IN SEARCH OF VISION TO INCREASE COMPETITIVENESS:

BUSINESS RESOURCE PLANNING AND NEW APPROACHES

Assist. Prof. Dr. Orhan ELMACI(*)

Assist. Prof. Dr. Hakan ÇELİKKOL(*)

Assist. Prof. Dr. Ahmet AĞCA(*)

Mediha Mine ÇELİKKOL, PhD (**)

INTRODUCTION

The transformation process occuring in 21st century has increased the pressure on business enterprises. This process is so fast that theory producing efforts of economy-politics has become insufficient.

Free market economy has taken its place in the focal point of in this transformation process. Changes in infrastructure and superstructure of dynamic market economy have accelerated. Within these interactive variables set, factor, such as competition, freedom, quality, disclosure, cooperation and integration have become miles stones for enterprises to reach new frontiers.

Among the critical factors change nature of today's free market economy, is the competition. Competition brings competitiveness. Competitiveness of a business enterprise is the ability of the enterprise having its products preferred among alternatives.

Economic developments in the world have caused radical changes in business enterprises' genetic compositions (focusing on customer, change in technology, nature (structure) of product, production process, human resource, etc.). In parallel to this drastic transformation process, in order to increase their competitiveness strength, businesses have to use their resources efficiently. From this point of view, information processing technologies emerge one of the tools providing competitiveness strength . The latest and most advanced proposed solution brought by information processing technologies is Resources Planning Systems.

Enterprise Resource Planning (ERP) Systems include all functional subsystems (MRP, MRP II, DRP). Efficiency of the systems depends on availability of perfect information flows. Based on that condition has been satisfied, business resources and managerial functions could be used most efficiently.

The biggest problem in integration of ERP systems with business enterprise is difficulty in providing correct, complete and timely data because of not paying enough attention to importance of the system by managers and system users. This problem becomes the biggest problem of the production in the dynamic production environment, because systems that used in business resource planning process need correct, complete and timely data, when this basic condition is not satisfied, synchronization of subsystems is effected, consequently efficiency of system is diminished.

In this study, the importance of ERP systems in increasing competitiveness, background of the concept, new approaches to the concept, the features of the systems' components and

integration of the system with business will first be addressed theoretically, and then a real application of the approach will be presented.

1. THE IMPORTANCE OF COMPETITIVENESS AND ENTERPRISE RESOURCE PLANNING (ERP) SYSTEM IN INCREASING OF COMPETITIVENESS

There are two major factors that affects companies' competitiveness both in national markets and global markets. The first one is general productivity level and the second one is cost advantage.

General productivity is an indicator that shows information and experience competence required for a company to reach the level of leader companies in the market. The general productivity level of a company will increase as it reaches or passes to the level of the leader company. For instance, company's concentration on basic abilities, immediate reaction to the changes or formulation of mechanism that provides integration of changes in genetic construction of company, perception and targeting markets as global markets, etc.. The cost advantage, the other component of competitiveness, is to minimize cost processes (economies of scale, economies of region and factor costs) by creating product or service differentiation. In other words, to decrease the cost by increasing the product and service quality.

These two components of competitiveness also formulate survival and growth strategies of the company**.** Successful implementation of the survival and the growth strategies depends on the information processes. Information processes refer collecting data, producing information from collected data, and using produced information. It will not be possible for a company to increase its competitiveness to desired level if it fails to create and manage information processes for balancing survival and growth strategies.

Enterprise Resource Planning (ERP) has an important role in formulation and management of the information processes. Because ERP is a system formulated to gather correct, timely and meaningful information required in planning, practicing, and controlling of organizational activities by balancing survival and growth strategies of business enterprise.

2. THE EVOLUTIONARY PROGRESS OF ENTERPRISE PESOURCES PLANNING (ERP)

Severe competition forced companies to produce low cost, high quality goods and services. This just could be realized by increasing productivity. In this conditions, information process (having, improving and using information) has come to the front as a key factor, and systems have been developed to use information process more effectively in business enterprises. System development efforts started with Material Requirement Planning (MRP) and reached to the latest level with Enterprise Resource Planning (ERP) applications.

Once IBM produced the first affordable computer for the business enterprises, business world met with the concept of MRP in 1960. MRP can be used easily, because it has a simple logic. MRP is a planning process of components of products used in production. In this planning process, MRP defines exactly components' needs. System includes main material data, bill of material and inventory data. In 1970's purchasing was included.

MRP system is a planning process of the product production . Within this process, net requirements of the product components (production stages, work in process inventory, raw materials) are determined. In addition to this, MRP prepares a production plan considering

materials in hand. By this way it produces time and location plans to make ready the missing materials. Methods used before MRP were based on the replacement of materials. MRP system just predicted which were required in complex manufacturing systems caused by technological developments. However, this approach was just beneficial to companies who had active system, and benefits to the companies were limited, depending on their demand estimation and customer order evaluation functions.

As a result of developments which appeared parallel to latest tendencies in the world, perception of the manufacturer's production changed from production for inventory to production for orders. Focusing on customers in production meant producing better quality goods more. For this reason, in addition to effective material usage, some factors such as capacity usage, economical production and financing subjects came front. As production technology getting complicated, MRP systems became inadequate in balancing planning processes, and each work based on MRP started to produce different results than the former one because of normal changes in demand and supply. While MRP systems' material requirements and business purchasing were planning whether the production capacity was sufficient or not to produce orders was not analyzed and this affected MRP's perception by companies negatively.

As a result of this progress, in 1980's Manufacturing Resources Planning (MRP II) was developed. Its extents contains management of all functions of manufacturing companies. MRP II is not a developed model of MRP. This new and broad approach includes MRP in resource planning. MRP II applications complete MRP, and formed by main and supportive programs about company's manufacturing, purchasing, selling, financing and accounting functions.

MRP II basically includes planning capacity of machinery and workforce in addition to planning of material requirements. MRP II enabled the top management to give correct decision among alternatives by using a common database in order to produce work flow plan, purchasing report, inventory plan. The main purpose of inventory management is to provide correct and timely information about inventory's level. Main performance criterion is harmony of amounts seen in records and amounts had.

The aims of MRP II systems can be summarized as follows; to lower inventory level, to control and to plan production and capacity restrictions, to improve customer relations, to reduce general costs, to increase product quality and productivity. Even though Capacity Requirement Planning (CRP) expanded MRP systems, the system could not keep in step with new conditions and could not answer the demands of companies. Plans produced by CRP and MRP formed successfully short term planning strategies, but were inadequate in long term and strategic planning. Distribution Resources Planning (DRP) and Computer Integrated Manufacturing (CIM) started to take place in MRP II concept in 1980's. In the same years some complex systems started using MRP II, CIM and DRP independently from each other.

In 1990's insufficiency of the existent systems to respond information requirements caused companies to find new solutions with the support of new software and communication technologies. This efforts resulted with birth of ERP.

ERP; MRP, MRP II is seen as a system that plans and checks integrated computer systems in a coordinated way to direct and to carry on production in an effective and productive way. Its integration ability is not limited within the company, it also has the ability to combine all partner businesses by using internet. These abilities made ERP preferred.

Today those are well known facts that customers' requirements change both quantitatively and qualitatively and it is difficult to predict these changes. It's provided by ERP to make business activities sensitive to changes, by paying attention to both aims and targets that are determined with strategic planning, and capacity and features of production and distribution

resources.

Today, ERP systems have united with elements outside of company by using internet and call-centers. ERP continues to go beyond its early stages by including Consumer Relation Management (CRM), Supply Chain Management (SCM) and Business Intelligence (BI) concepts.

3. THE STRUCTURAL PROPERTIES AND THE COMPONENTS OF MODULAR STRUCTURE FOR ENTERPRISE RESOURCE PLANNING

Enterprise Resource Planning (ERP) system is mainly defined as a software way, which has a process based approach for the enterprise, integrates all the functions tightly, has an aim to meet its information and needs, includes a lot of sub systems in its structure. ERP software can be specialized to be attuned to the different needs of different sectors. According to this, ERP software comes out in three different ways. These are:

i. Software is constructed in conformity with the enterprise by including the most comprehensive and direct conditions.

ii. The new modules are formed from comprehensive software. These modules are customized by considering the size of the enterprise.

iii. Software is customized for the enterprise after it is installed as in the first two stages.

Factors distinguish ERP systems from other systems are listed below;

i. It is a standard software packet targeting all sectors and it can be customized when it is installed.

ii. Comparing with other packets, it is more suitable for customization. Because these standard packets, whose target sector has been defined, can be customized in accordance with the special requirements of installation.

iii. ERP is an application software more than a data base administration software, interface software or an operation system.

iv. It is an integrated data base which keeps both main data and the business process data.

v. It presents solution proposals about main business processes.

vi. It has a highly functional structure, because it aims to support many institutional functions.

vii. ERP product packets have been designed to bring solutions independent from countries and regions worldwide. ERP packets carry out the functions such as accounting processes changing from one country to another, making special documents (etiquettes, bills etc.) and the management of human resources appropriately to special country needs.

viii. Since main ERP product packet has enough functionality to provide usage in the worldwide, it targets not some sectors but all sectors.

ix. The main distinguishing feature of the ERP software from the others is that ERP packets support repeated and continuous business processes such as supply administration, order administration, and payment transactions. These packets does not concentrate on poorly constructed and irregular transactions such as marketing, developing products,

project management.

An enterprise should choose the most appropriate software for its own structure and sector in order to get desired benefits from resource planning system and apply the system successfully. Major features of the customized ERP software are:

i. Elasticity: ERP system should be able to meet the changing needs of the enterprise.

ii. Modular and Open System: ERP system should have an open system. This means that a module can be added or taken out without affecting the other modules when it is essential.

iii. Extensiveness: It should be able to support various organizational functions and it must be suitable for a large area of the enterprise organizations.

iv. Exceeding the Enterprise Limits: ERP system should be limited with organizational limits to connect online with the other units of the organization.

v. The Best Enterprise Applications: An ERP system should collect all the best enterprise application processes that can be practiced in the worldwide.

vi. The Simulation of Reality: EP system enables the simulation of enterprise processes.

ERP systems collect all of the organizational functions work and information flows under one system. Owing to this way, enterprise resources are began to be used productively and they become a link to reach the strategic targets as a consequence of the improvements within the system. The effectiveness of ERP system comes out with having a perfect information flow. ERP systems have an aim to integrate through other applications they work together in the fields such as traditional MRP and MRP II system functions, finance, sale and marketing, logistics and human resources.

ERP can be defined as a software system which enables a multidimensional management among enterprises' human resources, distribution, sale, production and finance functions. The system enables internal of enterprise to have an open information and communication network. Open information is the information that can systematically be expressed, accessible and transferable. ERP based softwares are supported by functional databases and written by using different programming languages. They have graphic user interface and have a open structure. This makes possible to integrate with other software. Technical features of ERP system are listed below:

i. It is a three layered client/server structure: application, database and presentation.

ii. There are graphic interfaces in all application areas coherent with each other.

iii. Operating system and hardware are independent. ERP packets can be installed on different systems such as Solaris, Windows or Linux.

iv. ERP's are may be too complex, but there are no other systems that provide same services.

ERP system removed the obligation to use many interfaces by putting all work processes and automation into one software. Additionally, it provides valuable information obtained from each process to be used in another without losing time by creating a natural integration among all processes. The common properties of ERP are demonstrated as conceptual in Figure 1.

Figure 1: The Major Characteristics of ERP

Source: A. Hangman, What will be of ERP, **Project Report**, School of Information Systems Queensland University of Technology, 2000, s. 13.

ERP has been developed to increase enterprises' productivity and enterprises' competitiveness. An ERP consist of modules.

ERP integrates business functional areas. Notice how modules are arranged in Figure 2. The modules on the diagram are for Marketing and Sales, Production and Materials Management, Human Resources, Financial Management, Workflow, and Indutry Solutions. Workflow module can be used to automate any of the activities in ERP solutions. It can perform task-flow analysis and prompt employees (via e-mail) if they need to take action. Industry Solutions Module has found are appropriate for particular industries. These settings simplify implementation and let the buyer take advantage of software company's industry experience.

Figure 2: The Main Components of Modular Structure for ERP Software

Source: Joseph A. Brady, Ellen F. Monk, Bret J. Wagner, **Enterprise Resource Planning,** Course Tecnology, Thomson Learning, Canada 2001, s.24.

4. THE FORMULATION OF ENTERPRISE RESOURCE PLANNING (ERP) FOR THE ENTERPRISE

While ERP provides right, seasonably, meaningful information which needs for the planning of organizational activities, organizing, carrying out and control by balancing the existence and improvement strategies of the enterprise, the integration of developing informatics system for the enterprise is realized in four stages:

i. Assessment of substructure: In this stage in the framework of resource planning strategy and technology; the present network system of the enterprise requires what their roles in intranet and extranet resource planning are. Thanks to this, the present data base, data stores, project management and the systems supporting decisions should be analyzed.

ii. The analysis, designing and developing of the system: Designing the substructure of ERP consists of stages; auditing present information assets and systems, determining ERP staff, creating architect plan of ERP and developing the management system of ERP.

iii. Settling and spreading the system: In this stage, enterprise must be settled by outcome based increase methodology. The concepts of changing, culture and award must be considered while they are being settled and spread.

iv. Assessment: This last stage includes results of ERP studies, review of both conditions created and position reached.

TRX Company was studied based on these stages.

4.a. Assessment of Substructure

Sale planning, production planning, designation of material need, overspreading of material orders, acceptance of materials to the store, the registration of production findings and accounting of all these transactions were realised in different places in the enterprise TRX which was established in 1996 until 1998. However, every transaction had to be followed on different systems and also every transaction especially related to accounting-finance fields, which couldn't obtain integrity, had to be reloaded to existing program. Like in this area, the transactions performed in other areas only put forward the present case and didn't support planning and decision process.

When the developments in technology and demander / supplier systems were combined with deficiencies of the enterprise, new searching became inevitable. The company accepted the fact that its only possible to increase its market share by using information systems. As a consequence of this, it directed to Enterprise Resource Planning (ERP), a technological strategy, including the function of financial management in management information system inclined to the trinity; providing, production and sale.

4.b. The Analysis, Designing and Developing of the System

After the decision to buy ERP software was taken, a selection team consisting of two senior mangers, the manager of information processing department and an employee who worked on information processing for other enterprises before and worked to construct the information system of marketing in the enterprise during that period. This team always worked harmoniously until the end of selection stage with those responsible for buying, sale, production and finance departments of ERP considered to be applied. While doing selection among alternative ERP software, the criteria such as demonstrating the processes of the enterprise on software, building integration between processes, constructing harmony between the activities to be carried out through the system by the employees and the organisational structure; and the inclination of software to usage were put into consideration and software prepared by the enterprise NLX one of the international software companies founded to provide counselling and software were preferred. They have been still presenting the applications about ERP to usage.

ERP system, which the enterprise TRX established its substructure with this firm's software, took its place as an effective way in building integration among sale, buying, planning, inventory management, production control, distribution, sending, finance, multiple stores, multiple factory constructions and multiple financial management structures.

4.c. Establishing and Spreading the System

For enterprises, of high quality but low cost production, communicating inside and outside the

organisation, having the required speed to meet the needs of clients are main factors bringing competing superiority. The enterprise TRX has developed business strategies to obtain this superiority. Strategies are supported by the substructure of information and communication technology executing the business flow of the enterprise completely on time and integrating the information system. ERP applications provide great elasticity in the studies to reconstruct the enterprise processes that the developing strategies require, opposite the changing conditions of business life.

The components of enterprise information system consist of hardware, software, processes, data, internal and external suppliers. Some certain standards have been formed for hardware and software components so that information system should be effective, productive and elastics.

The enterprise has institutional software working integrate with each other during execution. The functions of existing software are continuously broadened in order to provide the continuity and adaptation of information to changing business conditions. In addition to ERP software, TRX has care program, business flow management system, document management system, lotus program providing communication among employees, report and analysis program getting datum from ERP software, CAD applications, internet applications and a system making use of the enterprise's own software.

Three levels have been determined at the construction of information system and a map has been designed. These levels are strategic level, tactics level and operational level. The enterprise TRX information system map has been shown on Figure 3.

Strategic level; there is no tool making analyses about taking decisions in the enterprise TRX information system, sampling data, simulation yet, but in the operational level, the right, timely and complete structure is about to be completed. Business Flow Management has begun to be used as pilot model since the beginning of 2004. In the enterprise which accepted management model by teams, the reports prepared periodically and not periodically, data prepared by information system tools on the operational level are presented to the use of senior management. Systems providing structural and semi-structural data are used to operate business flow management system and its control.

The analysis program on the tactics level is a product which makes the latest user prepare its own reports in an elastics ambience on different dimensions. It is the easiest and the most practical software for inquiry, reporting and analysis on the data collected by ERP software. Information is examined analysed easily and influentially through software from summary to details on various dimensions, the format wanted by the users.

By the way in the operational level, software constituting information system support the system to carry out the operational and tactics business flow separately or entirely. Document management system in this level has taken its place in the information system as the institutional memory of the enterprise. Data is collected, reported and analysed connecting with business flow by sub-systems such as ERP software in the present information and care software integrated to this software. Document management system has been gotten and put into practise to collect and count the data in the system except these findings, attained by general knowledge of the enterprise employees and remained in personal computers but not included in the system.

All these components have constituted the architectural structure of information system. As it is seen, in this structure the enterprise targets a unique control system integrating information of departments such as purchasing, financial affairs, production, planning, human resources, marketing. The critical point to reach this goal is that different departments use the same

information on the same data base. Therefore we encounter ERP system as the way of this assertive target.

ERP system has various functions. Suitable functions for the institution are put forward examining the system in the application process. The functions determined in the application of the enterprise TRX are:

- Production Management
- Stock Management
- Purchasing Management
- Sale Management
- Finance Management

Purchasing and Stock management consist of demand information coming from other departments or material need system to purchasing department, reporting the needs to supplier firms, delivery process. Purchasing modules operating this process includes three parts; purchasing transactions, purchasing demands and purchasing contracts. All procedures and documents related to purchasing are followed with this module.

The materials coming from supplier firms are accepted with stock unit codes determined before and the acceptance information of purchasing are matched with invoice and waybill information on the system. In this stage, there are financial registers belonging to operations with the help of previously defined accounting codes to the system. The persons responsible for purchasing and sores have active roles on software until the end of this process. Meanwhile demanding, purchasing, acceptance, quality control and seller current procedures are ran together.

In the extent of production and inventory management, owned software supports four kinds of production; production for inventory, production for orders, production for assembly and design for orders. The most important property of software is that these four types production can be executed integrate at the same time. All required modules, such as production planning and following business orders in the factor field, exist in software.

The activity encouraging the consumption of the materials stocked after acceptance process is production orders. Production orders include the amount information of stocked materials, store information of materials, planning information of capacity need, production trees and route information of major production after manufacture. Increasing productivity among users getting the information of the enterprise activities from the system is the main factor of the operation. While production planning, product store and sale personnel fulfil active roles, in the production process beginning with the spreading of production orders, planning, production store acceptance, store transfer, quality control and style procedures are operated together. Accounting registers are performed automatically.

Marketing Management consists of three parts; sale module, sale operations, offer and sale contracts. Sale order is the encouraging factor of the module. The marketing process comes to an end with making out invoices for the demands of client firms. Marketing, production and product store personnel use the system together in the process. Accounting register exist automatically with the stock exit of product store and making out an invoice.

There is a finance module encouraged by the internal and external finance movements. Due to integrated systems, purchasing, production, marketing and stock orders are determined before to complete the orders and accounting records are formed synchronously with the accounts

defined according to the system. Data coming from integration net is collected in the finance module and turned into financial statement information.

Modules are used as a whole during the implementation of software to the enterprise. A care software obtaining data only from ERP system because of enterprise policy which has been able to be integrated to these modules by software since 1999 and ERP has been tried to be developed by applying the working project module in ERP.

In order to run the procedure belonging to departments constituting the scopes and orders, forms to be filled, sub-processes developing in business process and ways of business in the system without deduction; new processes can be added and the old ones can be thrown out. Performed business analyses, main data hierarchy and operational data according to their definitions are updated in the system and the present case of the enterprise is transferred to ERP software. Analyses and report results are updated, operational entries are controlled, the studies of protecting elasticity continue. As Decision Support System has been brought forward, both enough details and ERP software are included in ERP through other software.

4.d. Assessment

ERP in the enterprise TRX has been practised quite comprehensively to meet almost all demands of users. The comprehensive application made the structure complex. Because of this case and the software prepared by another firm which has caused studies to be operated without the support of a counsellor firm. However the local support has been inadequate especially for the appropriateness to regulations in the aspect of undertaking finance module and it has created risk in the application. Despite this fact, data base that ERP made the enterprise acquire, which made the application indispensable.

The answers of the following questions are a point of view to measure the success of the application in the enterprise.

i. Can operations be directed / followed productively?

ii. Can the productivity of activities and processes be measured?

iii. Can integration be established between activities and processes?

iv. Can Decision Mechanism (senior management) reach reports / data, not out of date, in details and frequency they need?

A clear answer can't be given to the other questions except the questions 3 and 4, this shows control mechanism hasn't been able to be founded on the system. Control reports have been prepared but these reports couldn't be overspread for each activity.

In addition, there is an increase in business volume and new investments are being done. One of the targets of is to join different sectors. When this target comes true, operations become complex. The present software is doubtful about providing the desired ERP. Because software, the product of seven years ago has problems such as version upgrade, the integration of the applications not taking place in software (like human resources) to the system. Thanks to this, the enterprise is about to upgrade or take a decision about a new software without giving up the existing software.

5. CONCLUSION

Economic developments occurring around the world have caused drastic changes in business enterprises' genetic structures. Obtaining sustainable competitiveness for a company has become one of the key issues in this rapid changing environment.

For an enterprise, having its products sustainably preferred by customers relative to its alternative ones has become an inevitable economic reality. In that sense, perceiving an enterprise as a system and analyzing the relations arising from the interaction between the dynamic factors affecting the system and based on the results of the analysis reconfiguration of the structure of the enterprise has become obligatory. That formation leads to a change in the way of thinking from the perception of the operation of the enterprise as a whole rather than separately to the performers of the enterprise's operations as active participants in the formation of their own future rather than desperate reactioners. The way be pursued in the reformation of enterprise's functions requires a design which pays attention to balancing between survival and growth strategies of the enterprise.

Survival strategy of the enterprise enables it to sustain its existing profit level. While that strategy brings its strong points front in the area of assets of enterprise and information base, it pushes the weak points of the enterprise backward. The aim is to take the business opportunities at that time and avoid treats. The growth strategies demand reformulation of the enterprise's business environment by considering its new and distinct sides in such a way that it will make the enterprise superior in the future. These strategies also show how the enterprise can increase its negotiation power against potential suppliers and customers in the future by influencing the improvement of the sector. The strength of influence in that way could be provided by ERP and this obtains ground for establishing strong relations with future suppliers and customers. As developing ERP, potential rivals and their reactions to enterprise's acts must be considered.

The perfect balance between growth and survival strategies could be established by ERP. Because ERP gathers planning, practicing, and controlling functions of business enterprise in one common denominator. Using ERP and internet together will mean the concept of supply chain management. Therefore, by establishing information transmitting network between the enterprise and suppliers, regional depots, and wholesalers and retailers, inventory volume and production process will be simultaneously seen by all parties. As a result of that, the productivity and efficiency in logistic operations rises. Moreover, ERP reacts immediately to rapid changes in the sector and enables system operators to obtain high quality needed data and arises opportunities for performing survival and growth strategies in correct and balanced manner.

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