new work fields, customer expectations, legal obligations, segment II and segment III go towards the solution. The determining factors in selection, evaluation and decision-making are first investment and business cost, maturity of processes, internal resource competence (Trovarit 2015: 2).

Figure 5. *The Segmentation of ERP Sector in Turkey*



Source: Torvarit 2015: 2.

This segmentation shows that the studies devoted to SMEs in Turkey are increasing and should increase, at the same time with a market potential for both national and international ERP software companies.

In general, the following conclusions can be made about the ERP industry and its use in Turkey:

- ERP industry is in a growth stage in Turkey. This situation is proved with the interest of software companies to the market in Turkey.
- Big companies in Turkey are sensitive about ERP utilization.
- Small and medium enterprises' having a higher potential for ERP utilization points the future of the market and software goals.
- Local software companies are growing rapidly, they are having partnership with international companies.
- Local software companies are following the developing Technologies and adding them to their solutions.
- The businesses in Turkey approach the ERP solutions with more price sensitively. In order to protect their investment on different and not integrated software, they fail to notice strategic importance of ERP transition.
- The second hesitation after cost in ERP usage is on system utilization. Inefficacy of institutional structure and staff consciousness are thought as obstacles.
- The mentality of institutionalization is not spread nationwide in Turkey when compared to developed countries and this delays ERP utilization. However, the awareness is rising day by day.

Conclusions

The most important goal of the enterprises is to achieve the excellence with a full and complete management aim. They need integrated management systems to make right strategic decisions and get competitive advantages. Today, ERP systems front as a solution with comprehensive and versatile management abilities.

The advantages that will be obtained using ERP appear in the enterprises' dreams. How can this solution be achieved? How can a good system be achieved?

There is nothing called good or bad in ERP Solutions, what is important is which one is useful. Apart from this, ERP is not a solution for all the problems and the enterprises should be ready on investing extra money on developing some functions. If an enterprise chose and bought the ERP system they needed, they should apply and update this system.

In this study, general and theoretical information about the ERP and the use of it in Turkey are given and the comparison of the sector in the world and the sectoral evaluation are also focused on. The evaluations will put light on future studies and will help the understanding of the ERP sector easily in general.

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