DETERMINATION AND INVESTIGATION OF INFORMAITION TECHNOLOGY PARAMETERS EFFECTIVE TO FOOD INDUSTRY DEVELOPMENT

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ABSTRACT

Information Technology (IT) parameters are very important to develop of food industry. In this research IT parameters that are effective to food industry development have been determined. Also the food industry indexes and effect of information technology indexes on each it have been investigated. IT parameters that have been considered were eCRM, MRP, MRP II, ERP, eSCM, Data Base Application, DSS, SIS, MIS, Networking, and EDI. Results can help the managers of food industry to planning for improve their industries.

According to the results: ERP can apply magic affect to the major food industry processes. CRM helps food industries to use technology and human resources to gain insight into the behaviors of customers and the value of those customers. SCM can cut costs substantially, since you no longer need to pay to produce and store excess goods. MRP can computerized approach to inventory planning, manufacturing scheduling, supplier scheduling, and overall corporate planning. MRP II improves the best using of resources and can control the equivalent distribution of resources. DSS can help manager to take a good decision about quality of production and also improve electronic industry management. SIS is benefit for make strategic plan in huge company. MIS is affecting on integrate financial information, manufacture inventory, and integrate customer order information, respectively. EDI allows for the ability to send and receive information at any time thereby tremendously improving an organizations ability to communicate quickly and efficiently. Internet is most effective on food industry development parameters. Data base application is more useful to integrate financial information. And networking is very effective on speed up manufacturing processes.

Keywords: *ERP, CRM, SCM, DSS, MIS, Food Industry, SIS, EDI, and Information Technology.*

1. INTRODUCTION

Although Web Services and Electronic Collaboration are the key buzzwords of today's economy, the majority of food industry is still done via manual paper-based processing. For example, supplier invoices and customer orders are still received via fax machines of yesterday. The process for handling these documents is time-consuming, error prone, and most of all unnecessary. Changing the way in which trading partners interact with you is an evolving and slow process, but changing the way your organization deals with paper transactions can be done in a few weeks. Information technology (IT) parameters are removing the manual and cluttered processes of yesterday for many organizations around the globe.

The solution is programmed to recognize standard data elements of business transactions such as order numbers, amounts, bank details, article numbers, addresses, and more. As alterations or variations are presented, artificial intelligence learns and stores them in the knowledge base for future application so manual intervention is no longer needed. This process allows the system to handle structured and unstructured data, and is the key to deploying the solution quickly and efficiently. Remember, most food industries don't receive standard, pre-defined documents but receive hundreds of paper variations of the same data [1, 2].

Information Technology (IT) parameters are very important to develop of food industry. Subject of this research was determination and investigation of information technology parameters that are effective to food industry development. Information technology parameters that were considered in this research are electronic Customer Relation Management (eCRM), Material Requirement Planning (MRP), Manufacturing Resource Planning (MRP II), Enterprise Resource Planning (ERP), electronic Supply Chain Management (eSCM), Data Base Application, Decision Support Systems (DSS), Strategic Information System (SIS), Management Information System (MIS), Networking, Internet and Electronic Data Interchange (EDI) those are using or useful to food industry development. Also food industry indexes and effect of information technology indexes on each it have been determined and investigated. The food industry parameters that have been considered in this research were quality of production, human recourses, distribution of resources, economic benefit, best using of resources, increased customer service, integrate financial information, integrate customer order information, standardize manufacturing processes, speed up manufacturing processes, cost management, manufacturing inventory, supplier scheduling, sales and marketing, customer contact, master production schedule, bills of materials, and electronic industry management.

2. RESEARCH REVIEW

Rhion Jones believes that eCRM is not just customer service, self-service web applications, sales force automation tools or the analysis of customers' purchasing behaviors on the internet. eCRM is all of these initiatives working together to enable an organization to more effectively respond to its customers ' needs and to market to them on a one-to-one basis [3].

The Internet is revolutionizing the way organizations provide customer service. With more and more people using the web to interact with businesses, it is becoming increasingly critical for these organizations to collectively manage all main channels of communication from their customers, whether by phone, e-mail, through the post or via their website [4].

Opinions on the impact of digital technologies on customer relationships have swung from anxiety about the threat of frictionless commerce, to enthusiasm over the prospects for cutting customer service costs and tightening connections with customers. As recently as 1999 the prevailing view was that when customers could use the internet to expand their search for alternatives, learn more about them faster and easily compare prices, that margins would shrink and loyalty would be increasingly transient [5].

According to Norbert Höckl opinion, online shopping is getting increasingly common. Lots of articles are less expensive in the online stores and there are easy ways to compare prices of merchandise over the net. However, customers still prefer to spend a significant amount of their money via traditional channels such as "offline stores" [6].

Tom Sweeny believes that have your electronic service initiatives lived up to your expectations for cost and efficiency? What do your customers think about your e-services? Do they use it, and are they satisfied with the electronic services you provide? [7].

Druzdzel, M. J. and S. L. Alter, believe that for the reason of the lack of one generic model of decision-making, the concept of a decision support system (DSS) is extremely broad and its definitions vary depending upon the author's point of view and are strongly dependent on the DSS application context. DSS are a specific class of computerized information system that supports business and organizational decision-making activities [8]. A DSS can take many different forms and the term can be used in many different ways to use by manufacturers [9].

3. RESEARCH METHOD

IT parameters that are more important to food industry development and are more effective to improve industry management have been determined and investigated by question sheet that were spread among our population. Statistical population to determine the IT parameter was the employer and manager of food industry. Also the effective present of those parameters in food industry development has been determined. Independent variables in this research were IT parameters. IT parameters that have been considered in question sheet were eCRM, MRP, MRP II, ERP, eSCM, Data Base Application, DSS, SIS, MIS, Networking, Internet and EDI.

Food industry development is exposed to several factors, including , quality of production, human recourses, distribution of resources, economic benefit, best using of resources, increased customer service, integrate financial information, integrate customer order information, standardize manufacturing processes, speed up manufacturing

processes, cost management, manufacturing inventory, supplier scheduling, sales and marketing, customer contact, master production schedule, bills of materials, and electronic industry management [1]. These factors were dependent parameters in this research.

Data of question sheet has been analyzed by statistical software (SPSS) and those IT parameters that are more effective on food industry development have been illustrated.

4. RESULTS AND DISCUSSION

IT indexes have played a significant role in the development and use of electronic benefit to food industry systems. The results show that the benefit percent of each IT parameters on food industry development indexes.

4.1. Enterprise Resource Planning, ERP

ERP is a software system designed to support and automate the business processes of medium and large businesses. ERP can aid in the control of many business activities, like sales, delivery, billing, production, inventory management, and human resources management. All functional departments that are involved in operations or production are integrated in one system. In addition to manufacturing, warehousing, and shipping, this would include accounting, human resources, marketing, and strategic management.

The software attempts to integrate all departments and functions across a food industry onto a single computer system that can serve all those department's particular needs.

Building a single software program that serves the needs of people in finance as well as it does the people in human resources and in the warehouse is a tall order. Each of those departments typically has its own computer system optimized for the particular ways that the department does its work. But ERP combines them all together into a single, integrated software program that runs off a single database so that the various departments can more easily share information and communicate with each other [10].

The results showed that ERP can to improve the way Food Company takes a customer order and processes that into an invoice and revenue, otherwise known as the order fulfillment process. That is why ERP is often referred to as back-office software. It doesn't handle the up-front selling process (although most ERP vendors have recently developed CRM software to do this); rather, base on results (see figure

1) ERP takes a customer order and provides a software road map for automating the different steps along the path to fulfilling the order. When a customer service representative enters a customer order into an ERP system, he has all the information necessary to complete the order.

The results showed that ERP can apply that same magic to the other major business processes, such as employer benefits or financial reporting.

People don't like to change, and ERP asks them to change how they do their jobs. That is why the value of ERP is so hard to pin down. The software is less important than the changes companies make in the ways they do business. If you use ERP to improve the ways your people take orders and manufacture, ship and bill for goods, you will see value from the software. If you simply install the software without trying to improve the ways people do their jobs, you may not see any value at all. Result shows that ERP can improve human recourses.

4.2 Electronic Customer Relationship Management, eCRM

CRM is a process or methodology used to learn more about customers' needs and behaviors in order to develop stronger relationships with them. There are many technological components to CRM, but thinking about CRM in primarily technological terms is a mistake. The results show that CRM is as a process that will help bring together lots of pieces of information about customers, sales, marketing effectiveness, responsiveness and market trends (figure 2).

According to the results (figure 3), CRM helps food industries to use technology and human resources to gain insight into the behaviors of customers and the value of those customers.

Base on the results of research, web based CRM or Self service CRM (eCRM) software enables web based customer interaction, automation of email, call logs, web site analytics, and campaign management.

4.3. Electronic Supply Chain Management, eSCM

Supply chain management (SCM) is the combination of art and science that goes into improving the way your company finds the raw components. It needs to make a product or service and deliver it to customers [11].

Supply chain management software is possibly the most fractured group of software applications on the planet.

SCM can connect your supply chain with the supply chains of your suppliers and customers together in a single vast network that optimizes costs and opportunities for everyone involved. According to results SCM can improve the economic benefit of food industry.

The payoff of timely and accurate supply chain information is the ability to make or ship only as much of a product as there is a market for. This is the practice known as just-in-time manufacturing, and it allows food companies to reduce the amount of inventory that they keep. Results show that SCM can cut costs substantially, since you no longer need to pay to produce and store excess goods (figure 4).

4.4. Relationship between ERP and CRM

ERP is often called back offices systems indicating that customers and the general public are not directly involved. This is contrasted with front office systems like customer relationship management (CRM) systems that deal directly with the customers, or the eBusiness systems such as eCommerce, eGovernment, eTelecom, and eFinance, or supplier relationship management (SRM) systems.

ERP is cross-functional and enterprise wide. All functional departments that are involved in operations or production are integrated in one system. In addition to manufacturing, warehousing, logistics, and Information Technology, this would include accounting, human resources, marketing, and strategic management. Figure 5 shows the effective of ERP and CRM on food industries development indexes.

4.5. Relationship between ERP and SCM

Many SCM applications are reliant upon the kind of information that is stored in the most quantity inside ERP software. Theoretically you could assemble the information you need to feed the SCM applications from legacy systems, but it can be nightmarish to try to get that information flowing on a fast, reliable basis from all the areas of the company. ERP is the battering ram that integrates all that information together in a single application, and SCM applications benefit from having a single major source to go to for up-to-date information. These days, most ERP vendors have SCM modules so doing an ERP.

Applications that simply automate the logistics aspects of SCM are less dependent upon gathering information from around the company, so they tend to be independent of the ERP decision. You'll need to have these applications communicate with ERP in some fashion. It's important to pay attention to the software's ability to integrate with the Internet and with ERP applications because the Internet will drive demand for integrated information. For example, if you want to build a private website for communicating with your customers and suppliers, you will want to pull information from ERP and supply chain applications together to present updated information about orders, payments, manufacturing status and delivery. Figure 6 shows the effective of ERP and SCM on food industries development indexes.

4.6. Materials Requirement Planning, MRP

Material Requirements Planning is a software based production planning and also MRP is a scheduling procedure for production processes that have several levels of production. Given information describing the production requirements of the several finished goods of the system, the structure of the production system, the current inventories for each operation and the lot sizing procedure for each operation, results show that MRP determines a schedule for the operations and raw material purchases in food industry.

All manufacturing organizations, whatever it is they produce, face the same daily practical problem, customers want products to be available in a shorter time than it takes to make them. This means that some level of planning is required.

Companies need to control the types and quantities of materials they purchase, plan which products are to be produced and in what quantities and ensure that they are able to meet current and future customer demand, all at the lowest possible cost. Making a bad decision in any of these areas will lose the company money [12].

According to this research MRP can computerized approach to inventory planning, manufacturing scheduling, supplier scheduling, and overall corporate planning (see figure 2). The material requirements planning (MRP) system provides the user with information about timing (when to order) and quantity (how much to order), generates new orders, and reschedules existing orders as necessary to meet the changing requirements of customers and manufacturing. The results show that MRP can help manage food manufacturing process, and control inventory of production.

4.7. Manufacturing Resource Planning, MRP II

MRP II is the process for determining material, labor and machine requirements in a manufacturing environment. MRP II is the consolidation of material requirements planning (MRP), capacity requirements

planning (CRP), and master production scheduling (MPS).

According to the results (figure 2) MRP II improve the best using of resources and can control the equivalent distribution of resources in food industry.

4.8. Relationship between MRP and MRP II

Manufacturing resource planning (MRP II) evolved from material requirements planning when it was recognized that most major data needed to manage a manufacturing or distribution firm could be obtained from the material requirements planning information. The ability of a mmanufacturing resource planning system to meet the various needs of manufacturing, materials, and marketing personnel within a changing business environment contributes to its growing implementation by manufacturing companies.

MRP was originally designed for materials planning only. When labor and machine (resources) planning were incorporated it became known as MRPII. Today the definition of MRPII is generally associated with MRP systems. Figure 2 shows the relationship and correlation between MRP and MRP II. The results of this figure show that the effective of these parameters on food industry indexes are the same.

4.9. Relationship between ERP, MRP and MRP II

Enterprise Resource Planning is a term originally derived from manufacturing resource planning (MRP II) that followed material requirements planning (MRP). MRP evolved into ERP when "routings" became major part of the software architecture and a company's capacity planning activity also became a part of the standard software activity. ERP systems typically handle the manufacturing, logistics, and distribution, inventory, shipping, invoicing, and accounting for a company. ERP software can aid in the control of many business activities, like sales, marketing, delivery, billing, production, inventory management, quality management, and human resources management.

According to figure 3 ERP is most effective on food industry improvement indexes than those MRP and MRP II, because ERP contain the modals of MRP and MRP II.

4.10. Decision Support Systems, DSS

Decision Support Systems is a type of Information System. DSS are a specific class of computerized information system that supports business and organizational decision-making activities. A properly designed DSS is an interactive software-based system intended to help decision makers compile useful information from raw data, documents, personal knowledge, and business models to identify and solve problems and make decisions.

According to the results DSS can improve the food industry index to grow. DSS can help manager to take a good decision about quality of production and also improve electronic industry management (figure 4).

4.11. Strategic Information System, SIS

Strategic Information System (SIS) is a type of Information System that is aligned with business strategy and structure. The alignment increases the capability to respond faster to environmental changes and thus creates a competitive advantage [13]. A major source of controversy surrounding SIS is their sustainability. Results show that SIS is benefit for make strategic plan for huge company. Figure 4 shows the results of effective of SIS on food industries development indexes according to these results for small food Industry companies this kind of information company also can used in food industry.

4.12. Management Information System, MIS

Management Information System is a type of Information System [14]. MIS system, typically computer-based, that collects and processes data (information) and provides it to managers at all levels who use it for decision making, planning, program implementation, and control. MIS is comprised of all the components that collect, manipulate, and disseminate data or information. The activities involved include inputting data, processing of data into information, storage of data and information, and the production of outputs such as management reports. Figure 4 shows that MIS is affecting on integrate financial information, manufacture inventory, and integrate customer order information, respectively.

4.13. Electronic Data Interchange, EDI

Electronic Data Interchange (EDI) is the computer-to-computer exchange of structured information, by agreed message standards, from one computer application to another by electronic means and with a minimum of human intervention. In common usage, EDI is understood to mean specific interchange methods agreed upon by national or international standards bodies for the transfer of business transaction data, with one typical application being the automated purchase of goods and services [15].

Despite being relatively unheralded, in this era of technologies such as XML services, the Internet and

the World Wide Web, EDI is still the data format used by the vast majority of electronic commerce transactions in the world.

According to the results of this research, there are several advantages of using EDI all of which provide distinct benefits to improve food industry development. One of the most notable benefits to using EDI is the time-saving capability that it provides. By eliminating the process of distributing hard copies of information throughout the company, easy access to electronic data simplifies inter-department communication. Also, another time-savings advantage is the ability to track the origin of all information therefore significantly reducing time spent on corresponding with the source of the information (figure 5).

Another benefit for the food industry of this information system is the ultimate savings in costs for the company. Although the initial set-up costs may seem high, the overall savings received in the long run ensures its value. For any business, regardless of its size, hard-copy print outs and document shipping costs add up. EDI allows for a paper-less exchange of information reducing handling costs and worker productivity that is involved with the organization of paper documents.

Electronic data interchange has another strong advantage over paper-based information exchange which has to do with accuracy of information. When the information is already stored electronically, it speeds up an organizations ability to check for accuracy and make any necessary corrections as the data is already inputted in the system. Also, unlike paper-based methods, EDI allows for the ability to send and receive information at any time thereby tremendously improving an organizations ability to communicate quickly and efficiently.

4.14. Data Base Application, Networking and Internet

Recently Data Base Application, Networking and Internet are affecting on industry development. Results show that Internet is most effective on food industry development parameters. Data base application is more useful to integrate financial information. According to the results (figure 5) networking is very effective on speed up manufacturing processes.

5. CONCLUSION

According to the results of this research, Information Technology parameters such as ERP, eCRM, eSCM, EDI, DSS, SIS and another parameters can improve the food industry development indexes, in below some advantages of Information Technology on food industry development are present.

1. Reduce costs by automatically recognizing, verifying, and integrating your paper-based transactions into your applications.

2. Remove manual, error prone re-keying of critical documents.

3. Automated two-way document matching to ensure that invoices which are properly matched to the system generated purchase orders.

4. Data is recognized and converted into any other format such as XML, Flat file, application file, and more for integration with any back-end application automatically send change notices, acknowledgements, or other partner notifications.

5. Increased customer service as automation removes lost orders and delays Global solution which can easily understand different languages and regional transaction elements.

6. Integrate financial information.

7. Integrate customer order information.

8. Standardize and speed up manufacturing processes.

9. Reduce inventory in food industry.

10. Standardize human resource (HR).

11. Ensure materials and products are available for production and delivery to customers.

12. Maintain the lowest possible level of inventory.

13. Plan manufacturing activities, delivery schedules and purchasing activities.

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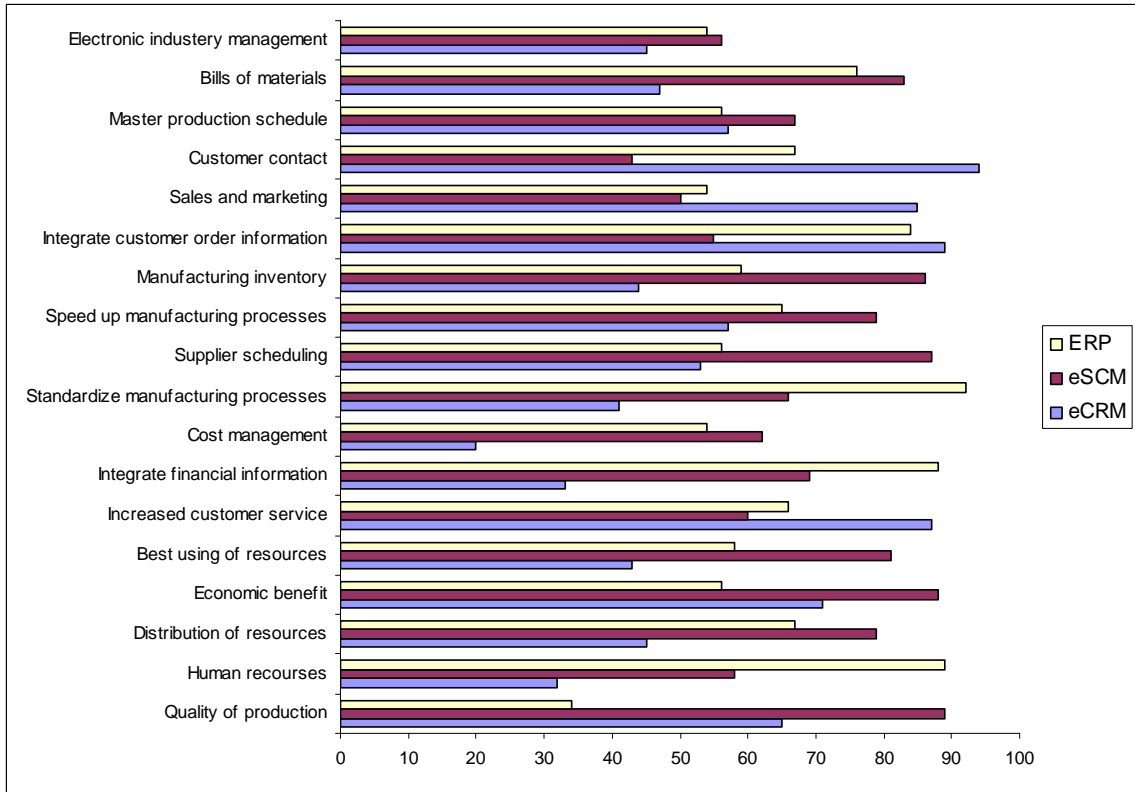
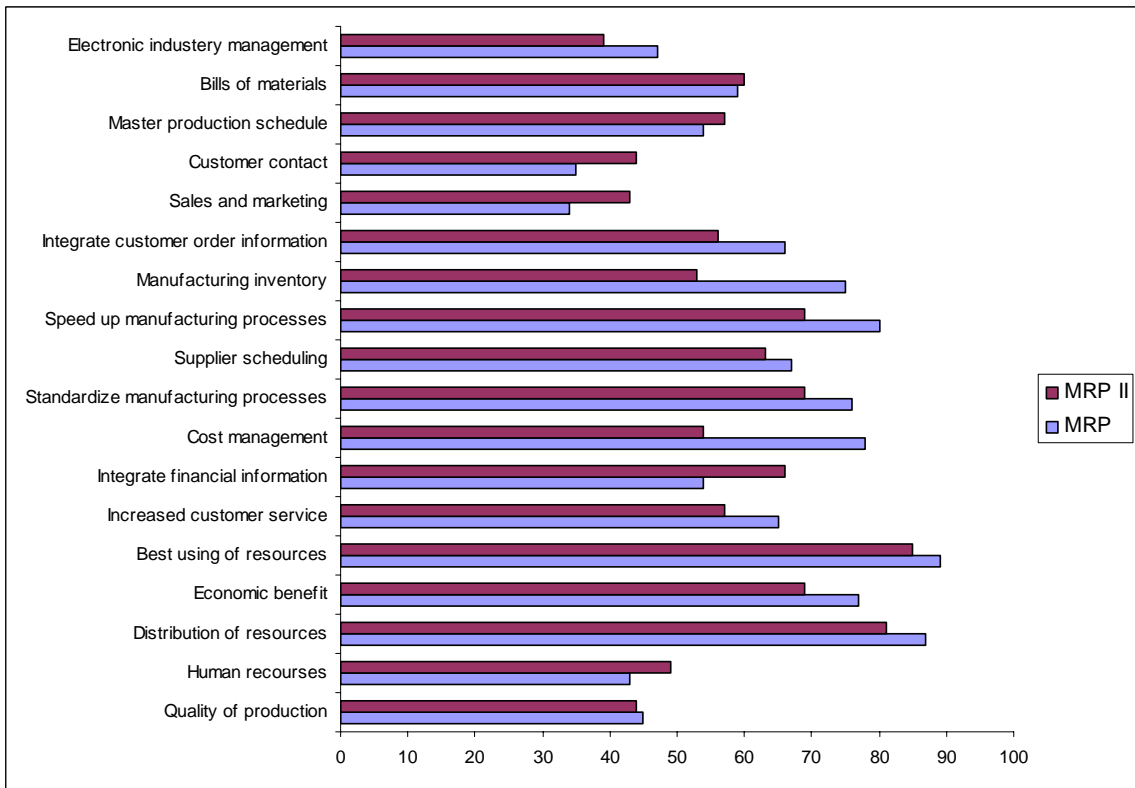*Figure 7. Effect of ERP, eSCM, and eCRM on food industry development indexes*

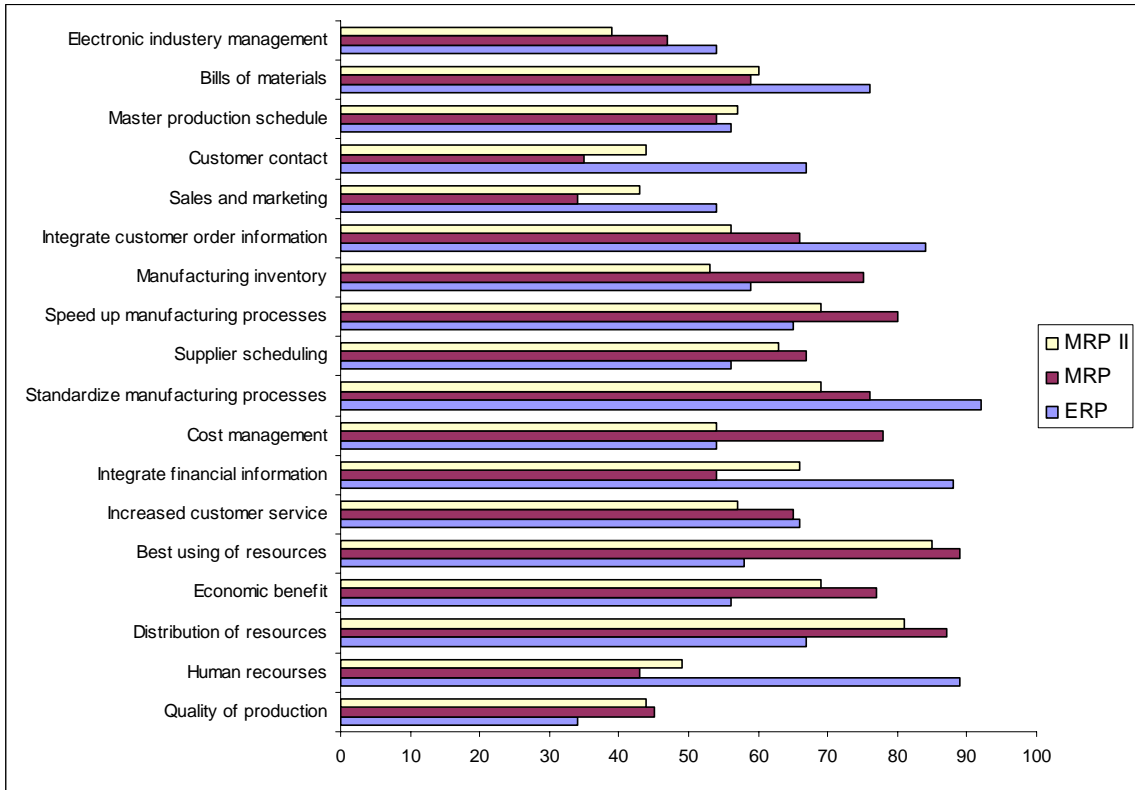*Figure 2. Effect of MRP and MRP II on food industry development indexes*

Figure 3. Relationship among MRP, MRP II and ERP and effective of these parameters on food industry development indexes
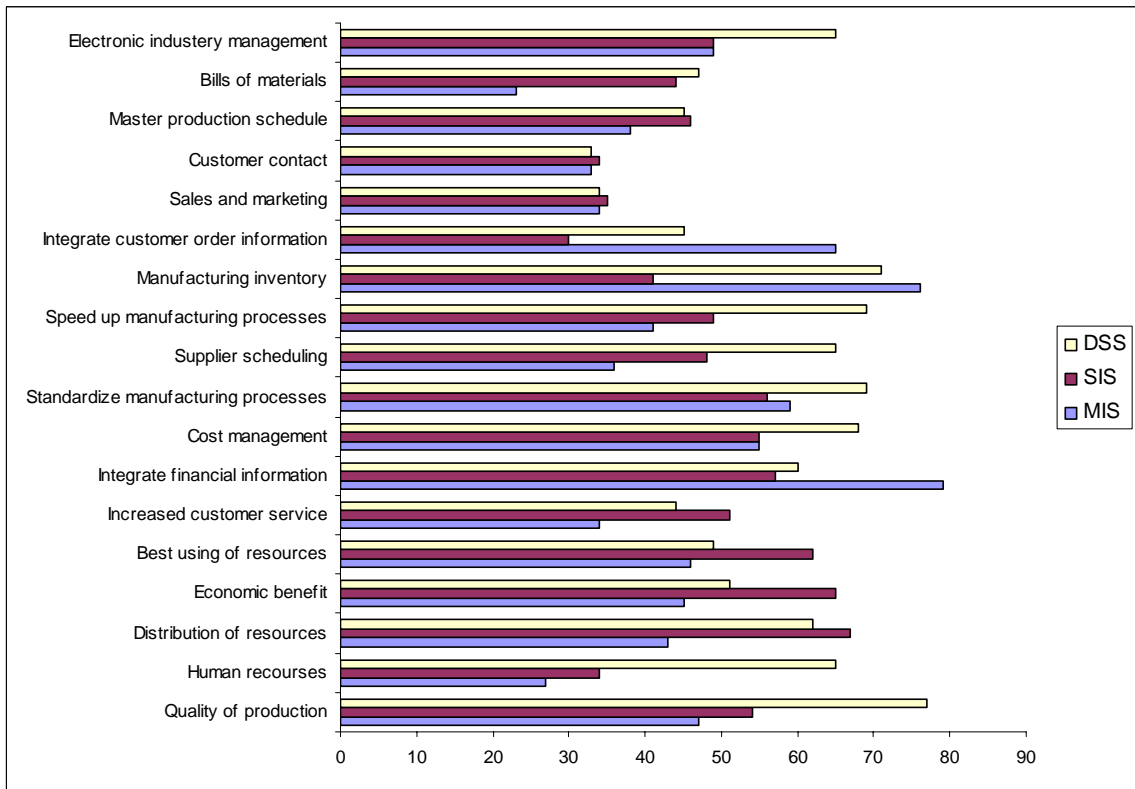

Figure 4. Effect of information system parameters such as DSS, SIS, and MIS on food industry development indexes
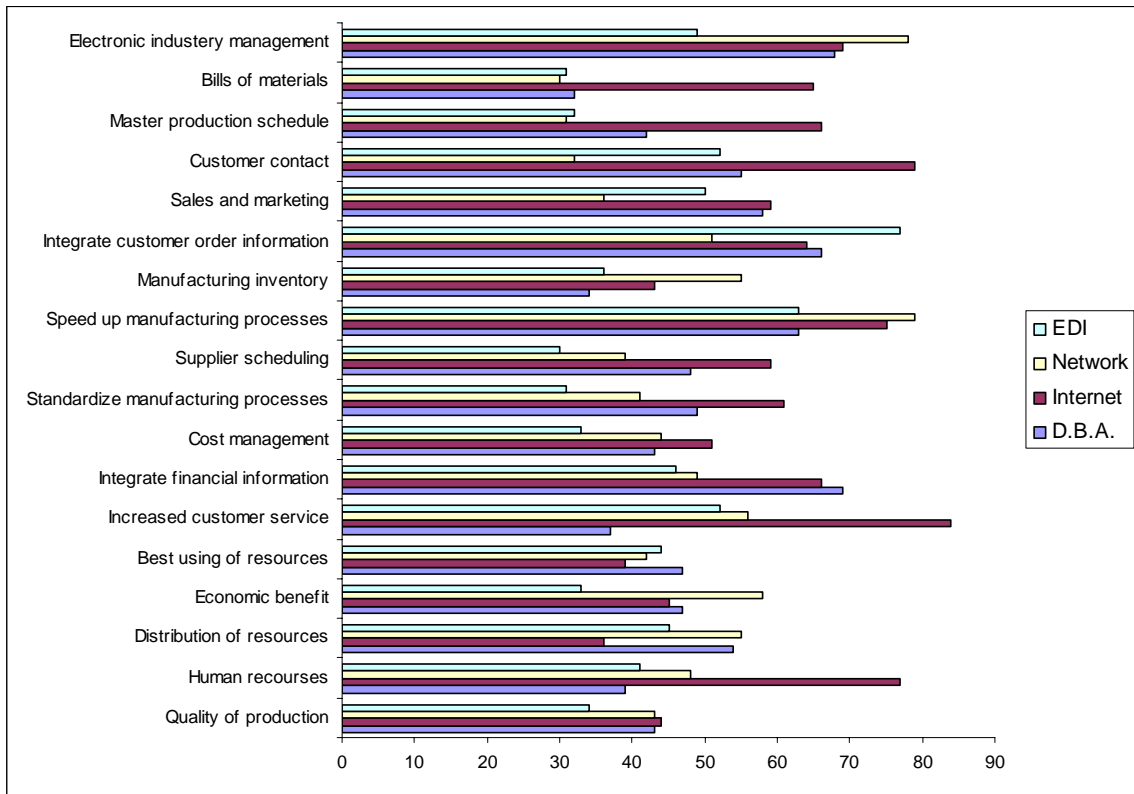
Figure 5. Effect of EDI, Networking, Internet, and D.B.A. on food industry development indexes