NEAR EAST UNIVERSITY
GRADUATE SCHOOL OF SOCIAL SCIENCES
BUSINESS ADMINISTRATION PROGRAM

# CREATION OF ELECTRONIC DOCUMENT MANAGEMENT SYSTEMS: A RESEARCH ON PRODUCTIVITY IN PUBLIC INSTITUTIONS

KENAN, ABACI

PhD THESIS

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PhD THESIS

THESIS SUPERVISOR

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2020

# ACCEPTANCE AND APPROVAL

We as the jury members certify the ‘Creation Of Electronic Document Management Systems: A Research On Productivity In Public Institutions’ prepared by the Kenan ABACI defended on 25/12/2020 has been found satisfactory for the award of degree of Phd.

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# DECLARATION

I Kenan ABACI, hereby declare that this dissertation entitled ‘Assoc. Prof. Dr. İhsan Tolga MEDENİ (Supervisor)’ has been prepared myself under the guidance and supervision of ‘Creation Of Electronic Document Management Systems: A Research On Productivity’ In Public Institutions’ in partial fulfilment of the Near East University, Graduate School of Social Sciences regulations and does not to the best of my knowledge breach and Law of Copyrights and has been tested for plagiarism and a copy of the result can be found in the Thesis.

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# ÖZ

## CREATION OF ELECTRONIC DOCUMENT MANAGEMENT SYSTEMS: A RESEARCH ON PRODUCTIVITY IN PUBLIC INSTITUTIONS

Bu çalışmanın amacı, elektronik belge yönetim sisteminin (EBYS) yönetsel kontrol, verimlilik, iş memnuniyeti, etkinlik ve güvenliği sağlamada ne kadar etkin olduğunun saptanmasıdır. Bu araştırma bakanlık tarafından kullanılan elektronik belge yönetim sisteminin yönetsel kontrol, verimlilik, iş memnuniyeti, etkinlik ve güvenliği sağlamada ne kadar etkin olduğunun saptanması, Türkiye'de kamu kurumlarına EBYS kullanımının avantaj ve dezavantajları hakkında bilgi ve geliştirilmesi adına öneriler sunulması açısından önemlidir. Çalışmanın evrenini Bilim, Sanayi ve Teknoloji Bakanlığı'nda merkez ve taşrada çalışan personel oluşturmaktadır. Araştırmanın örneklemini 880 çalışan oluşturmaktadır. Veri toplama aracı olarak anket formu kullanılmıştır. Anket formu toplamda 53 sorudan oluşmaktadır. 10 adet kişisel bilgilere ilişkin soru, 42 adet EBYS ve verimliliğe ilişkin soru ve 1 adet açık uçlu soru yer almaktadır. EBYS uygulamalarına ilişkin 42 adet soru 5'li likert formunda ölçektir. Ölçeğin geçerlilik ve güvenilirlik çalışması pilot çalışma ile sağlanmıştır. Araştırma sonucunda EBYS uygulamalarına yönelik yönetsel kontrol, etkinlik ve verimlilik algılarının yüksek olmasının, çalışanların iş memnuniyetini arttırdığı ve buna bağlı olarak kurumun verimliliğinin arttığı tespit edilmiştir.

**Anahtar Kelimeler:** Belge Yönetimi, EBYS, İş Memnuniyeti, Verimlilik, Kamu Kurumları.

# ABSTRACT

## CREATION OF ELECTRONIC DOCUMENT MANAGEMENT SYSTEMS: A RESEARCH ON PRODUCTIVITY IN PUBLIC INSTITUTIONS

The aim of this study is to determine how effective the electronic document management system is in terms of managerial control, efficiency, job satisfaction, efficiency and safety. This research is important in terms of presenting suggestions for the knowledge and development of advantages and disadvantages of using EDMS in public institutions in Turkey in determining the effectiveness of electronic document management system used by the ministry in managerial control, productivity, job satisfaction, effectiveness and safety. The universe of the work is the staff working in the central and provincial offices of the Ministry of Science, Industry and Technology. The sample of the study is composed of 880 employees. Survey form was used as data collection tool. The questionnaire consists of 53 questions in total. 10 personal information questions, 42 EDMS and productivity questions, and 1 open ended question. 42 questions about EDMS applications are measured in 5-point Likert form. The validity and reliability study of the scale was provided by pilot study. As a result of the research, it has been determined that managerial control, efficiency and productivity perceptions for EDMS applications increase, employees' job satisfaction increases and accordingly the efficiency of the institution increases.

**Key Words:** Document Management, EDMS, Job Satisfaction, Productivity, Public Institutions.

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## ABBREVIATIONS

| | |
|---|---|
| **EU** | European Union |
| **USA** | United States of America |
| **Inc.** | Incorporated Company |
| **R&D** | Research Development |
| **ISMS** | Information Security Management System |
| **ICD** | Information Community Department |
| **BS** | British Standards |
| **CD** | Compact Disc |
| **CPU** | Central Processing Unit |
| **SOCRS** | State Organization Central Registration System |
| **SPO** | State Planning Organization |
| **DVD** | Digital Versatile Disc |
| **EDMS** | Electronics Document Management System |
| **ERP** | Enterprise Resource Planning |
| **ISO** | International Organization for Standardization |
| **IT** | Information Technology |
| **REM** | Registered Electronic Mail |
| **PSC** | Public Certification Centre |
| **MERNİS** | Central Population System Project |
| **B.C.** | Before Christ |
| **MSIT** | Ministry of Science, Industry and Technology |
| **PACTM** | Plan-Apply-Control-Take Measure |
| **UDP** | User Datagram Protocol- |
| **T.R.** | Republic of Turkey |
| **TCP** | Transmission Control Protocol |

| | |
|---|---|
| **TUANA** | Turkey's National Information Infrastructure Master Plan |
| **TUBITAK** | Scientific and Technological Research Council of Turkey |
| **TS** | Turkish Standard |
| **TOA** | Tax Office Automation |
| **TOFAP** | Tax Office Full Automation Project |

# INTRODUCTION

## Subject of the Thesis

Today, knowledge is the most important asset that the institutions should have in their possession in order to catch up with the competition environment and sustain their existence. Active efforts of all the institutions and corporations for the growing of nations is necessary, as well as the capability to compete with the global markets. This is applicable also for the public institutions. The effectiveness and productivity of public institutions increases the service provided to the society, while at the same time leads to a more effective state and ensures competitive advantage over the other countries (Bircan, 2002).

In today's world, information is the most important capital in all institutions and organisations. Accordingly, it is important for organisations to access information as soon as possible to facilitate better decision making. Organisations should provide information and documents in the most effective way (Odabaş, 2009). In institutions and organisations, information and document resources are used widely as tools for decision support, business process management, structured communication, auditing and verification. Many institutions have recognized the importance of Electronic Document Management System, which is one of the integrated software of Corporate Source Planning and therefore has campaigned for creating EDMS together with a robust information infrastructure. The effective management of these resources also plays a key role in improving corporate success. Public institutions and organisations must produce and accept documents, then store and reuse these documents that are evidence of their actions to carry out activities, perform management actions and fulfil their legal obligations (Gülenç, 2011). Electronic information and document management systems provide institutions and organisations with the opportunity to use their stored information and documents in an effective and efficient way. In this context, institutions have rapidly configured these systems within their structures. As mentioned in a past study, information and document management systems can be influential in the success of business processes and can be used as

tools and methods in managing people, capital, natural resources, services and products (Külcü, 2012). Moreover, the use of electronic information and document management systems, which manage documents comprising organisational information sources, ensures the continuity of transactions in state of emergency or disasters and strengthens the institutional structure (Yeşil, 2006). Attempts to establish and develop electronic document management systems (EDMS) have increased since the use of information technologies (IT) and the spread of e-state applications country-wide in public institutions and regulations (e.g. electronic signature law and related regulations), ensuring the validity of the documents created, kept, stored and transmitted in information systems (Yıldız, 2010). Today's Information Age has necessitated the management of these documents in an electronic environment. Therefore, necessary regulations have been implemented with regards the use of EDMS in public institutions and organisations. After that, public institutions have begun to quickly integrate these systems into their organisations (Özdemirci, 2007). Within the framework of the 2015–2018 Information Society Strategy and Action Plan published by the Turkish Ministry of Development, the importance of electronic information management systems in terms of development and employment has also been emphasised. It has been claimed that information society strategies have become necessary tools in ensuring the development and sustainable employment in the country. The information sector is expected to promote an increase in employment and economic growth within the scope of information society strategies by ensuring a strong and competitive structure. In turn, such a move increases the influence of EDMS on other sectors and creates an ecosystem that is suitable for the development of Internet-related initiatives. The importance of electronic information management systems can obviously be seen in the context of user-centred design and efficiency in the fields of IT, technology infrastructure, information and communication technology support solutions, information security, user security and public services (Ministry Of Development Of The Republic Of Turkey, 2014).

Many public institutions in Turkey have started to use the EDMS or have been experiencing the transition process. The vision of the Republic of Turkey's Ministry of Science, Industry and Technology (MSIT) is stated as follows:
“Our vision is to be a leader and make Turkey one of the world’s ten most developed countries with its knowledge-based and competitive economic structure, which is based on entrepreneurship, innovation, scientific development and high-value-added technology production”.

In accordance with the vision mentioned above, it will be important for the MSIT to lead in promoting effective EDMS and determining the requirements of the system to be used in its own institution. After that, the MSIT should promote this to all public and private institutions and organisations. As stated by Turkish Ministry of Development in the 2015–2018 Information Society Strategy and Action Plan, promoting the use of EDMS, in both public and private institutions and organisations, is a necessary component in carrying out the country's information society strategy. In this regard, the MSIT undertakes an important vision in the promotion of these technologies. As the MSIT is obliged to act differently from other ministries, it is considered as a subject in the present research. The basic vision of the Mist, on behalf of Turkey being one of the world's 10 developed countries, is to support entrepreneurship, innovation, and scientific development and to the economy based on high value-added manufacturing technology In this context, it has adopted to carry out studies to guide enterprises and institutions both in public and private sectors in terms of technology, innovation, entrepreneurship and competition.

**Significance of the Thesis**

If EDMS are used in all public institutions, such institutions can take advantage of its many great benefits. In addition to the cost, labour force, time and space advantages, those systems also offer benefits related to security and archiving. Considering the benefits for civil service, it can be claimed that working hours can be changed for the better. Operations can be performed during the evenings, lunch breaks or in weekend shifts, as needed. If the process of distributing the documents and records is managed by mailing them

out, another type of cost can be reduced. More importantly, the correspondences can be exchanged directly. Reduced workload offers the advantage of efficiency in resource utilisation. Unlike the previous filing systems, it is now possible to access the files or information more quickly. All of these factors will significantly increase productivity and will continue to increase.

The thesis is significant in that it determines the level of the effectiveness of electronic document management system used by the Ministry in ensuring administrative control, productivity, job satisfaction, effectiveness and security and provides knowledge about the advantages and disadvantages of EDMS usage in Turkey by public institutions and offers proposals for development in this field.

**Purpose of the Thesis**

The purpose of this study is to identify to which extent the electronic document management system is effective in ensuring administrative control, productivity, job satisfaction, effectiveness and security.

In addition, the research was designed to “present a good practice example” for other organisations in Turkey that plan to use EDMS in the future.

**Order of the Thesis**

The thesis consists of three chapters. The first chapter includes knowledge about the information management and electronic document management systems. The general concept in the field such as concept of knowledge and knowledge community have been covered to make introduction to the knowledge management systems. A literature review has been provided on information systems, information technologies, fundamental tools of information technologies, main components of IT and corporate resource planning and proceeded with information management systems. Information has been provided about the main components, benefits of document management systems, archiving methods, classification and recognition systems and information security. Within EDMS and the legal grounds of

EDMS in Turkey; information has been provided about electronic signature, electronic standards, State Organization Central Registration System (SOCRS), Registered E-Mail (REM) and electronic correspondence program. The final chapter of the literature review dwells on the impact of EDMS on productivity. The EDMS applications in Turkey and across the world has been covered and EDMS and productivity in terms of employees, corporations and public institutions have been examined. The second chapter of the study provides information about the method. It includes model of the study, research questions and hypotheses, universe and sample, data collection tool and pilot study findings. In the last chapter the findings obtained and the proposals regarding the study have been specified.

# 1. CHAPTER
# INFORMATION AND DOCUMENT MANAGEMENT SYSTEMS

## 1.1. About Information

After the concept of information and the relevant concepts are explained within the chapter on information management systems, the information types, information society, information management, information systems, information technologies and the specifications of such technologies as well as the corporate source planning shall be covered.

### 1.1.1. Definition of Information

Since there are as much as four different English counterparts for Turkish word “knowledge” it is necessitated that we choose these notions diligently and use them with more care. For these four different English words, “data-information-knowledge-wisdom”, Turkish words, “veri-enformasyon/haber-bilgi-bilgelik-kehanet”, could be applied as their counterparts, in accordance. In short, it is known that these notions for Turkish word “knowledge” are not the same and depend on circumstances, time and people (Medeni and Aktaş, 2010).

It will be beneficial to understand the meaning of concepts similar to the information concept to comprehend information from a conceptual perspective. Specification of the differing aspects of concepts similar to the concept of information is crucial for constructing a definition of information.

Information first of all is produced personally and reaches to the organizational level. Information is described as the most fundamental input of all kinds of organizational activity. Information consists of the total of dynamics which

render possible the realization of any kinds of organizational activity and occurring both inside the organization and around the organization (Sağsan, 2007).

#### 1.1.1.1. Data Concept

The concepts of data, knowledge and information are usually confused with each other. The concept of data refers to the "raw facts" in its basic sense (Drucker, 1994). The concept of data is also referred as the source where the information obtained as a result of the examinations made on the factuality (Gökçen, 2002). In this respect, so that the data can have a meaning for the users, they have to pass through a certain process and the data must be taken under evaluation.

Today, the fact that information society has gained importance carries the concepts of information and informatics to different dimensions. In this regard, making proper discrimination of the concepts of data, knowledge and information come across as a necessity in the globalizing world. Today, information placed in the root of every component inevitably exists also in the electronic environment. Therefore, it will be crucial to understand the difference among the concepts of data, information and knowledge and rest the infrastructure on such understanding.

Explanation of knowledge and data differences has great importance for two aspects. One of them is that the administrative layer desires to know the data-based requirements and the information-based requirements during the establishment of information systems. The second is that provision of information is ensured for the managers who feel more need for information than data. In this regard for the companies, data refers to the records which are preserved at certain forms related to the activities carried out (Özden, 2015). Our age is the age of Technology. This situation ensures that data is now stored in computer systems. Existing of data in the computers highlights the concept of speed and its quick storing and quick recall components gain importance. Therefore, new fields of expertise related to data emerge. All

these circumstances lead the companies to do more investment on data systems.

It is possible to produce information from data. For that reason, the institutions conduct some researches to obtain data and access to information from such data. Interpretation of data indeed is a kind of information provision. Therefore, the enterprises and institutions organize polls and studies to reach certain statistics and try to access some data. The obtained data are converted into the form of information through certain statistical or different methods.
Based on what has been explained so far, we can say that data serve as a source in the formation of information. Provision of information from data in structural aspect is possible also through the evaluation of data.

#### 1.1.1.2. Information Concept

Another concept confused with the concept of knowledge is information. It is the equivalent of the word "Information" in English, settling to Turkish as "Enformasyon". Information is generally referred as message which can be heard, seen or found in written form. There are two directions of the message given under the scope of information. While one of them is the party sending the message, the other is the party receiving the message. The sender of the message aims to create awareness in the attitudes, behaviours, decisions or ideas of the receiving party. Such case causes information to be a flow of message which structures, shapes and changes the knowledge (Seçgin, 2010).

Information refers to the orderly data which is in available form. Therefore, they are found as processed data with a value, which the enterprises can use in making their decisions. For instance, the figures and letters on a telephone feature as data alone. However, when such figures or letters are sequences in a certain order, they become a telephone number or a name, thereby creating information. In this respect, it is possible to state that information causes certain change (Türk, 2003). Data creates information and information creates knowledge.

The capability to process and differentiate the data and information expands their areas of usage, it also facilitates the increase of current knowledge accumulation. In this sense, science and technology develops and new areas emerge every passing day. The number of usable and available components increase day by day with the proliferation of information. Information is significant to generating new knowledge from data and information. At the core of the current advancement lies the ability to generate new knowledge from the information. Structurally, information comes into being as a quality which enables putting one brick over another.

#### 1.1.1.3. Knowledge Concept

Knowledge originated with the first existence of the human being. The importance of knowledge has exponentially increased within the period so far. In the historical process, the concept of knowledge was first evaluated in 7th Century B.C. In this process, since the Greek Civilization began to do philosophy, the concept of knowledge started to be focused on. The word Information was derived from the word "Information" in Latin and its meaning is giving from. In English, the word information was derived from the word "Information". This word in English means information and knowledge (Turaç, 2011).

For a human being to survive in nature, he or she must do certain actions and must have some knowledge to be able to do such actions. In the old periods, knowledge would be obtained from the 3rd persons, and in some situations from direct experiences. However, the information obtained through experience were transferred to the new generations by the people of that period and thus, information was gradually proliferated. This reveals that knowledge is a transferable phenomenon. New requirements emerged along with the development enabled by knowledge, and it has become necessary to reveal new information. In this respect, knowledge has functioned as a resource for generation of new knowledge.

Knowledge is a structure emerging as a result of examination of experiences from a structural view and of information, values and expertise opinions focusing on a target in combination with the new data, information and experiences. The experts create knowledge in their consciousness and put the created knowledge into implementation. Furthermore, knowledge in companies are revealed not in the stores and documents, but mostly in processes, routine works, norms and practices (Davenport and Prusak, 2001).

Usage of certain types of knowledge by individuals on a continuous basis reveals the expertise. In addition, the people who have specialization in their own fields can use their experiences to produce new knowledge in the light of their current knowledge. Within this scope, it becomes possible to create the processes and functioning. Therefore, knowledge has reached a position where it manifests itself in the actions and activities.

The data are found in the records and transactions; while information in the messages. On the other hand, knowledge is obtained from the individuals or the group of knowers or in some situations from the usual activities of the institution. It is transferred through the printed and electronic sources of information such as the books and documents, through conversations and individual communication ways stretching out to master-apprentice relations (Davenport and Prusak, 2001).

Knowledge is a concept which might bear both concrete and abstract features in terms of structure. In addition, it is possible to ascribe some functions to the knowledge. Knowledge has existed since the moment when the humanity came into being and it found place in much more spheres every passing day. This has gradually enhanced the importance of knowledge within the historical process. In the past owning an army, nobility, possessing land and economic power would be regarded as components of power, while today having knowledge is considered as an element of power. Today, those who use knowledge for the purpose of specific strategies and then produce certain

technologies out of it can achieve competitive advantage over the other companies (Özdemirci, 2012).

That the concepts of information, data and knowledge interact with each other causes these concepts to be confused with each other. To prevent the confusion, the difference among these concepts have been indicated in Table 1.

| **Data** | **Information** | **Knowledge** |
|---|---|---|
| They are the uninterpreted symbols. | They are processed data. | They are usable information. |
| They are fundamental observations and indicate the current case. | They transmit very simple facts. | They allow us to establish cause and effect relation and make predictions. |
| They can be encoded or structured. | They are simple, clear and structured. | They are semi-structured and complex. |
| They can be explained in qualitative, quantitative and written form. | They can be easily explained in written form. | They are difficult to be explained in sentences. |
| They are the records kept in certain forms in relation to the transactions conducted. | They are obtained as a result of certain calculations. Whether they are true or not can be identified by combining and calculating the data. | They are obtained from experiences, communication, solution finding attempts and comparison skills. |
| The data has no specific owner. | The information has no specific owner. | Knowledge has an owner. It is based on ownership. |
| It is stored in different technological systems. | It is evaluated in information systems. | It needs topics which do not have any form. |
| They cannot be a solution alone to any problem. | They serve as resource in conferring meaning regarding a general situation. | They serve as the fundamental resource in making plan, making estimation and taking decision. |
| They are formed in the documents and books as a result of the research. | They are obtained from the evaluation of data. They are | They are formed and shared with collective consciousness |

| | | |
|---|---|---|
| | formed in the documents and books. | and developped through experience. |
| They can be processed and decomposed. | They can be inserted one another and used again. | Generally, it emerges in the consciousness of people through experience. |

**Table 1:** Differences Among Knowledge, Information and Data.
*(Tiwana, 2001)*

As it is seen in table 1, although the concepts of data, information and knowledge differ from each other in many aspects, it is not possible to separate them. In terms of their functioning, they exist together and act in line with each other.

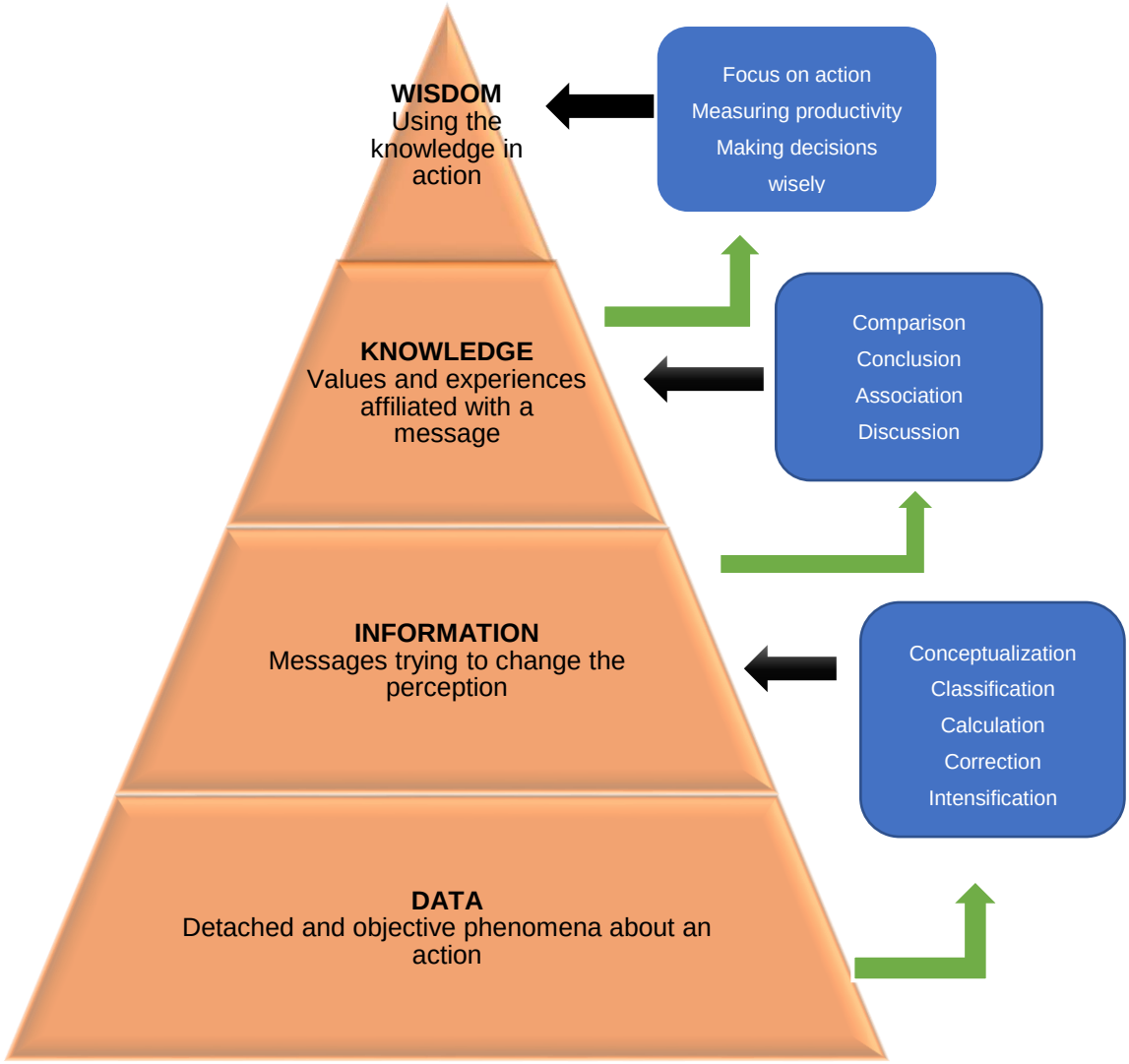


**Figure 1:** Knowledge Hierarchy.
*(Jay Leibowitz, The Knowledge Management Handbook, CRC Press LLC, 1999)*

### 1.1.2. Types of Information

The fact that the information has different types makes it difficult to divide information into types. That the information systems are at the forefront in relation to the subject makes it necessary to investigate all information systems. Along with the changes in technology, economy, communication and social life, different desires emerged and this started to manifest itself also in information needs. The differentiation of information needs gave rise to the necessity to provide diversity in information systems. Existence of special needs in operational, strategic and tactical level caused the designing of special information systems. The companies began to benefit from information systems to increase the quality of service or product, reduce the costs and implementation periods and to take right decisions. The types of information systems are divided into categories depending on their liability level and implementation areas. The companies do not have any obligation to categorize the information systems they use. The reason is that the main purpose of the information systems is to meet the needs. However, division of information system types into categories is very significant for understanding their interaction (Aktan et al., 2005).

There is need for some information-based systems for the enterprises and institutions to fulfil their liabilities, conduct their activities and most importantly to maintain their existence. For an enterprise to be able to produce service or product, it should depend on certain systems. It is possible to categorize the types of liability-based information systems as follows (Karakuş, 2015):

a) Transaction based systems: They provide support related to the transactions and activities to the managers dealing with material purchase, sales and wages. The main goal of such information systems is to provide support to the solution of some problems encountered daily in the institution. Such information systems usually address to the man activities.
b) Information Based Systems: They provide information and data to the company personnel. Their aim is to determine the activities to be carried

out in the institution and ensure that they are carried out in a coordinated way, provide new information flow to the company and assist the institution in monitoring such flow.

c) Strategy Based Systems: They are the systems which provide information to the management about the strategic matters on the inside and outside of the enterprise and long-term applications. Such system addresses to the matters such as labour force change considered by the management, using new technology and product development.
d) Management Based Systems: They are the systems used to support the middle level managers as regards with the administrative activities. They use information on matters such as cash flows, production resources, annual financial statements and short-term plans.

The institutions and enterprises require certain systems for being able to do their daily routines and realize daily service or good production. These requirements are met by transaction-based systems. And information-based systems are required to act in line with the general activities and goals. For the company to advance and develop itself, it has to carry out certain works under specific structure. This can be enabled by strategy-based systems. For this purpose, it is possible to benefit from management-based systems for managers to take decisions.

There are also computer bases system types at the enterprises, other than the liability-based information system types. This system type is divided into six branches as data processing systems, office automation systems, specialist systems, decision support systems, management information systems and senior management support systems. The enterprise information systems have been indicated in Figure 1.

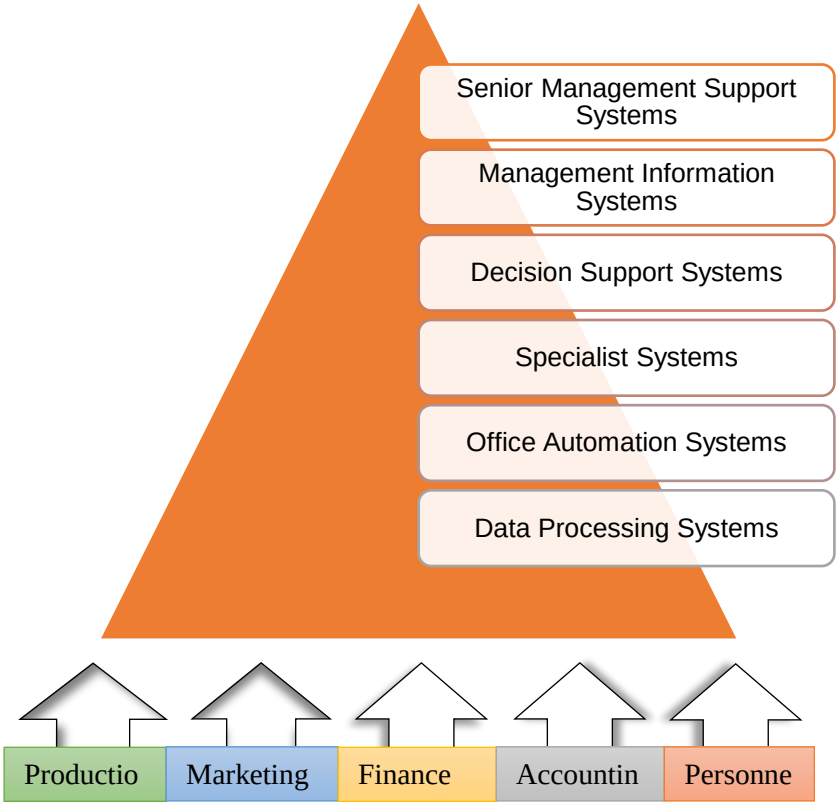


**Figure 2:** Enterprise Information Systems.
*(Hoşcan et al., 2008)*

The data processing systems under the computer-based information systems focus on the execution of activities and recording of activities. Beside a solid programming system, it produces information according to the requirements of enterprise staff and presents such information subject to the enterprise functions. Such structure cannot generate results related to decision making. The main reason is that it runs as focused only on converting the data to information. Such system requires the employees to enter data (Bensghir, 1996). Data processing processes mainly consist of three phases. These phases are as follows (Lucey, 1987):

- Processing of daily transactions: It refers to the recording of transactions such as payments, purchases, sales, orders and invoices.
- Report processing: It refers to the preparation of reports covering the lending, purchasing and staff activities and prepared according a specific system.
- Enquity processing: It refers to the processing of results such as browsing and stock inspection.

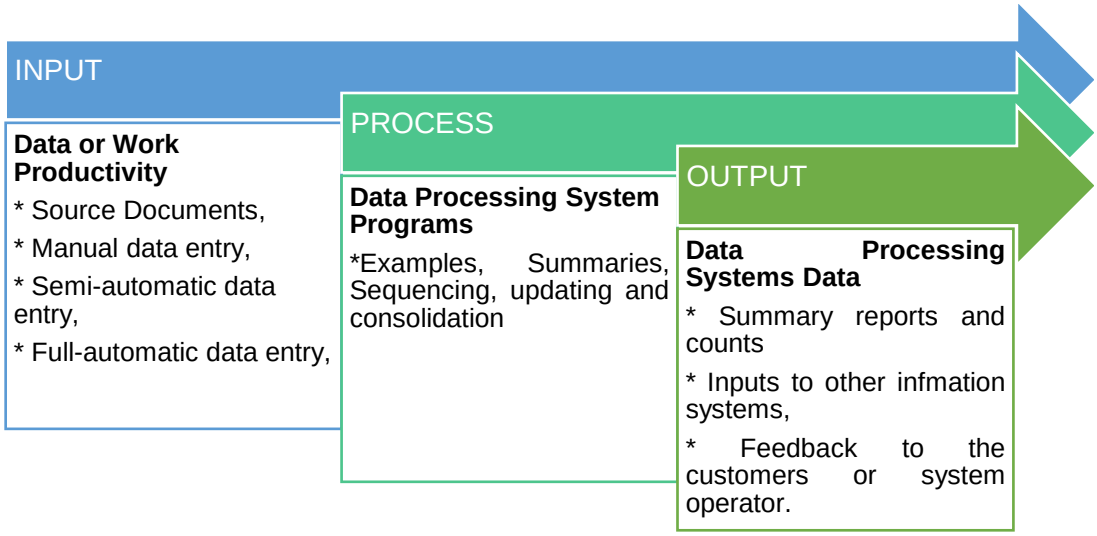


**Figure 3:** Functioning in Data Processing Systems.
*(Kul, 2009)*

Another system taking place under the computer-based information systems is office automation system. They are information systems used for the purpose of enhancing the productivity of office workers. In office automation systems, computers and electronic devices are heavily used. They ensure acceleration of information and data transmission at the enterprises and facilitates communication. Thus, the productivity of institutions increases (Kul, 2009). Figure 3 indicates the functioning of office automation system.

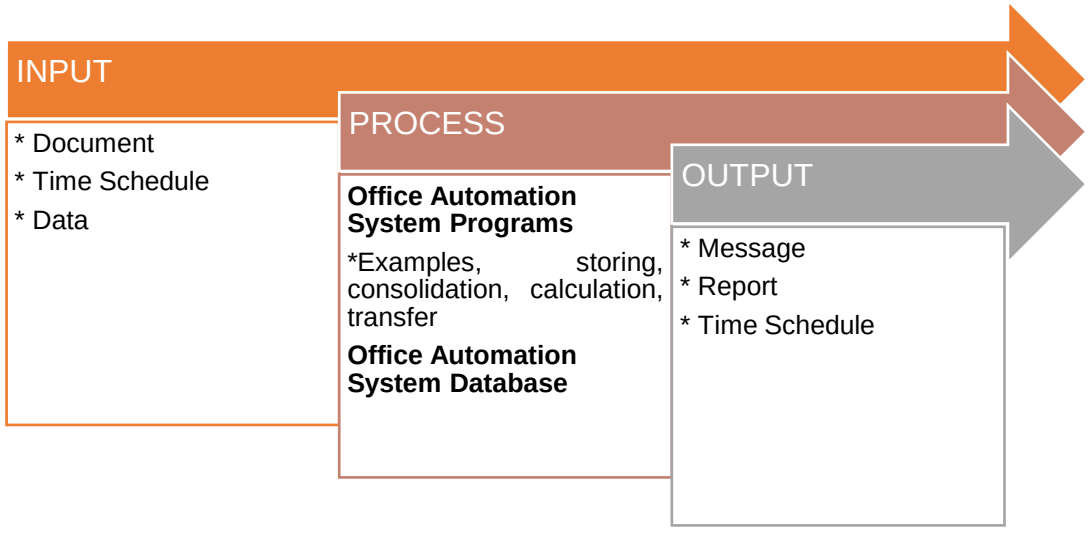


**Figure 4:** Functioning of Office Automation Systems.
*(Kul, 2009)*

Office automation systems are the systems which are installed for purposes of information transfer at the institutions. In this respect, all the devices used at

the institutions such as telephone, fax, modem, photocopy machine and computers can be considered within such system. Today, in parallel with the development of computer technology, that these devices can interact with each other have provided a great many advantages to the corporate staff (Karakuş, 2015). To be able to develop office automation systems, the sub-systems under such system must be designed appropriately. Such systems are document access systems, database management system, graphic system and text editing system (Öğüt, 2012).

Certain degree of information infrastructure is necessary for the use of office tools and equipment. Especially with the disseminating advanced technologies of today, the content of devices become more and more complex. Such case requires also more advancing of information infrastructure related to the devices. In this respect, office automation systems are important in terms of ensuring that the devices and tools in the enterprises can be used and the problems encountered by the employees regarding such tools can be eliminated.

Another system under the computer-based information system types are the specialist systems. They the systems providing information according to the specialty areas of employees. The specialist systems are developped by use of information technologies by persons with certain specialty and used again by specialist persons. They are produced in the format of computer software (Öğüt, 2012). The specialist systems which assume supportive role in solving the problems can diagnose the problem and are based on the techniques of logic benefitted for producing solution (Bayraktaroğlu, 2002). Figure 4 demonstrates the general structure of specialist systems.

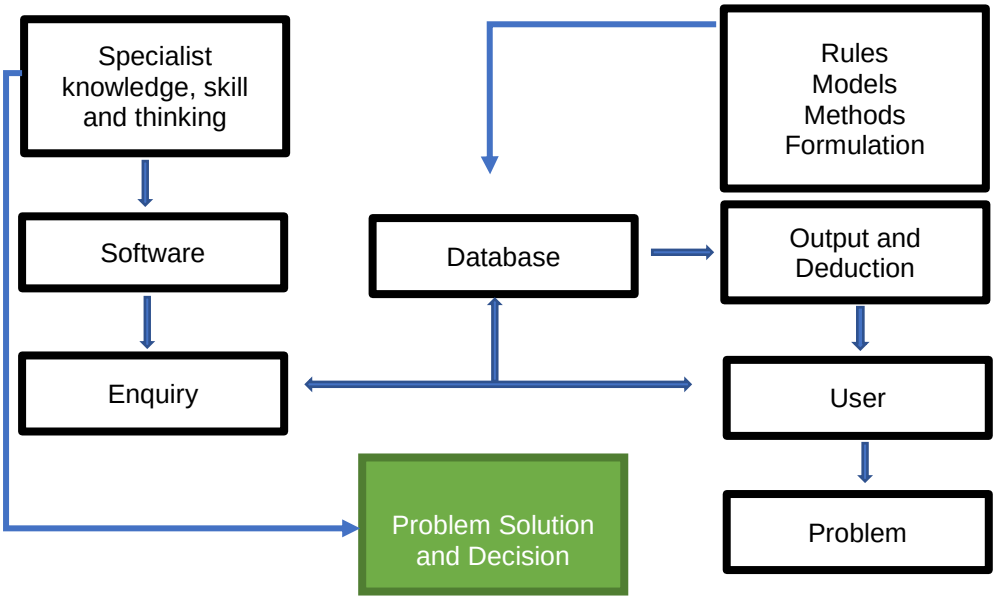


**Figure 5:** General Structure of Specialist System.
*(Aktan et al., 2005)*

The specialist systems can be a guideway for the enterprises and enterprise managers. Furthermore, with the specialist systems which enable mutual interaction, it is possible to perform criminology studies, determine the employee wages, conduct medical researches, banking transactions and studies in areas such as meteorology. Other than these areas, the services such as scanning, cataloguing and reference can be carried out in the information sciences and librarianship areas (Aktan et al., 2005).

That the specialist systems allow for working in coordination accelerated the development with the help of the various areas. Today, along with the increasing usage of the same information in different areas, it has been possible to achieve results including different components from the same information in information technologies. Other than the development of information in fundamental usage areas via the specialist systems, it is possible to use information in combination with the secondary areas. Thus, multiple usage of information and information technologies have become easier thanks to the usage of specialist systems.

The decision support systems are another branch under the computer-based information systems. Such systems are the structures which serve as

guideway under the decision-making processes (Öğüt, 2012). They are information systems designed to help the managers in their decision-making process for the incidents occurring out of the ordinary functioning. Decision support systems do not include artificial intelligence. Such systems facilitate only decision making (Kul, 2009). Therefore, the decision support systems help the employees to use their own skill, in case that they do not know how to execute an activity.

The enterprises' taking certain decisions and creating certain policies is significant so that they can regulate their activities and maintain their existence. Although the decision support systems do not take such decisions and create such policies by themselves, they facilitate the decisions of managers with the options they present. Considering that the existence of enterprises is dependent on making decisions and putting such decisions into implementation, it will be understood how important these systems are.

Decision support systems assume supportive role before the middle or senior managements take any decision regarding any situations they encounter at that moment, or regarding the situations which have never been experienced before (Hoşcan et al., 2008). Three types of decisions can be taken in the enterprises with the help of decision support systems. These decision types are as follows (Aktan et al., 2005):

- Structured decision: It refers to the type of decision which can be taken according to the operating rules and the characteristics of the emerging problem depending on the policies, plans and applications determined by the enterprise. In this sense, they are decisions with identified procedure to ensure decision processes complying a certain order. The decisions structured in line with the experiences generally are used by the lower stage managers.
- Semi-structured decision: It composes the decisions related to some sections of the emerging problem. Such decision allows the managers to do assessment regarding some aspects of the problem.

- Structured Decision: They encompass the decisions taken by the senior managers of institutions. Such decisions are used for the purpose of doing strategic planning. They are the decisions taken regarding the issues which cannot be solved within certain method due to the existing probabilities. Therefore, they are not suitable for planning and strategy development. The institutions do not have the relevant experience or knowledge regarding such decisions.

Four main pillars of decision support systems are as follows (Yozgat, 1998):

1) Decision support systems are used to provide support in making of structured or semi-structured decisions.
2) Decision making other than for the automatized decisions helps with solution of the problems.
3) They can quickly meet the changing requirements of decision makers.
4) It elevates the productivity and effectiveness of decision making.

Figure 6 indicates the functioning of decision support systems.

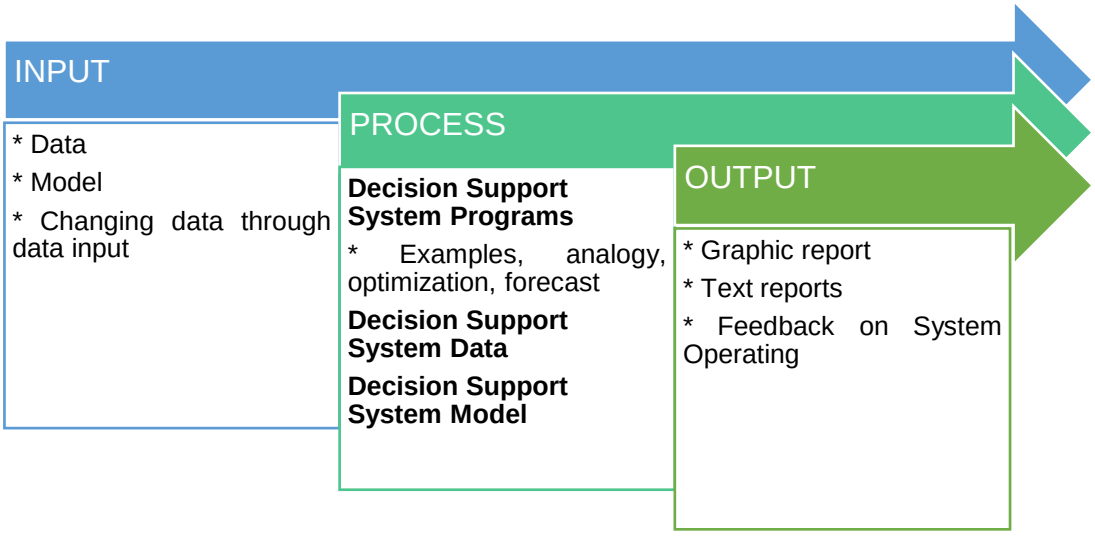


**Figure 6:** Functioning of Decision Support System.
*(Kul, 2009)*

Another system taking place under the computer-based information systems is management information system. Such information systems convert into information the data obtained from inside and outside the enterprise and help the managers in making effective decisions on inspection, planning and similar executive activities within the scope of their duty and present such information

to the managers. In this respect, manager information systems are the systems that have been designed for the purpose of revealing information together with the supplied internal and external news. Thus, the decision makers can base their decisions by having certain information (Anameriç, 2003). Apart from this, the management information systems can also provide information about the correct success level of the institution (Kul, 2009).

The institutions execute their operations through certain decisions and planning performed under such decisions. The inspection process must be maintained to determine whether the operating or functioning is proper. Such cases are usually addressed under the roof of management. Therefore, management systems are important to provide information which can be processed and differentiated based on the internal and external data. Thus, it is possible to create different information. As the information creating capabilities of management systems increase, it will be easier for the institution to make decisions regarding the management processes.

Management information systems can be implemented in all corporations, whether profit or non-profit. The purpose of such systems is to provide the information required by the management levels (Anameriç, 2003). They aim to provide such information by creating some differences in business processes of the enterprise leveraging the computer systems (Kul, 2009). Figure 6 indicates the functioning of management information system.

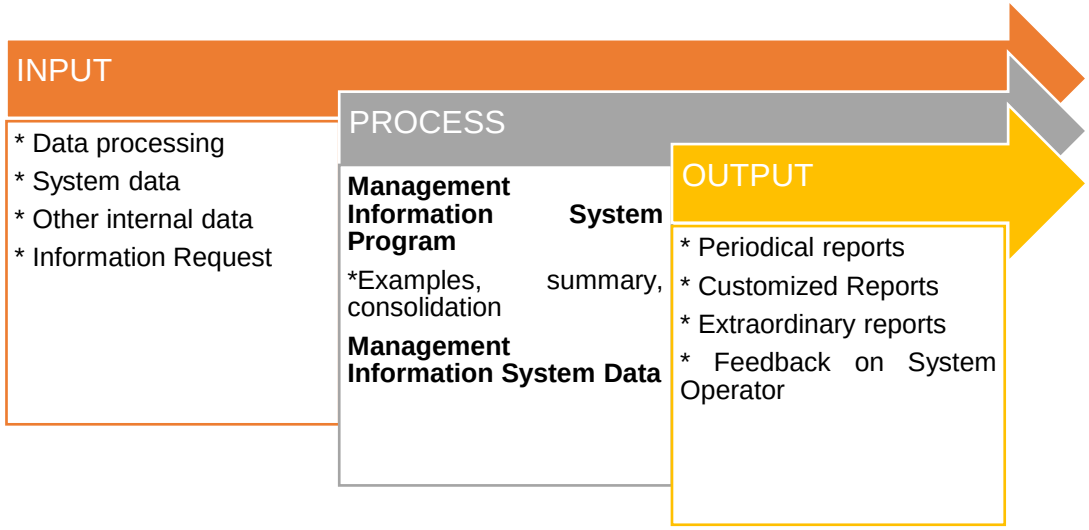

**Figure 7:** Functioning of Management Information System.
*(Kul, 2009)*

Management information systems continuously reveal the information which are necessary for sustainability of the enterprise and deliver such information to the relevant places. They are the systems which contribute to the solution of emerging problems and at the same time help the managers in decision making processes. Management information systems ensure formation of enterprise integrity/unity and that each employee works in line with the common goals (Öğüt, 2012).

Private enterprises use information management systems to increase their profitability. However, today, public institutions also resort to the usage of information management systems in order to enhance the public welfare. The public institutions where the hierarchy is intense and therefore the corporate functioning is slowly started to use information management systems to meet as quickly as possible the requirements of citizens. In this respect, usage of information management systems gives a more flexible structure to the public institutions and enable quick solutions to the problem of citizens. Thus, it becomes possible to enhance productivity in public institutions.

The final of computer-based information systems is the senior management support systems. This system provides the important information needed by senior managers in the desired form, at the desired time from inside or outside the company. They are the systems designed for the purpose of shaping the unstructured decisions of senior managers with the contributions of communication and graphic technologies (Öğüt, 2012). The senior management support systems were produced as a result of designing of decision support systems as more dedicated to the managers. The senior management support systems have been developped for the personnel who determine the corporate goals, plans, mission and vision such as the members of executive board and general manager or CEO.

It may not be very possible for the senior management staff to be knowledgeable about the special circumstances at the enterprise. However, it is critical that the senior management of the enterprise knows whether or not the other staff is committed to the determined mission, vision and goals. Senior management support systems provide information to the senior managers regarding the overall functioning of the enterprise.

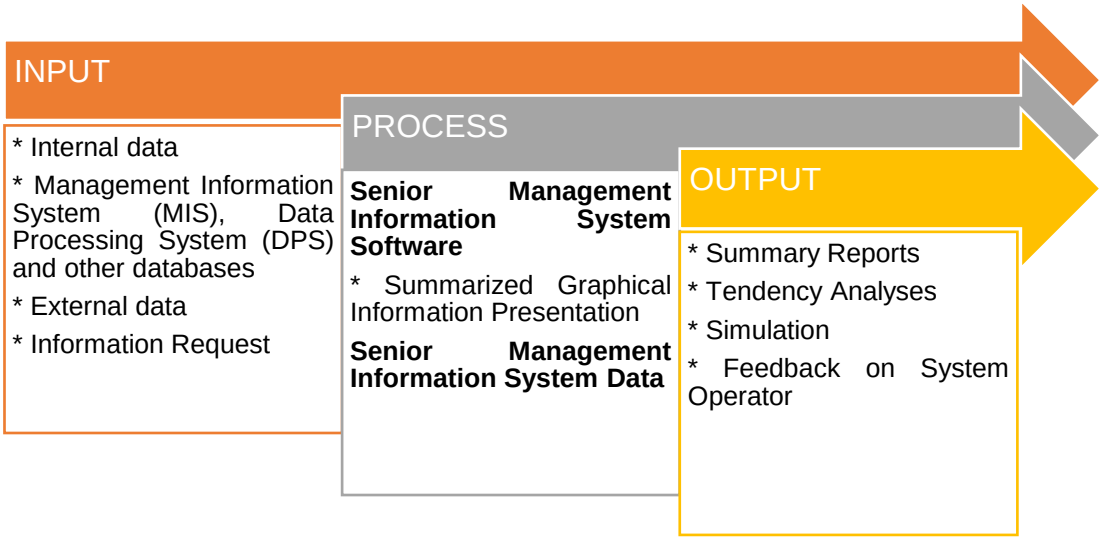


**Figure 8:** Senior Management Support Systems.
*(Kul, 2009)*

Senior management support systems assist senior managers in the following matters (Aktan et al., 2005).

- Career planning,
- New product development,
- Labour force change,
- Marketing strategies,
- Technology change,

As it is obvious, senior management support systems provide information to top managers in relation to many fields such as human resources, production, marketing and R&D. Thus, it facilitates for the senior management staff to take decisions that will ensure the implementation of the corporate goals, objectives, mission and vision. However, one aspect that should not be overlooked here is that the senior management support systems are not in a decision-maker position. Top managers have to make some decisions by

interpreting the information they receive from these systems. Although these systems related to information technologies provide great benefits, they are not currently in a decision maker position.

In addition to responsibility-based and computer-based information systems, institutions also benefit from some basic business information systems. In this regard, basic business information systems can be expressed as follows (Karakuş, 2015):

- Production information systems,
- Marketing information systems,
- Finance information systems,
- Accounting information systems,
- Personnel information systems,

Basic business information systems represent a structure constituted by systems that provide structural and internal information to the managers and stakeholders of institutions (Hoşcan et al., 2008).

Production information systems, which is one of the basic business information systems, provides data related to planning, operation, supervision and regulation in the production process. The production information systems reveal some differences in terms of the input-output tools with the data they offer as they use the information systems used to perform different functions (Bengsghir, 1996). Provision of raw materials and production factors constitutes a significant branch of production information systems. Apart from this, production productivity, proper use of resources, elimination of problems in production, determination of the appropriate labour force for production are under the responsibility of production information systems.

Marketing information system, which is another basic business information system, shows how the manufactured goods and services are transferred from the manufacturers to the customer and also examines some issues after the transfer. In this sense, it provides information about new product development, market research, after-sales services, pricing, advertising and promotion,

customer satisfaction and sales analysis (Karakuş, 2015). Production or service alone will not make any sense. Marketing activities are important in terms of introducing them to the target audience and directing them to the target audience. However, it is important that marketing be carried out within the scope of certain strategies and plans. Marketing information systems, by arranging these strategies and plans, not only ensure customer satisfaction, but also increase the profitability of the business.

Finance information systems, on the other hand, appear as systems that provide financial managers with information about the costs, resources, areas where resources should be used, and the control of resources. It primarily focuses on monetary resources and the provision of these resources. As a result of the information provided within the scope of financial reporting, financial planning and financial auditing, the company can take decisions on growth, contraction and investment. This information is obtained through the financial information system (Hoşcan et al., 2008). If businesses cannot manage their financial matters well, it is not possible for them to make any profit or to continue their existence. Financial information systems enable a business to sustain its existence and also gain profit, by rendering the management of costs and revenues possible. Furthermore, the fact that profit is considered at secondary relevance in public institutions brings to the forefront the issue on continuing to exist as an institution. In this regard, financial information systems are extremely important in terms of covering the costs in public institutions.

Accounting information systems are the systems that collect the data and information necessary for the purpose of controlling and planning the activities of the institution. Accounting information systems perform some processes to reveal the information that the users need. These processes can be listed as follows (Hoşcan et al., 2008):

1. To collect data related to the mentioned applications through the applications which are structurally of financial nature and to record such data to the accounting system
2. Processing of data,

3. Accumulating data for use over time,
4. Providing reports created in line with the needs of information users or revealing the data collected in the accounting system,
5. Controlling the integrity of the processing to produce reliable information within the system.

Accounting systems perform tasks such as indicating the current financial structure of institutions and enterprises, supervising the financial structure when necessary, providing information to partners, and informing individuals who will invest in the institution. This situation requires existence of certain standards and regulations in accounting. Apart from the legislative regulations, the existence of some in-house accounting systems has importance in terms of the facilitation of the accounting process. Facilitation of the performing of actions addressed to within the scope of accounting principles is ensured under the accounting information systems.

Personnel information systems provide information to the managers in relation to the evaluation of employees with different characteristics. The matters such as the evaluation of the working personnel, employment of personnel to be recruited, performing job analyses, training of employees, planning of employee payments, determination of salaries are conducted based on the information provided by the personnel information system. In addition, the information systems provide very much support to the inspection of employees (Bensghir, 1996).

The fact that the corporations are established on human labour is an issue requiring the corporations to invest in labour. Therefore, the corporations should display activities which give value to the labour force and places the institution to the hearth of the employee with affection, rather than regarding labour force as a machine. The department of human resources is a unit taking care of the employees and providing their positions in the working life. On the other hand, personnel information systems assume duty in terms of evaluation of the employees and presenting information related to such evaluation. Under such systems, the wishes and expectations of the employees are learnt and the corporate policies are determined accordingly.

### 1.1.3. Information Society

Since the time they existed, the human beings evaluated information in different manners and attributed different meanings to it. In the early ages of humanity, information was important in understanding which animals were dangerous and which plants were detrimental to health. The humanity began to benefit from information in making of tools and utensils as they have developped with information. The process gradually evolved and the human being used nature for its own benefit (İnce, 2001). We are witnessing the development towards a “information society” not just on country level but on a global scale. Thus, it is a necessitation to have a definition for “information society” that almost everyone can agree upon. At this point, we come across with three notions, particularly used by people in data and IT disciplines: data, information and knowledge. As a matter of fact, it would not be wrong to say that the notion for “knowledge” coming all the way through the inception of recorded history, evolves towards these three to four different notions in consequence of rapid progression and advancement of internet especially since the nineteen-nineties (Medeni and Aktaş, 2010).

With the proliferation of computers, communication technologies and their gainings, we can describe the information society as a society oriented towards utilization of basic information and communication technologies, in simplest terms. In another terms, it can be described as a society which people can access to necessary information in essential time with necessary accuracy through necessary convenience and cost, for their active decision-making needs. In relation to such a definition, examples of structures that utilize today’s most extensively used extension “e-” could be aligned, e.g., e-Trade, e-Library, e-Education, e-Governance, and at this point e-Society, e-State, maybe relating us the most. (Medeni and Aktaş, 2010).

In history, in years around 1600, along with the advances in direction and mapping knowledge, people increasingly migrated to new regions and such case have offered new opportunities to the states in line with the economic

targets. Especially, during this period, discovery of the Far East Indian Sea Route and the American Continent revealed such advances clearly. In this respect, as it can be understood, knowledge has taken place in different forms in each period of humanity history. Today, knowledge has become so important as it has never been within the historical process (Berberler, 2010).

Knowledge has functioned as a tool in meeting the accommodation, food and drink and safety needs of the people within the historical process. After information was used to meet such fundamental needs, new requirements have emerged and new information was produced accordingly. This process exponentially grew itself. This situation paves the way for the process of using information in parallel with the needs of human beings.

Until it has attained the information age as today, the humanity passed through different economic and social structures. Until the end of the primitive era, the humanity tried to survive with simple tools and encountered a great many challenging factors within this process. Among the main problems of the people in the primitive age was accommodation and safety difficulties. With the commencement of agricultural era, the people started to be addressed in two categories as "civil" and "primitive". The segment which is referred to as "civil" were those who have agricultural knowledge and thereby know how to cultivate the soil, while the primitive segment was those who could not cultivate the soil only because they did not know agriculture. Permanent settlement began with agriculture. In addition, the humanity started to step towards civil society in parallel with agriculture (Tutar, 2010). In this sense, discrepancies have emerged in the manner by which the civil society and primitive society processes information. During the primitive periods, having knowledge only on matters such as hunting and sheltering was sufficient, whereas in civil societies, along with the transition from nomadic life to settled life, advanced in architecture, agriculture and animal husbandry. For this reason, the civil society increasingly processed information over time. From this perspective, the production speed of information grew day by day in parallel with the civil society's progress.

The process of industrial revolution gained momentum with the development of steam technology. Along with the industrial revolution, diversifications emerged in the economic and social structure. Upon the proliferation of produced goods, the manufacturers sought for selling them in other countries. Furthermore, the democracy perception evolved within the process, whereby people having differing frame of mind and mentality became influential in the ruling of countries. Thus, the traditional social structure which existed in the past began to be replaced by the new communal structure. As a consequence of the Industrial Revolution brought about by the new communal structure, such social structure was named as the industrial society (Yalçınkaya, 2014). On the other side, the social structure following the agricultural and industrial society has been the information society. One of the most substantial qualifications of the information society is that the speed of change in information society is much higher than the preceding community types (Türk, 2003).

One of the fields which has importance within the scope of knowledge accumulation has been the technological development. In the advance of technology, the scientifically produced information has been influential. In this regard, the industrial revolution faces us as a process which accelerated the scientific and technological advancement. Development of steam technology within the scope of industrial revolution started to manifest itself initially in the fields of production and transportation. The expansion coming into being in production started to manifest itself with the designing of unprecedented products. Besides, in parallel with the developments in transportation, the communication services enhanced. Thus, as information started to be used increasingly to lay the foundation of technology, it has been possible to invent technologies in various areas. Every new information has given birth to new information.

Along with the emergence of information society, different production forms, different occupations, new social structure and class formation originated and

such formations have reshaped the economic system. In this regard, with the emergence of the information society, the information society has come to the forefront, the technological development has accelerated, information technologies have accumulated and the concept of human capital have become of increasingly more importance. Such developments have enabled exponential growth of the advances in the industrial society (Berberler, 2010).

Existence of information society have carried the functioning of information to an unmatched dimension. In this process, it has been possible to add almost every second layers of information inside the existing information. On the other hand, it has become easier for people to access information facilitated by the development of computer and Internet technologies. However, what is important here is being aware of how to use the real information, rather than the ability to access information.

Table 2 presents the economic, social, technological and political comparison of industrial society and information society.

| **Structure** | **Industrial Society** | **Information Society** |
|---|---|---|
| Economic Structure | National Economics | Global Economics |
| | Economy based on physical capital | Economy based on human capital and information capital |
| | Industrial organizations | Organizations established based on information |
| | Symbolic superiority of paper currency | Superiority of digital currency (or cryptocurrency) |
| Social Structure | Nuclear family structure | Different forms of individual-oriented family |
| | Institutionalizations providing assurance | Institutionalizations boosting personal skills |
| | Values such as social class, compatibility and being | Values such as participation, individuality and equality |
| | Mass seasonal education | Individualized life-long learning |

| | | |
|---|---|---|
| Technological structure | Mechanical technological revolution | Information technological revolution |
| | Machines replacing labour force | Computers enhancing brain capacity |
| | Production system installed on the assembly line | Production system based on management and information |
| | Communication structure based on written and visual | Communication structure based on digital technologies and the |
| Political structure | Polarization and National conflict | International harmony with the global political integration |
| | Centralization | Reinforcement of local administrations |
| | Nation-state | Regional and global organizations |
| | Administration for security | Citizen-focused administration |

**Table 2:** Economic, Social, Technological and Political Comparison of Industrial Society and Information Society.
(*Gümüştekin, 2004)*

Today, even though the overall characteristics of agricultural and industrial societies have fell behind, some characteristics of them still survive. Nevertheless, it is the information society which is overwhelmingly applicable in today's conditions. In this sense, the fundamental input of production today is not the physical capital, but the information capital. Apart from this, it is the concept of "organized scientific information" which have enabled high growth of production. In the information society, production and dissemination of information gains momentum along with the developments in technology and communication. The information society not only uses information for production, but also it produces information. And this causes a continuous development (Çukurçayır and Çelebi, 2009). Such functioning continuing within the scope of information society paves the way for the emergence of new industrial branches, new economic structures, new occupations, new scientific fields and many other new branches. And these newly originating branches continue to produce information at a fast pace within themselves. These, in turn, prepares the ground for the formation of other new fields. So, the accumulation of information extends almost forever.

## 1.2. Information Management Systems

The rapid increase of information and its practically uncontrollable expansion requires certain functioning structures. Hence, it will be possible to proliferate and control information within the framework of a certain system. In this respect, this chapter will dwell on the information systems functioning in the management of information.

### 1.2.1. Data Management

Data has evolved in quality and quantity, whereby influencing the data systems enabling access to qualified and accurate information during our life-time. In this regard, the data which was previously found in physical form now are being preserved in large mechanical memories. One of the most significant contributions of the technological developments is that they allow quicker access to data. On the one hand data and on the other hand the information technologies have had impact on the discipline of data and document management, which organize data and enable access to data. The fact that the enterprises desire to control their activities in digital environment have smoothed the way of ERP– Enterprise Resource Planning systems. Recording of all input and output transactions in the enterprises have given rise to the utilization of ERP systems for creation of a certain standard and influenced the Electronic Document Management Systems. Enterprise Resource Planning is an integrated web of systems which collect under the same roof and ensure management and control of all operation units such as human resources, document management system, accounting-finance, stock management, procurement and marketing, etc. Rapid development has enabled digitalization across the globe, and consequentially further growth of work data and content. Today, the enterprises produce large quantities of documents, contracts, proposals, sales advertisings, marketing tools and training documents for instance on Human resources. The uncontrollable data cannot be used at a fast pace and in proper manner to serve for the enterprise, customers or the other stakeholders. The document management systems taking place in Enterprise Resource Planning have been developed. Thus, all the documents coming into being through the modules such as on Human Resources, Stock

and Accounting may be included to the process, stored in the system and monitored as integrated with the system records without any need for further action. To the extent that the workflow is supported by the other applications, the circulation processes will speed up. If we are to consider a payment transaction, only one payment letter is viewed within the Electronic Document Management System under normal conditions. With this application, it will be possible to monitor also the payment order document, mobile transaction bill, purchasing processes and initial request data.

In view of the general corporate structures, it can be argued that the corporations execute their functions by leveraging the data systems (such as web content, e-mail management, document management and human resources) which address to the different work processes. Despite usage of different tools, the data systems are developped and specialized in line with the corporate structure, culture and identity; and they can be used over an integrated platform by means of the software of enterprise resource planning and content management (Çakmak, 2011). It can be suggested that the enterprise or corporate data systems are tools for efficient usage of internal and external data sources of enterprises and involve a software strategy where a wholistic approach is adopted. As in the private sector, also the public institutions are divided into different operation units within their own body and works and transactions connected to each other are carried out among such operation units. It is observed that some institutions develop their own systems, and other institutions use different systems they have procured through outsourcing to be able to realize such works and transactions As these systems might cover the works and transactions of only one operation unit, they might also cover the works and operations of multiple interconnected units.

The evolving technologies of current time reveal their impact on management systems more compared to the other structures. The management process which entails the fulfilment of an operation as a result of the interaction of physical resources and human resources at the institutions incorporates to the

structure the people equipped with a specific expertise, knowledge and skill level. The change occurring in data technologies causes the organizations to restructure and increases the flexibility of boundaries of organizations which could not be noticed completely in the past and allows fulfilment of enterprise and institution functions in different forms (Şahin and Örselli, 2003). The specializations which emerged within the scope of certain areas in the past, now have been replaced by specializations in a great diversity of areas. Emergence of different specializations have at the same time led to the emergence of a highly complicated structure. No matter how the enterprises and institutions have attained a flexible structure today, the existence of different areas has made the management of them difficult. Here, the concept of data management has come to the forefront.

Data Management is a field of science which puts into implementation the operations for identification, expression and controlling of all the sources of information which have been recorded or not recorded as a result of the transfer of learning, experience and education/training to the organizational functioning. The enterprises might have a great variety of resources. However, the resources which will give upper hand in competition to the enterprises are characterized mainly with their uniqueness, inimitable nature and valuable assets. Data is such a valuable asset. The enterprises which create data, obtain data and direct and disseminate it across the whole corporate body are the successful ones (Turgut and Beğenirbaş, 2016). Data management has taken on a new significance as a discipline which has built up its effectiveness across the world day by day and is tried to be implemented at all enterprises. Data Management also refers to upholding the values of enterprises in affiliation with their targets, catching up with the competition, combining the internal and external information with the production processes and thus making contribution to the productivity. The most significant goal of data management is to identify the sources of information which already exist in the enterprise or are possible to emerge and then engaging such information to the operations. Furthermore, another goal of data management is to ensure that new information emerge, by allowing the transactors to access the data

(Anameriç, 2005). Data management enables to provide information to facilitate the corporate operations with the support of information systems technologies and to execute the processes, goals and purposes on the desired level. In other words, data management is essentially the production of beneficial information, development and then dissemination of such information. Today, management at the enterprises and institutions is conducted over the information management. Data management is expressed as the ability of the enterprise to have human capital, to keep it under control, and to benefit from it as a value (Tutar, 2010).

When looked at from a closer perspective, it is seen that the information management systems have circular qualities. Information systems enable the production of information, control it and deliver it to the required areas, and provide new information within the scope of the information provided. It ensures the control of the reproduced information, transmits it to the required fields and ensures the production of new information again.

Data management is a form of management that allows employees, units and the entire organization to use information and produce information within a certain system in order to achieve corporate goals in the best possible way. This form of management; covers employees, units and the entire institution. In this structure, it is important to produce information, engage data into the processes and share data (Barutçugil, 2006). In this regard, the existence of the human factor is very important in the production of information. The information is produced, processed and distributed over the human factor, especially in institutions. However, it should not be forgotten that today, information can also be produced over information technologies. On the other hand, it should not be overlooked that the information produced cannot be interpreted and used without human factor.

The main objectives in data management can be expressed as follows (Gümüştekin, 2004):

- Accelerating the learning processes of employees,
- Ensuring acceleration of improvement,

- Ensuring new information production in the institution,
- Ensuring that the accessed information is used in line with the decisions taken,
- Ensuring that reliable information is transmitted to the right employees at the time it needs to be reached,
- Speeding up the transformation process,
- Ensuring that the data which benefits the surrounding institution is earned to the institution,
- Encouraging the development of knowledge by using factors and social culture,
- Ensuring that corporate data is presented with data, documents, records and databases,
- Making it possible tha the data created in corporate departments or different departments are conveyed across the departments,
- Increasing the value of corporate data and ensuring that such data is converted to intellectual capital and making it possible that such data is leveraged through information management.

Today, the information technologies which are very frequently used can be utilized for taking efficient decisions in management positions of institutions. In other words, data management, as being one of the organizational functions provides advantages in reaching different strategic targets and in decision making processes with the help of information technologies (Öğüt, 2012). It is the data management which allows for carrying out the operation and functioning based on information and for such functioning to generate new information within a certain order. In this sense, data management ensures that te existing data is expanded under a certain order, thereby preventing possible chaos.

### 1.2.2. Data Systems

The enterprises and institutions leverage data in order to eliminate the uncertainties and to minimize the risks. The purpose of the data systems is to ensure acquisition of knowledge on a level which will allow for making decision

under risk and uncertainty circumstances. In this respect, data systems are the systems which allow the institutions to improve their productivity, become knowledgeable about the internal and external events and enhance the service quality (Anameriç, 2003). The data workers benefit from the data systems. Although such workers are not at the managerial or executive positions at the institution, they might determine which way the institution will move towards by virtue of their studies and researches. In relation to this, a physician who monitors the pregnancy process through an ultrasound device, an engineer who determines the structure of product in a manufacturing process and an architect who ascertains the construction aspects of a building can be shown as examples. In addition, it will be proper to express the information systems used by such professionals as data system (Kul, 2009).

As the data development continues, it plays a critical role in elimination of the existing uncertainties and risks. Today, the enterprises and institutions have to harness the existing conditions efficiently and eliminate the existing risks to be able to survive. Data systems engage here by providing information to the enterprises and institutions to eliminate such risks and uncertainties and thus, guarantee their sustainability.

There are data which play critical role for the in-house departments and external departments. Solution of the problems, making decisions, provision of new goods and services are the main areas where information systems are utilized. Such components are inputs, outputs and transactions. The inputs refer to combining the immature information which are inside or outside the institution. The transactions function as contributing meaning to the immature information, while the outputs refer to transferring the processed data to those who will potentially benefit from such data. Other than these components, there is also the feedback component allowing for controlling the inputs in the institution under the information systems (Karahoca and Karahoca, 1998). In this respect, such process initiated with the discovery of information continues with the interpretation of information for the purposes of certain goals and objectives and with dispatching of interpreted information to the relevant units.

Here, the process is completed with the detection of problem, identification of the components of problem, ensuring that the identified components have certain meaning and the interpreted components are delivered to the necessary points.

It will be to the point to explain the concept of information systems, along with the data systems. Information systems come across as the systems meeting the information requirements of enterprises in line with the changes in communication, technology, social and economic life and with the needs emerging with such changes. Along with the gradual diversification of need for data, so the information systems also have passed through diversification. In this sense, there has emerged the necessity for the enterprises to have information systems unique to the departments which meet the operational and strategic needs of each department. The departments leverage these information systems for purposes such as scaling up the quality, diminishing the costs, taking effective decisions and ensuring time saving. Generally, the information systems are divided into categories by their accountability level and implementation areas. The reason is that the main purpose of the information systems in enterprises is meeting the needs (Aktan et al., 2005).

The existence of information systems contributes to the acceleration of data processing. The enterprises can produce information at a more rapid pace thanks to the information systems and can interpret data more quickly and transfer to the relevant units more quickly. This situation allows increasing of productivity in data systems and hence, across the enterprises and institutions. The information systems focused on the requirements makes it possible for enterprises to utilize data in line with their needs and gives them flexible movement capability.

The benefits to be achieved by enterprise managements from the information systems can be enumerated as follows (Tekin, Güleş and Öğüt, 2003):

- As the management will easily access all the information related to the enterprise, it will be able to obtain any information it needs any time and thus take decision more easily.
- They will be able to obtain what they want through quick calculation skill, central data bank and thanks to the existence of program which can handle the other transactions.
- The success possibility of the managers' future estimates and plans will increase.
- The enterprises leveraging information technologies will become more influential on the market compared to the other enterprises and thus, will gain competitive advantage.
- It will be possible for the enterprise to quickly track the needs of the employees and thus, there will be reduction in the cost of employees.
- By virtue of quick data transmission through the information systems, there will be saving from time and thus, the decision makers will be allowed to deal with different management activities.

The information systems accelerate the overall processing time of data and saves time for making new decisions. In this respect, it is possible to produce new information in different areas. In parallel with this, the time saving made possible by the information systems will allow for making arrangements for the possible future situations and take some security measures.

### 1.2.3. Definition and Characteristics of Data Technologies

Technology development continues based on data. In this regard, data is required for technology development. Provision, recording, processing, storing and transmission of data through utilization of technology is referred to as "Data Technologies". To elaborate in more detail, data technology is the entirety of electronic devices and the methods encompassing them used in collection, processing, recording, transmission and controlling of data that are in different forms and generated in communication and electronic data processing systems (i.e., computer) and allows people to interact with each other and access to information (Emrealp, 1993):

Today, ubiquitous existence of electronic components ensures gradual expansion of data technology usage. In parallel with this, strengthening of the current potential of data each passing day renders it necessary to execute the information processing over the electronic environment. From such perspective, the data technologies make it possible to easily carry the existing data load and facilitates data production, while also leads to the increase of data load. For such reason, the dependency of individuals on data technologies is constantly rising up for being able to use the data.

Different definitions regarding data technologies can be made. In one of such definitions, data technologies has been expressed as the technology which allows for performing the transactions such as recording and storing of data and information, putting data and information into certain processes and reproducing them, accessing and transferring such reproduced information (Heskett et al., 1990). According to such definitions, the specifications of data technologies emerge. And these are as follows (Bensghir, 1996):

- Provision and collection of data
- Processing of data,
- Storing and stocking of data,
- Ensuring easy access to data,
- Ensuring that the data can be transferred,

The data technologies are structures producing data, while they are also the components which differentiate the data, store data to be used later and transfer data to the relevant individuals and units. In today's world where electronic technologies are ubiquitous, it has become virtually impossible not to benefit from data technologies.

#### 1.2.3.1 Fundamental Tools in Data Technologies

One of the most prominent representatives of current data technologies is computers. Computers are the primary technological tools used since 1950s. Aside from this, today's system engineering, circuits, Internet technologies,

smart phones, multimedia, communication technologies, marketing and production technologies, etc. are addressed to within the scope of data or information technology (Bilgin, 2016).

It is possible to describe the fundamental tools used in data technologies as follows (Yavuz, 2016):

- Hardware,
- Software.

and physical parts of computers and other devices used in data technologies are called "hardware". Computer hardware consist of four units. Such four units are indicated in Table 3.

| **Unit** | **Specifications** | **Hardware Samples** |
|---|---|---|
| Input units | They are the equipment providing data and entry of data to the computer. | They refer to the equipment such as digital camera, keyboard, mouse and scanner. |
| Transaction units | They are the units executing the data processing. They refer to the case and the electronic components inside the case of a computer. | They are the hardware ensuring connection between the equipment installed on the computer case and the other device mounted to the computer. Microprocessor (CPU - Central Processing Unit) and Main MeMory (RAM) are the most important units of function in the computer. |
| Output units | They refer to the devices allowing for seeing the outputs generated as a result of processing the data in the computer. | Heatset, printer, loud speaker and screen are some examples. |
| Storing units | They are the devices ensuring storage of programs, data and information. | The disc driver, DVD driver, CD driver and hard disk are some examples to such devices. |

**Table 3:** Components Making Up the Hardware.
*(Yavuz, 2016)*

Hardware in computer generally consist of the sections which make it possible to enter data and obtain data. Also, the devices where the data are processed and stored are handled in the hardware section.

Another objective of the data technologies is to create software. Software refers to the programs composed of some instructions and created for the purpose of controlling the functioning at the units of input, transaction, output and storage in order to compile together the desired components. The software is treated under three groups among themselves. These groups can be referred as follows (Hunton, Byrant and Bagranoff, 2004):

- System software: it is referred as a component necessary for executing all the functions related to the computer system. The system software ensures establishing connection between the applications and the hardware. System software is required so that the computers can operate. Such systems ensure main functions such as that the transactions are performed, the programs can run smoothly interactively, and the commands can be fulfilled.
- Application software: it refers to the programs used for the purpose of performing special operations of the computer users. The programs such as Paint and Microsoft Office can be shown as example.
- The auxiliary software: they are the programs used for the purpose of enhancing the impacts of applications and system software.

#### 1.2.3.2. Main Components of Data Technologies

The main components of data technologies are generally dependent on information systems. However, data technologies at the same time support the data management of institutions. Such main components are such as communication, data processing and storing (Becarra-Fernandez, Gonzales and Sabherwal, 2004). Four main functions are provided with data technologies. These four main functions can be described as follows (Evans and Wurster, 1999):

- Access: Data technologies facilitate access to data. The concept of access is referred as network. Advanced network structure accelerates

access to data and enhances productivity. There are the components called as switching devices in the network structure. These devices are divided into two as periphery switching and backbone switching.

- Depth: It is related to the smooth and fast being of the information transfer. The transfer pace can be expressed as the bandwidth. As the bandwidth increases, the depth function also increases. The in-house transfers can be expressed as internal band, while the transfers from outside the institution as external band. The most substantial factor explaining the depth function is the protocols. Without the protocols, no communication can be possible between the data technologies. The globally recognized protocols are Transmission Control Protocol (TCP) and User Datagram Protocol (UDP). TCP protocol is safer, but slower than UDP.
- Diversity: It refers to the data diversity in the network. It can be in written, audio and visual forms. Along with the development of technology, diversity gradually increases.
- Integration: It refers to ensuring an integrity with the processing and synthesizing of data. Data technologies serve to reach such goal.

Leveraging on the main functions of data technologies, the individuals and enterprises can execute many different functions together. Access to the existing information, ability to establish quick communication and provide information, obtain data with different features and synthesise different kinds of data and ensuring that different information can be produced are the main qualifications of data technologies. Given the main components of the data technologies, it is obvious that they show similarity with the data systems and data management. Such case also enables supporting of data technologies with data systems and data management processes.

#### 1.2.3.3. Data Systems in Data Technologies

The need for data is a critical driver for provision of data, development of data and orientation of data. In this respect, data technologies is an important tool for meeting the need for data and for fulfilling the other functions. Today,

execution of the functioning of economic structure over the institutions and enterprises necessitate that data is used by such institutions and enterprises. The data technologies are used for facilitating the access of institutions and enterprises to data. Furthermore, to be able to access to large amount of data through the data technologies, certain structures are needed for management of data. In such case, the data systems engage in.

The data technologies are important structures which determine the productivity and performances of institutions or enterprises. Such technologies consist of the parts used to provide the most reliable data and to use such data in the most efficient way possible. Data system has emerged as a result of detection, processing, usage and transfer of data in raw form. In organizations, data systems can be expressed as the systems which supply from the smallest unit or overall the institution the data and information needed by the management, and then summarizes and reports such data and information to the relevant units and managers (Soyuer, 2000).

Along with the rapid advancement in data technologies as of 1980s, the data systems have come to the forefront. Until such period, the phenomena such as personal skills and interpersonal skills were used as conventional methods. Beginning of production process based on data have pioneered the development of technologies and such case have created the need for data technologies (Becarra-Fernandez, Gonzales and Sabherwal, 2004). Such requirements were observed initially in areas such as accounting and finance and such case caused the data technologies and data systems to be used firstly in such fields. In the succeeding processes, with the gradual growth of enterprises, the data systems were started to be used also in different departments of the enterprises. Especially, dissemination of the use of computer have proliferated the usage of data systems (Soyuer, 2000).

It is possible to note the purposes of data systems benefitting from data technologies as follows:

- Ensuring that the data technologies consisting of hardware and software can accord with the enterprise. And in such harmonization process, the goals of the enterprise and a system-compatible functioning should be determined. The fact that data technologies are products encompassing the cutting-edge technology and compatibility of such products with the enterprise is more important.
- Being able to reach the required information in time and accurately.
- Providing the required information in decision making processes.
- Being able to do data analysis regarding the past incidents and the circumstances which might be encountered in the future.
- Ensuring that the service quality is elevated through usage of comparative data.
- Reducing the work load of employees by effectively benefitting from the human resources.

Each corporation or enterprise have their own unique qualifications. In this respect, regulation of the data technologies to be used in the enterprise in a manner appealing to the features of the enterprise is highly important. Such case will also pave the way for acceleration of the decision-making processes of the enterprise and obtaining data more quickly. The enterprises move from short term activities to long term activities. In this respect, thanks to the data which the enterprise has obtained within the scope of the researches it carries out based on the previous incidents it experiences allows to make estimation regarding the situations which might come up in the long term. Aside from this, it is possible for the enterprise to develop itself my performing benchmark study with the obtained information and therefore increase its service quality.

### 1.3. Enterprise Resource Planning

With the development of technology, the information technologies have started to manifest in all spheres of human life and corporate life. In societies where information technologies are realized a major change has occurred and therefore some human circles have been influenced by the developments to a great extent. With the impact of the globalization, information technologies

were needed in order to acquire access to new markets. And this in turn have given priority to advertising. Another way of acquiring competitive advantage is to use the information technologies in the most efficient way on the part of the enterprises. The data conversions in information technologies are continuously used in daily functioning of the enterprises (Amrit, 2003). Though ERP provide great advantages, it is also a costly system. It is costly on account of the cost of hardware and software, the training costs, data transformations and other work processes changing and improving costs.

### 1.3.1. Definition of Enterprise Resource Planning

In line with the emerging concept of globalization, the multi-national enterprises which have factories in many countries and regions have felt the need to integrate all their sub-units (Tanyaş and Baskak, 2013). The integrated information system emerging from the need of multi-national companies to integrate their sub-units has been called as enterprise resource planning (ERP). ERP is an integrated software system which accommodated the functions required for the meeting of client/citizen demands in the most efficient manner in line with the strategic goals and targets of the corporations, for the effective and efficient planning and controlling of the supply, production and distribution resources. For the managers ERP is a comprehensive software providing support to the decisions, planning and control activities (Vollman, Berry, Whybark and Jacobs, 2005).

For data technologies department, ERP is the software system which integrates the other functions of the company such as finance, production, supply, sales and marketing, human resources management and document management (Vollman et al, 2005).

There are many definitions related to Enterprise Resource Planning. Enterprise Resource Planning (ERP) software is an information system which integrates the work process (human resources, document management, inventory management, customer relations management, project management, etc.) under single database, and ensures that all units and

departments incorporate the most updated and accurate data to the process, regardless of the size and dimension of the public institution, company or enterprise (Aktaş, 2009). ERP Software eliminates the necessity to use a great number of interfaces as they perform all the work processes over the same software, and it creates a natural integration among all these processes, and ensures that the valuable information obtained from each process is used in another process, whereby allowing for avoidance of errors and time saving. Thus, the information collected under the same roof can be presented to the right person at the right time and at the right cost (Tevatiroğlu, 2007).

According to another definition emphasizing the core characteristics of ERP, the ERP systems which are based on the enterprise units sharing communication and information with each other, ensures that the enterprises are collected under the same roof by integrating their processes such as finance, production, purchasing, sales, logistics and human resources, etc. (Keçek and Yıldırım, 2002).

ERP Software eliminates the necessity to use a great number of interfaces as they perform all the work processes over the same software, and it creates a natural integration among all these processes, and ensures that the valuable information obtained from each process is used in another process, whereby allowing for avoidance of errors and time saving. Thus, information gathered under the single umbrella is presented to the right person, at the right time and at the right cost (Güroğlu, 2006).

ERP systems are the configurable information system packages which combine the information and data inside the functional areas in an organization (Kumar and Van Hillsgersberg, 2000).

ERP has become one of the indispensable systems for today's enterprises, considering its centrally located data integration base, modular structure and its applications supported by software (Laudon and Laudon,2010). Furthermore, the essence of the ERP systems allows for the existing

infrastructure to operate for the sustainability and quality of information thanks to the existence of integrated systems along with the integration and standardization and enables the flexibility system in such integrated processes run efficiently (Jacobs and Bendoly, 2003). Therefore, ERP systems is not a software package with the means and capabilities they have, but at the same time, a management approach providing the most important change and transformation for the enterprise.

### 1.3.2. Fundamental Qualities of Enterprise Resource Planning

Thanks to the ERP systems, all the documents as to the production of good and service are can be evidenced and produced in the electronic environment along with the historical records and within the framework of the existing operating policies (Memiş and Tüm, 2011).

At this most recent point arrived by the ERP systems and with the technological advancement, it is highly critical that the information is not only produced simultaneously, but also is reliable. It is the action taken as a result of the decisions based on qualified information so that the enterprises can gain competitive advantage. Therefore, today emerged the need for the successful performance of such activities and more efficient management of information owned in the execution of the applications. Therefore, with the increase of the prominence of Electronic Document Management Systems, the information is required to be revealed and used in a systematic way and serving for the purposes.

Currently, the most significant component forming the infrastructure of the information systems is the technological infrastructure. Both the hardware used and the computer software are the indispensable components of today's information systems. One of the most outstanding integrated applications used to efficiently management the information processes in enterprises is the software called as Enterprise Resource Planning (ERP) applications.

Fundamental Qualities of Enterprise Resource Planning have been indicated below.

The features of ERP systems may vary by the structure of the companies, but here are their fundamental qualities:

• Rather than a database management software or an operating system, ERP is an application software.

• It offers proposals of solutions for fundamental business processes.

• It is an integrated database keeping both the main data and the data belonging to the business processes.

• The fundamental ERP product package targets not only specific industries, but all the industries by virtue of its functionality sufficient to enable usage at global scale.

• As it aims to support miscellaneous corporate functions, it has a highly functional structure.

• ERP provides access to the suppliers, customers and if any, to the information systems of the partners.

• ERP systems are costly systems.

• They might offer correct information to the customers about the completion and delivery time of an order. • It offers the companies using it the opportunity to do customization/adjustment related to the program.

• ERP has a structure encompassing all the units of an enterprise.

• It enables quicker and easier access to information (Çakır and Bedük, 2013).

• ERP offers a flexible organization structure. The companies from a large spectrum of function and alternative business processes can apply the modules that they need. The system flexibility gives companies the opportunity to turn change into their favour (Tandoğan, 2007).

Behind the establishment of ERP systems lies an approach placing information to the forefront. Because, the main point intended to be arrived at with the establishment of ERP systems is to be able to obtain the data forming the basis of the decisions and processing such data (Al-Mashari, 2002).

### 1.3.3. Critical Drivers of Success in Enterprise Resource Planning

ERP and electronic document management system software require utmost attention and diligence during the stage of instalment, as well as in the competition race in terms of the data they have created after the instalment for in-house usage, and from the selection to the instalment state of software and from the usage stage through the maintenance stage.

The Electronic Document Management developped by the Ministry of Science, Industry and Technology and used by the central and rural organization of the ministry is also one of such systems.

Critical Drivers of Success are as follows:

**Infrastructure of Information Technology:** It constitutes the information management and communication platforms of the enterprise. A strong data management infrastructure is stated in literature as a prerequisite of any data system and especially of the success of the ERP system (Karagül, 2006).

**Support of Senior Management:** The senior management plays a very critical role in the installation of ERP systems and successful operating of the installed system. Active participation and vision of the management to the project and their directing the junior administrative officers will provide the motivation required for sustainability of the project (Karagül, 2006).

**Project Management:** A successful ERP system installation requires a project management practiced effectively. Project Management involves critical points such as clearly setting and description of the goals, development of operation plans and recovery plans, project follow-up and communication (Karagül, 2006).

**Change Management:** The organizational structure of enterprise may not be fully compatible with the structure and tools of the system to be installed and with the types of information to be generated. Therefore, it might be necessary to reconfigure the fundamental processes for the targeted goals and/or

develop new processes. It is necessary to plan, organize, coordinate and control the change beginning from the first stage of the project until making sure that it runs in the intended manner (Karagül, 2006).

**Culture:** In fact, the cultural component which can take place within the change management substantially influence the operating ways of enterprises, and therefore is regarded as a distinctive critical success factor. The installed system transforms the organization structure and this influences the working forms of employees and their interaction with each other. Therefore, the transformation must be relied on a strong strategy and well-defined installation methods and also the employees must be briefed about the changes that the new system will create at the enterprise and the targets the enterprise desires to achieve as a result of such changes (Karagül, 2006).

**Risk Management:** The factors causing the installation of ERP systems to fail are called as risk factors in ERP literature. The factors which are referred as critical success factors are indeed potential risk factors for ERP systems. The senior management must identify the potential risks at the enterprise and take the necessary measures so that such potential risks do not prevent the success of project (Karagül, 2006).

**Expectation Management:** Successful system installations are closely related with the successful management of user's expectations. With the expectation management, which is an essential component of change management, the benefits of a successful system for an enterprise and the roles of employees in ensuring such success are explained to the employees. The critical success factors which are highly important to active success in such systems take place in all stages from the originating of system through the system valuation.

### 1.4. Document Management Systems

The enterprises benefit from the documents in order to record their activities and functioning. Such documents are very crucial as they can be inspected,

evidenced, examined, evaluated and used again when it becomes necessary. That the enterprises execute many activities collectively, causes a great number of documents to be produced. Such situation requires the documents to be kept under certain control. Here the document management systems come into play.

In this section, firstly the document management will be explained and then the electronic document management systems will be mentioned within the document management systems. Furthermore, after mentioning about the electronic document management systems, finally the specifications that the electronic management systems must have will be explained.

### 1.4.1. Document Management

The institutions need to preserve their document within the scope of their corporate duties and responsibilities. The preserved documents are at the same time the evidence of executed activities. In addition, such documents make accountability possible in relation to the executed transactions (Johere, 2008). The documents are indispensable for the managements. In this regard, the management process can be formed through the controlling of all enterprises which provide or produce service and use resources. Recording the transactions and actions conducted at the enterprises and carrying them over the next periods are practices which have been applied for a very long time. Document management is a quality function which the enterprises must have no matter what the format is (Kandur, 2011). Document management is one of the processes also for recording and archiving the documents of enterprises. The enterprises can sustain their activities more efficiently through document management technologies (Sağsan, 2006).

The enterprises record the activities they perform, whereby they both ensure demonstrability, and can evaluate such activities in the upcoming periods. Keeping the documents related to the enterprise under record is critical for the execution of planning process.

Document management encompasses the management of document revealed by the companies or enterprise in relation to their functions. The documents can be converted to written form, regardless of the conditions where they are created and stored. In this respect, the documents are included to the scope of evidences on the functioning of company, while they also support the daily routines (Christine, 1998). Document management can be expressed as a system allowing to keep under control, access, file, distribute and destroy the documents which the enterprises and institutions created while they maintain their activities or provide from outside (Odabaş, 2009).

The enterprises need documents in order to stay in conformity with the legislative regulations. The documents qualify as substantial proof in terms of demonstrating that the conducted activities have been performed in conformity with the legislative regulations. Aside from this, the documents serve as a means for proof within the scope of the inspections performed by external institutions. Such case reveals the fact that the enterprises document management systems in order to both maintain their activities and protect themselves.

### 1.4.2. Main Components of Document Management System

Document management is a process starting with the preparation and creation of the documents. Then the transactions such as the usage, storing, access and destruction of the documents compose the structure of these systems. Therefore, it is possible to enumerate the main components of document management system as follows (Odabaş, 2009).

- Composition of documents
- Benefitting from and protection of documents,
- Elimination of documents.

While the document management systems based on paper were prevalent in the past, now the electronic document management systems are prevalent. In addition, such electronic document management systems allow for printing the documents on paper and store them in paper format. However, being able to

store the documents in electronic environment is important in terms of minimizing the costs arising due to the archives. While in the past the separation of documents from the physical archive rooms for elimination purposes caused big time loss for the enterprises, now it is sufficient to spare only a few minutes for the classification of documents in the electronic environment. This provides big time saving and cost advantage for the enterprises and institutions with the use of electronic document systems.

### 1.4.3. Advantages of Electronic Document Management

It is possible to list the advantages offered by electronic document management (Kandur, 2011; Güler, 2013):

- Storing and archiving the documents,
- Providing access to documents,
- Offering opportunity to use the documents whenever they are needed and in timely manner
- Enabling to know which documents should be eliminated and when.

Document management provides also indirect benefits, other than the aforementioned fundamental advantages. Operating is easier at a company which preserve its documents effectively through document management and this reflects positively to the company's overall productivity. At an institution where the documents can be easily accessed, it is simpler to make new productions by leveraging the documents and this becomes very helpful for an institution to develop itself. Furthermore, document management allows for time management and helps the enterprise be engaged in many more activities. Apart from this, document management helps eliminating the outdated and obsolete documents, whereby opening space for the new documents and preventing confusion of documents at the enterprise. Those working in the electronic document management systems can access to the related documents within seconds and minutes. Also, while the enterprises and institutions and/or individuals used to do the official correspondence over the postal services, they incurred a great loss of time in the operations. However, today in correspondences made over the electronic document

systems, the interaction among the institutions and between the institutions and the individual is swifter and this accelerates the corporate operating. It is also possible to increase the customer satisfaction along with the ability to rapidly meet the requirements of individuals who are outside the enterprise. Electronic document management systems undertake critical roles in the increasing of productivity and effectiveness and in the improvement of service quality.

According to the explanations so far, it is possible to summarize the attributes of electronic document management systems as indicated in Figure 8.

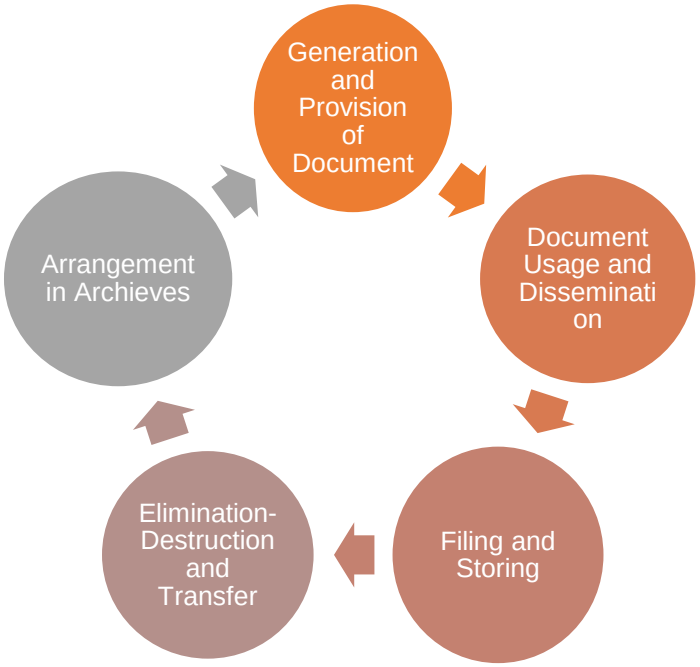


**Figure 9:** Document Management System.
*(Odabaş, 2009)*

### 1.4.4. Electronic Document Management Systems

Record or document management systems date back to the initial documentation systems of the early 1970s, when computers were held as recording and storing devices of documents in organizations. Over time, their importance and use had increased, and document management was defined as organizing and maintaining documentation about specific tasks and processes. With the emergence of information technologies, developments of document management systems have changed the way of documentation,

and electronic document management systems (EDMS) have gained a strong position with the extensive use of computers in organizations. In addition, digitizing documents within the content of e-transformation is one of the major operations in many organizations, especially in government agencies (Medeni at al., 2013).

At the present time, the documents created in any condition in the companies and enterprises should be treated and addressed to in electronic sense, in line with the innovations in data technologies. In this respect, electronic document means any kinds of document which is generated as a result of the business activities and then stored, accessed to, transferred and eliminated in the electronic environment by use of electronic means and computers. The documents coming into being as a result of transfer of paper form documents to the electronic environment also are electronic documents. However, so that the paper documents subjected to such transformation can be counted as electronic documents, they must be relying on a legal regulation and marked with a time stamp stating that the document is prohibited from being altered during the transformation into electronic format. This electronic documentation process can be conducted during the process of conversion or the addition of the digital certificate time stamp. As a result, the document can be considered a reliable document (Aydın and Özdemirci, 2011).

After the transfer of on-paper documents to the computer environment, it is critical to take some precautions to ensure safety. In this sense, electronic stamping and putting time statements to the electronic documents is important for protecting the integrity of enterprise/institution. Apart from this, these methods are important for preventing that the documents are altered in the electronic environment to earn illegal profit. Therefore, the methods providing safety of electronic documents not only helps protecting the enterprise, but also the public institution.

Electronic document management is a document management system which has been developped subject to the advances in technology and is incorporated to the companies and institutions in parallel with such advances.

In harmony with the progress in computer technologies, the companies now create their documents in the computer environment and transfer in the computer environment (Aydın, 2005). Although electronic document and electronic certificate is used to refer to the same meaning, these concepts are different from each other. Electronic document acquires the quality of electronic certificate when they are used in the operations of companies and enterprises and stored as a proof of such operations. In comparison, electronic records cannot be changed due to the presence of official qualifications on these documents. However, such an obligation does not exist for electronic documents (Aydın and Özdemirci, 2011).

That the enterprises and institutions are bound to legal obligations make it necessary for them to keep electronic documents. However, the enterprises are entitled to create electronic documents about their own development and how the in-house activities are progressing and to use these documents to be able to do some estimations. Within this framework, as a consequence of the proliferation of electronic researches and studies, there has been an increase in the volume of electronic documents. It will be possible to benefit from the electronic document systems to scrutinize and control the coverage of documents. It should be noted that such documents do not bear any official quality. In this respect, it is not possible to legally benefit from such documents. The emergence of such difference is due to the fact that the electronic documents can be altered, whereas the electronic certificates cannot be altered.

Electronic certificate management is in a broader sense, referred as a structure managing the records under a certain medium electronically. In comparison, the EDMS is explained as a system allowing an enterprise or organisation to manage some documents by using computer programs (Güler, 2013). In other words, it is possible to describe all audit activities as EDM with the electronic management forming some steps, such as using, assessing, distributing and storing a document, a record or similar written or visual items, generated within an organisation's workflow or operation (Külcü, 2012).

An enterprise or public institution requires certain finance to be able to develop a program, though it has obtained specific approval. For such finance and approval to be given, the enterprise or institution managers must understand why the program needs to exist. There is so much need for the approval of corporate managers so that the electronic document management systems can be operated effectively. Other than that, it is recommended to conduct a research inside the enterprise or institution so that the in-house requirements are tackled and solutions are found accordingly. In order to ensure an efficient electronic document management, it is necessary to lay the grounds for a document management ensuring sustainability of documents, records and sheet either in paper or electronic form. It is also noteworthy to explain the potential adversities and the benefits (Arden, 2009).

From this point forward, it is obvious that the electronic document systems and electronic certificate systems are critical at the enterprises and institutions for the establishment of a certain informational infrastructure and easy access to, storage, transfer and when necessary, elimination of such informational infrastructure. In addition, whereas these functions could be fulfilled in the past by spending hours and days, now they can be fulfilled within just minutes thanks to the electronical transformation.

### 1.4.5. Classification of Electronic Documents

It is a well known fact that the enterprises and institutions must have written documents as well as electronic documents. It is highly important to classify the documents so that the corporate employees can comfortably access the electronic or paper documents. With the classification, it becomes possible to easily access the documents and also, they can be sorted to their kinds, stored, managed and eliminated or discharged. For these reasons, it is necessary to establish a robust classification system. The qualifications that an efficient classification system must have can be described as follows (Goh et al., 2009):

1. An efficient system supports the corporate or business-related requirements.
   - It lends assistance to the decisions, future activities and services of the enterprise or institution.
   - It provides the requirements of system users.
   - It keeps the costs at a suitable level.
   - It provided an optimum level of employees and fund.
   - There will not be dependency on outside for operational needs.
2. It becomes easier to understand the electronic document system though the classification system.
   - The employees and users comprehend the electronic documents more easily.
   - Dependency on human memory disappears.
   - It is used more easily.
   - It ensures the users to feel self-confidence.
3. The system sensitivity will increase with classification.
   - There will be much less suspicion on whereabouts of the documents and records.
   - It enables quick definition and provision of documents.
4. The documenting system becomes more comprehensive with classification.
   - It is ensured that all the documents that are required to be inside the system are located in their files.
   - It is enabled that all documents to be created in succeeding periods are involved to the system.
   - With its flexible structure, the system can be narrowed down, expanded or rectified.
5. The documents can be backed up according to the classification system and the relevant training tools.
   - The documents are stored in a more transparent and detailed manner.
   - The content, usage and monitoring of the system is expressed more easily.

- With the completed samples, all the main copies are provided.
- It can be supported with training programs.
- It can be supported with guidance and professional assistance options.

6. It is possible to easily digitalize the classification system.
   - It enables easy convertibility of documents for use in electronic recording systems.

### 1.4.6. Information Security Management Systems

Information security ensures that information is protected from unauthorized access, kept confidential, information integrity and accuracy is preserved and information can be accessed any time (Isaca, 2017).

The following components come to the forefront from the perspective of information security (Gülmüş, 2010: 16):

- Confidentiality of Information This concept refers to giving permission to access to information only to the persons who have authorization to do so.
- Integrity of Information It refers to information staying in raw form without its content being distorted.
- Availability or accessibility of information: It refers to being able to access and use information when it is required or desired.

To ensure information security, it will be proper to take some various security measures. All of the information which a company or institution possesses or obtains to offer value, earn profit, safeguard its continuity and achieve competitive advantage can be expressed as the information asset of such company or institution. For such information to be protected in physical and electronic environment, physical security and electronic security must be established.

The literature involves some definitions about information security. In one of such definitions, the information security has been expressed as prevention of

information from getting damaged or distorted, facilitating the qualified technology for benevolent goals and prevention of information from being seized by unwelcome individuals (Canbek and Sağıroğlu, 2006: 69). According to another definition, information security is the process of preventing potential attacks such as unauthorized access, usage, alteration, disclosure, distortion or deletion.

Information security has been defined as assuring that only the authorized individuals can access the information, ensuring that the information is accurate and safeguarding that the officials or authorized persons can access the information when necessary (Iso, 2005). In a different definition, information identity has been expressed as ensuring that the resources of enterprise information technologies can be protected from the threats against confidentiality, accessibility and integrity. British Standards (BS) 7779 have set forth the information security as protection of information from miscellaneous threats for providing business continuity, keeping the business damages at the lowest level, maximizing the business opportunities and investment returns (Aygün, 2010).

There are some terms involved in the definition of information security. These terms have been presented in Figure 10.

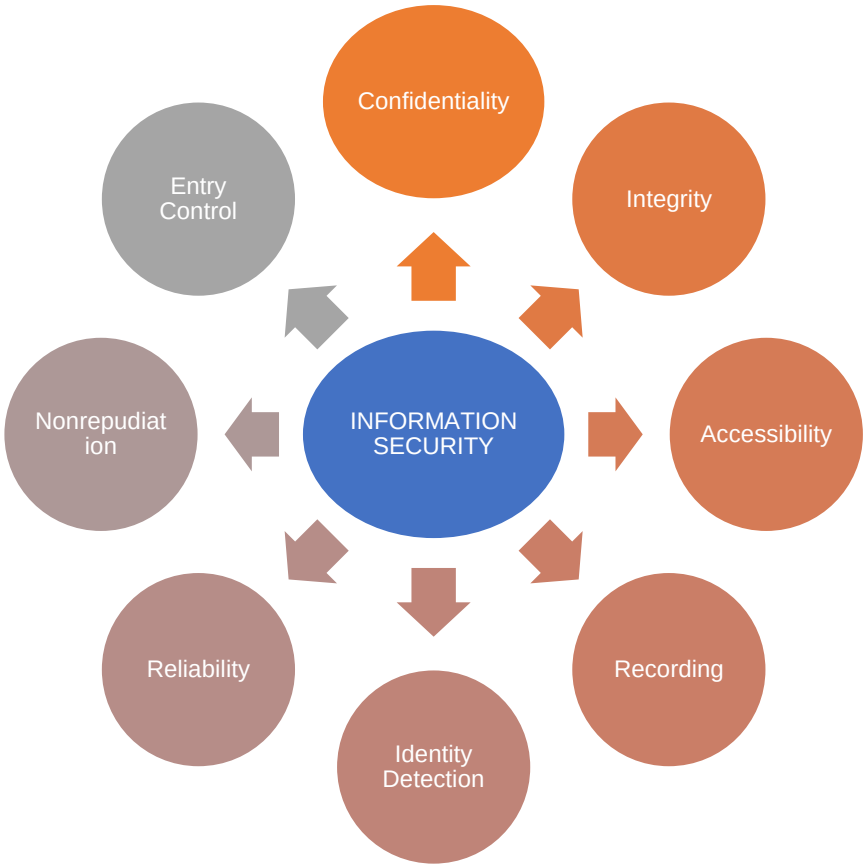


**Figure 10:** Terms Involved in the Definition of Information Security. *(Gülmüş, 2010)*

A significant step is taken for information security in the environments where access to information is enabled by identity detection. However, it is critical for ensuring information security that not only the documents, but also the individuals to access the documents are recorded. Such conditions also ensure nonrepudiation. Restricting the confidential information only with the use by certain individuals is important for information security. Nevertheless, existence of a definite information security system is significant also for ensuring reliability of the system. Having similar security measures in place for all documents ensures integrity thereby boosting the feeling of trust in the system.

Some studies have been carried out in order to establish the standards in relation to the information security. The first one of these studies in the information security management system called BS 7799 designed by the British in year 1995. Then, BS 7799-1 and BS 7799-2 were introduced. This

process was followed by ISO 17799 Standard issued by ISO. Towards the end of year 2005, ISO 27001 Standard was put into effect. ISO 27002 was published as implementation guide. ISO 27005 was put into force as Risk Management guideline. However, information security management system is executed in accordance with ISO 27001 (Calder, 2006).

The Information Security Management System (ISMS) can be regarded as the integral part of management systems existing depending on the risk management approach to ensure, as well as to design, plan, execute, follow-up, control and sustain the information security (Iso, 2005). The benefits that ISMS can provide to the enterprises and institutions can be outlined as follows (Calder, 2006):

- Ensuring that the information and documents are protected in accordance with the requirements,
- Ensuring that the information is protected for business continuity,
- Ensuring that the risks and threats are determined and so risk management conditions are created,
- Protecting the reputation of the enterprise or institution,
- Understanding by the international community that the enterprise or institution cares about information security,
- Inspection of access to information resources,
- Setting forth the risks which might derive from the studies conducted on behalf of third persons,
- Company's contributing to the risk perception,
- Raising of the awareness of employees, employers and the managers regarding the security and briefing of them about the critical security matters.
- Ensuring the confidentiality, integrity and accurateness of the information in one's possession.
- Preventing malignant usages of information systems by employees while they are addressing to the liabilities of users and customers,
- Preventing that the employees are accused of due to the abuses and misuses done by others,

- Ensuring that the laws, legislations and conditions of agreement are obeyed,
- Earning competitive advantage to the enterprise,
- Contributing to the enterprise image,
- Engaging the improvement system to prevent any breakdown in computer networks, hardware or software which might occur due to the reasons on the part of the individuals using the information systems such as deliberate abuse, indeliberate misuse and negligence.

Determination of the scope in terms of the ISMS, identification of inspection processes, determination of risk management methodology, creation of preventive and corrective action policies, deciding on the inspection system are necessary. From this point onwards, it is possible to describe the scope of ISMS as follows (Landoll, 2006):

- All of the information systems owned by the enterprise,
- Some part of the information systems owned,
- Information systems in a certain area of settlement (such as campus, general directorate, headquarters, etc.),
- An information system focused on (network, web server, computers, server computer, etc.)

Subject to ISO 27001 standards, ISMS focus on Plan-Do-Check-Act (PDCA) cycle. PDCA cycle has been addressed to in Figure 11.

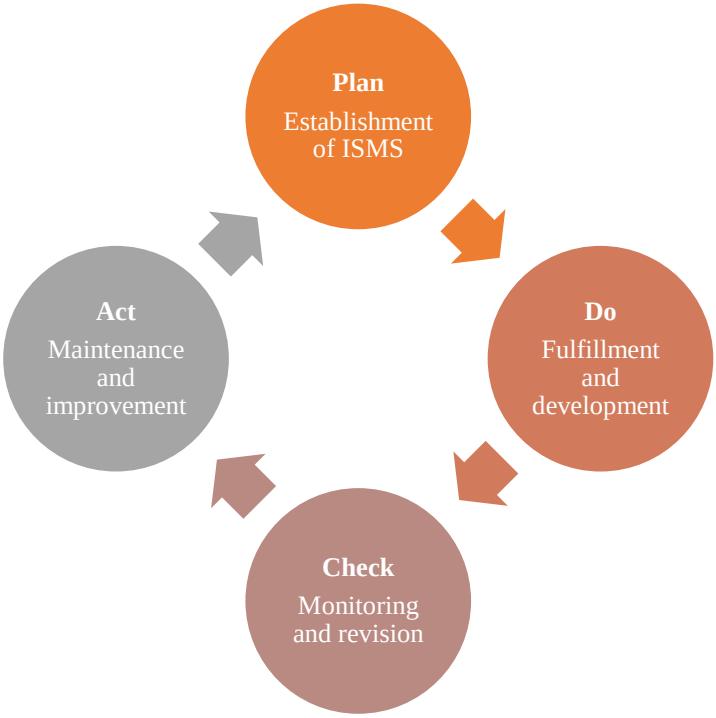


**Figure 11:** PDCA cycle in ISMC.
*(Gülmüş, 2010: 69)*

The cycle is completed with the fulfilment of each of the stages taking place in PDCA cycle under the ISMS. With the provision of this cycle, a robust structure of ISMS will be established.

### 1.4.7. Qualifications that Electronic Document Management Systems Must Meet

It is possible to outline the qualifications that Electronic Document Management Systems must meet as follows (Küçükönder, 2006: 53-59):

- Open architecture The Electronic Document Management System (EDMS) must have the qualifications which can be adapted to the new technologies in terms of the software and database that it has. In today's world where especially the information technologies show rapid development, this faces us as an obligation.
- Lucidity: It is important that the EDMSs are easy to understand on the part of the users so that they can use then with ease. And lesser time needs to be spent for the training of a system which is easy to understand.

- Scalability: The document volumes of enterprises and institutions increase day by day. Such situation requires that the EDMSs are scaled.
- Integration of applications: It is highly important that the used applications can be integrated on account of the document management systems. It is necessary to ensure integration in the e-mail, table and word processing systems.
- Business oriented structure: EDMS needs to be arranged in such a way to meet the requirements of the users placed in two different poles. In this respect, it should accommodate functions which can be used by the users from the lowest level to the highest levels.
- Remote access to documents: The corporate information should be accessible not only to the employees working inside the office, but also to the employees working outside the office. Apart from this, the traveling employees must have the functions of document management from their laptops.
- Electronic Document Management Software: Though EDMS generally seems like a structure embodying the file indexing programs, it leverages the core database engine within the scope of management of information located on the network.
- Group software: These programs create a structure over the server for purposes of managing the electronic information centrally. The users creating their documents in their individual computers have the opportunity to use the documents with the other users. At the same time, the employees can work on a project collaboratively thanks to such software.

### 1.5. EDMS and Legal Grounds of EDMS in Turkey

The applications of electronic document management systems today have started to be prevalent in all areas. Implementation of such systems in the public sector is important especially for the acceleration of the system due to red-tape. It is important to impose some rules for the recording, transmission, safety and elimination of documents created in electronic conditions (Sayıştay,

2006). Therefore, in Turkey, Marmara University and State Archieves General Directorate has issued the "Electronic Document Management System Criteria Reference Model". Such study was accepted in year 2007 as TS 13298 Information and Documentation Electronic Document Management Standard.

In Turkey, a great deal of electronic document management software is produced in private and public enterprises. Particularly, a big portion of such software are produced under the scope of projects subsidized by the government. It has become a necessity to create certain standards and set the legislative infrastructure on such matter which is investigated with studies heavily. Therefore, it will be appropriate to address the EDMS applications and the components within the electronic government applications under the following sub-titles.

### 1.5.1. Right to Information Act

The Right to Information Act, no 4982, which allows the citizens and enterprises to acquire information, entered into force on the date of 09.10.2003. In pursuant to the Act, the citizens and enterprises are entitled to acquire information subject to the principles of clarity, equality and neutrality as a requirement of transparent and democratic management.

While it is possible to use any kinds of written, visual and audio document within the scope of right to information, the electronic documents can also be used within the scope of right to information. While it is possible to give one copy of the document within the scope of right to information, in cases where this is not possible, it is permitted to look at the document content or take note about the document. However, everybody is entitled to obtain information under the Right to Information Act. Nevertheless, the information requested by the foreigners residing in Turkey and the legal persons displaying activity in Turkey must be relevant to themselves or their own scope of activities.

On the other hand, the submission of any kinds of documents to the persons or enterprises within the framework of the Right to Information Act might cause

slowdown in the in-house functioning. As the process of finding the documents and submitting them to the persons and enterprises may slow down the in-house functioning, submitting the electronic documents will ensure fast functioning. Such case has been encouraging the usage of electronic documents.

### 1.5.2. Regulation on Procedures and Principles to be Applied for Official Correspondence

The institutionalization processes assume a significant role in terms of ensuring continuity of EDMSs. It is especially very important to ensure continuity and carry out the correspondence in electronic environments within the framework of certain standards and rules. The companies and enterprises are established and display activity subject to specific rules. Such case has to manifest itself also in official correspondence.

The information included in the documents are significant for being able to access and archive the documents and to do the correspondences. The components which the documents must embody within the scope of official correspondences can be enumerated as follows (Özdemirci and Odabaş, 2009):

- The name and address of the company producing the document, the name of the enterprise or unit where the document has been produced,
- The date of writing, recording and producing the document,
- Record number of official letters, enterprise, department, sub-units where the document has been produced, the code designated for conveying the document,
- General explanation about the scope of letter and the subject matter of the letter,
- The references revealing whether or not the letter is related to any previous letter,
- The name of relevant individuals, place and institution doing the correspondence, significant events/cases and content of the letter,

- Names of the person(s) appending signature or approving in the approval and signature section,
- Documents and annexes supplementing the correspondence,
- Names of enterprises or institutions to which the document is sent for distribution purposes,
- Address of the institution or enterprise where the correspondence has been produced.

The procedures and principles related to the official correspondence in Turkey were put into force in year 2004 under the "Regulation on Procedures and Principles Applicable for Official Correspondences" Such regulation is highly important in that it specifies the rules to be observed within the scope of the official correspondences. Furthermore, it illuminates the document management and archive transactions. However, such regulation was annulled by the New Regulation on Official Correspondence, which was published in the Official Journal, dated February 2nd 2015 and numbered 29255. This regulation covers the correspondence rules specified in the preceding regulation and it involves further arrangements with regard to the official correspondence to be made in the electronic environment.

Under the scope of New Regulation on Official Correspondence, the definitions such as "secure electronic signature", "EDMS", and "electronic approval" have been set forth. With these definitions, it has been stated how the correspondences will be carried out in the electronic environment. Though there is a new arrangement in the regulation as to the conventional correspondences, it also provided detailed information regarding the correspondences to be done under the EDMS applications.

### 1.5.3. Electronic Signatures and Electronic Signature Law, no 5070

For the electronic documents to qualify as legal, they have to bear electronic signature (e-signature). In this respect, it is not possible for an electronic document to have any legal validity, if it does not bear electronic signature.

The concept of electronic signature is defined in different ways across the literature. In one of such definitions, electronic signature has been stated as electronic data which is created subject to the document to be signed under the electronic conditions and is stored by being attached to the document (Bensghir and Topcan, 2010). In another definition, electronic document has been explained under three requirements. The first of these three requirements is that electronic signature must have a character which is distinctive from the electronic documents and is attached in the electronic environment. The second requirement is that the electronic signature must establish a logical interaction with the document to which it is attached, and the third requirement is that it must have a logical relation with the document and also it must be created for the purpose of identity verification (Orta, 2005).

So that the documents can gain legal status, it is crucial that they are not altered. It is also important to identify which person and enterprise the document belongs to. Electronic signature is highly important to reveal all such aspects for the electronic documents. Electronic signature is very critical for electronic documents to qualify as official. In addition, with the electronic signature, the fact that which enterprise or institution owns the electronic document is also officially verified.

The concept of electronic signature has been addressed in Turkey under the Law, no 5070 on Electronic Signature. In this Law, electronic signature has been defined as follows: "Electronic data added to another electronic data or have logical relation with the electronic data or used for purposes of identity verification" (article 3 of Law, no 5070). Another component relevant to the electronic signature is the concept of electronic certificate. Electronic certificate is explained as an element assuming the task of matching the identity information of the person who signs the document with electronic signature (Article 1(ı) of Law, no 5070). In Turkey, in order to provide electronic certificate, one must file application to the Public Certification Centre (KSM) affiliated with the National Electronic and Cryptology Research Institute and Scientific and Technological Research Council of Turkey (TÜBİTAK).

A significant phenomenon related to electronic signature is that it should be determined when the electronic document has been signed. For determining such phenomenon, the concept called as "time stamp" is used. Under the law, the time stamp has been described as follows: "the record of an electronic data verified by e-signature of an electronic certificate service provider for the purpose of identifying the time when an electronic data is produced, changed, sent, received and/or recorded (Article 3(h) of the Law, no 5070). Time stamp gains the following features to the electronic documents:

- It gives the electronic document the feature to be a proof,
- It adds the electronic signature the time component,
- It enables to determine the date of electronic certificate.

While the time concept is important in the documents for not exceeding the restricted periods to execute the activities, it is also significant for determination of how long such documents can be legally used. The official documents must be archived for certain periods due to legal requirements, despite they are not used. Time stamp is of utmost importance to meet such requirements within the scope of electronic documents.

Electronic signature and time stamp are important by virtue of the fact that they offer the same features of written documents in the electronic environment. With such components, the documents preserve their legal validity in the electronic environment and thus remain available.

### 1.5.4. Regulation on Procedures and Principles to be Observed in Provision of Public Services

The Regulation on Procedures and Principles to be Observed in Provision of Public Services, no 2009/15169 aims to provide an accountable public service. Apart from that, it also has specific goals such as ensuring that the public services are transparent, quicker, more efficient and high quality, and facilitating that the services are of lower cost. Furthermore, it is also intended to provide the public services to the citizens from the first stage. In this respect,

it is aimed to engage multiple mechanisms of approval and decision-making in the process.

The regulation numbered 2009/15169 intends to ensure tht the government services are provided in the electronic environment. Article 4 of such regulation includes to the following arrangements:

1. Transferring of written and printed documents to the databases through electronic environments and sharing of the same with the other administrations,
2. It must be ensured that the administration can receive the applications in the electronic environment, the applicants can follow up their applications in the electronic environment, and the result is communicated to the relevant person or body in the electronic environment. In this respect, the administration must provide that its services are in compliance with the e-Government Gateway.

One of the important problems in government services is that the citizens have to wait for hours in public institutions to be able to benefit from such services. However, in parallel with the moving of government services to the electronic environments, the citizens no longer have to spend much time waiting in the public institutions. This both enables public institutions to operate efficiently and the citizens to save time. Moreover, the prestige of public institutions and the state as perceived by the citizens enhances.

### 1.5.5. Electronic Standards

Standardization of archiving applications through document management is frequently encountered situation in business life. In this regard, the standards with determine the scope and content of many documents are the components or requirements which exist and continue to be used in almost every country (Cabero, Martin-Pozuelo and Zazo, 2011). Within the framework of the standards, it is possible to maintain the operations under a certain order and with more ease.

Electronic document management systems are, too, created and managed within the scope of specific standards and regulations. Therefore, international and national regulations have been published in relation to this matter. The first recognized standard in Turkey is the Turkish Standard (TS) ISO 15489 for Information and Documentation-Document Management. In addition, ISO 15489-1 which qualifies as international standard and the following ISO TR 15489-2 standard have provided a standard structure (Mcleod, 2003: 70). One of such standards ISO 15489-1 includes arrangements as to the composition of documents and recording and management of such documents by the enterprise managements. In addition, the components and functions required for management of the documents and certificates explained in TS 15489 have been addressed in ISO/TR 15489-2 standard.

ISO 15489 standard has some structural qualifications. Such qualifications can be outlined as follows (White-Dollman, 2004):

- It is an international standard.
- It provides a common fund in international structure with the requirement to implement a single system.
- Under this standard, the document management approach is process oriented.
- It has the qualifications which support the other ISO standards adopted by the companies.
- These standards have been clearly established by the IT specialists in languages and matters the readers may understand.

The fact that ISO 15489 standard has been designed in conformity with the international structure contributes also to Turkey's European Union (EU) harmonization process. Such case is important also in terms of the development of Turkey's international relations. Moreover, not only in the government, but also in the private organizations, adoption of such standard allows easier functioning and operation.

One of the other standards used in Turkey is TS 13298 Information and Documentation-Electronic Document Management Standard issued by

General Directorate of State Archives. This standard forms the basis of EDMSs. It has been arranged in three chapters. There are sections under the three chapters covering the infrastructures required to be able to use such standard. The chapters involved in TS 13298 standard can be expressed as follows (TS 13298, 2009):

- The chapter describing the system criteria, the components required for an electronic structure to be treated as electronic document system and how such system must be designed.
- The chapter elaborating on the numerical imaging systems, document criteria, features of electronic documents, management of documents found in the physical environment and conversion of such documents to electronic documents.
- And the chapter setting forth the metadata requirements related to the electronic document management system.

TS 13298 standard stipulates that the public institutions must establish the conditions for EDMSs under the scope of Prime Ministry Circular Note, numbered 2008/16. Consequently, it is obligatory that all the electronic document management systems planned to be used or used in public institutions and enterprises must be accredited with TS 13298 standard certificate. TS 13298 standard is important to settle a robust electronic document management system in public institutions. Furthermore, considering that the public institutions are in interaction with each other, existence of a specific structure in such functioning will significantly facilitate such interaction among the public institutions. High quality usage of electronic document management systems in public institutions also guides the private enterprises. Apart from these, existence of a specific structure in public institutions is important also for providing productivity in such institutions.

Archiving is an activity which requires a detailed effort it and of itself. However, the archive related regulations of TS 13298 standard which has been made obligatory to use for EDMS in public institutions and enterprises is not sufficient. Therefore, the storage procedures, times and elimination practices

related to E-archive have been stated, but the other elements regarding this matter have been neglected (TS 13298, 2009). In this respect, it is important to develop a standard addressing the details related to archiving so that it can be determined how archiving needs to be performed.

### 1.5.6. Principles of Interoperability in Government Information Systems

The Principles of Interoperability in Government Information Systems have been put into implementation with the Prime Ministry Circular Note, no 2009/4. Such circular note as guideline has been prepared in three chapters. The first chapter explains the general principles related to the operability policy. The second chapter dwells on the technical standards related to the transfer, presentation, integration and amendment of information. The third chapter covers the components which supplement the guideline considered to be used in the upcoming periods.

The Turkish Standards section of this guideline has set forth the standards and principles related to 6 subject matters. These 6 subject matters are as follows (Principles of Interoperability in Government Information Systems, 2012):

1. File submission and amendment,
2. Interconnection,
3. Data integration and content management,
4. Security,
5. Geographical information systems,
6. Development and management of information systems.

The subjects found in the guideline are prominent for rendering possible the interoperability of public institutions and agencies during the provision of electronic government services. In addition, it facilitates the provision of back office integration, thereby reinforcing the productivity of e-Government Gateway.

One of the topics focused on by such Circular Note is the interoperability policy. Interoperability is expressed as the skill of a structure or process to use the functions and/or information of another structure or process. The goal of

activities aimed to provide interoperability carried out within e-Government is to ensure information sharing across the government departments and units, assume regulatory duty, provide integrated government service to the citizens, enable return of investments made in information technologies and to raise the user satisfaction. The two main targets are intended to be achieved through the usage of communication and information technologies. The first one is to ensure that the citizens are provided with government service according to their requirements and the other is to ensure the establishment of advanced decision support processes. (Principles of Interoperability in Government Information Systems, 2012).

The interoperability requirements can be addressed in three dimensions as semantical, technical and organizational. Semantical interoperability dimension aims that the data are analysed appropriately by the institutions other than those who produce the data. Technical dimension focuses on the technologies which make information sharing possible across miscellaneous applications. Organizational dimension is interested in the aspects such as object-oriented software engineering and modelling languages (Principles of Interoperability in Government Information Systems, 2012).

The first subject addressed in the standards section is the file submission and amendment. Such standards focus on settling the standards related to the submission of information to the users in the electronic environment in e-government applications. Furthermore, the formats as to the official correspondence made in electronic environment between the public institutions and agencies are regulated in this chapter. This issue is handled in e-Correspondence Project format.

It is required that the institutions express unequivocally and clearly the information that they need and have for sharing information with each other. From this perspective, data integration and content management must be realized to make such process possible and sustainable.

Another issue relevant for settling the standards across the public institutions is security. Security is crucial for guaranteeing of secure conditions during the transmission and sharing of information among the institutions. To this end, it is important to determine the security standards for the security of both the institutions themselves and the citizens. The Information Security Management System (ISMS) has been established to serve for such purposes. Moreover, the components as electronic signature and cryptography should also be mentioned.

Another issue dwelled on within the scope of Circular Note of Interoperability in Government Information Systems is the geographical information systems. Geographical information systems allow for obtaining, storing, processing of graphical and non-graphical information and making such information available to users for the purpose of supporting the users in decision making processes and, in their works, based on location or space.

### 1.5.7. State Organization Central Registration System – SOCRS

The State Organization Central Registration System – SOCRS, which is one of the sub applications of Electronic Government Information Management System (EGIMS (in Turkish KAYSİS)) is an e-government database which identifies the Registered Electronic Mail (REM), electronic organization structure and communication data of the institutions and agencies doing correspondence in official format in Turkey, and then converting them to the codes in unalterable format (KAYSİS, 2017). The units which are within the body of all institutions included to the coverage of SOCRS are assigned an unchangeable code which is similar to the Turkish Republic Identity Number.

The State Organization Central Registration System was formed initially under the Prime Ministry Circular Note, no 1991/17 and then it remained in effect along with the Circular Note, no 2011/1. Such system was created for the purpose of ensuring that the organization structures in electronic document management systems are treated according to certain functioning scope. SOCRS allowed the institutions to do the official correspondence more easily.

Apart from that, SOCRS can directly regulate the changes emerging in public institutions and agencies and can prevent the uncontrolled changes which are not in line with the requirements, but are made only as desired. Furthermore, it enables that the units executing the similar or the same activity are placed in a similar hierarchy.

### 1.5.8. Registered Electronic Mail (REM)

The electronic e-mails have today become the most frequently used communication tools. Therefore, the electronic mails can be described as a means of communication which allows for production, storing, transmission and achieving of information by and between the persons, communities and institutions in the electronic environment (Benghsir, 1996). Today, the electronic mails which have become used by almost every person on earth are also used by the institutions and enterprises. In this respect, the electronic mails are now used also in official transactions. Registered Electronic Mail (REM) system has been created to add official quality to the electronic mails used by miscellaneous institutions and enterprises and to ensure security of such mails. This system entails the dispatch, transmission and receiving of electronic information and reveals provision of legal proof related to the same (Regulation on Procedures and Principles for Registered Electronic Mail System, article 4(i)).

The documents conveyed under the scope of Registered Electronic Mail (REM) are conveyed with electronic signature. Thus, these documents also bear time stamp. Other than that, the sender and receiver individual or institution information are found in such electronic mails and the accuracy of such information is confirmed. REM also ensures confidentiality of the documents. Furthermore, REM prevents any undesired messages and thus provides that the communication among the institutions is more reliable and cost-efficient (Akyelek at al, 2011).

REM system is very often used for notifications. The notifications are used for purposes of informing the relevant individuals of the legal practices and are

created upon the announcement of authorized bodies or in written form (Tüzüner, 2011). The procedures and principles for electronic notifications have been determined under the Electronic Notification Regulation published on the Official Journal, dated 19.01.2013 and numbered 28533.

The Registered Electronic Mail system is considered as an envelope of electronic mails within the scope of Electronic Document Management Systems. In this sense, REM has assumed duty for provision of information security.

### 1.5.9. Electronic Correspondence Platform

Electronic correspondence platform is important for institutions and enterprises maintaining their official correspondence in a safe manner. The initiatives of creating an electronic correspondence platform in Turkey started in year 2011 by the Ministry of Development. The Ministry published the "e-Correspondence Technical Guideline" which covers the procedures and information which must be involved in the electronic correspondence across the institutions. This guideline includes the creation of structure to serve for the transmission of letters sent among the public institutions and agencies and the components for confidentiality and encoding of such structure.

For the purpose of identifying the principles on Electronic Correspondence Platform, the Ministry negotiated with e-Correspondence Project and software companies, TÜRKSAT A.Ş. (Turksat Satellite Communications and Cable Tv Operations Company), General Directorate for State Archieves and tried to determine the content of the electronic correspondence package in line with the company needs. As a result of such initiatives, e-correspondence package was created (e-Correspondence Technical Guideline, 2011). According to such package, the electronic documents created in electronic document management systems are signed with electronic signature and encoded with metadata with the format they have. Then, the receiver institution opens the package and can do transaction over it in the electronic environment. With

such package, the qualifications of the electronic documents can be preserved in a reliable manner.

## 1.6. Productivity Concept and Impact of EDMS on Productivity in Public Institutions

### 1.6.1. Definition of Productivity

Productivity refers to the interaction among the inputs used for the purpose of creating the relevant phenomenon affiliated with the goods produced or services provided as a result of an activity or business system or whether or not the production factors are leveraged efficiently. With a different evaluation, productivity describes the efficient usage of production factors for purposes of providing service or producing goods (Karakuş, 2015).

Productivity means avoidance of resource wasting and using the resources in the best way possible. Furthermore, productivity allows for increasing the quality of service or good produced, protecting the nature, developing the working conditions, enabling employee satisfaction and increasing the quantity of production per input (Uslu at al, 2013).

Productivity refers to the processes such as utilizing the produced resources in the most optimum way and obtaining the most ideal resources, by leveraging the whole of phenomenon such as the existing improvement techniques for high quality service and good production and distribution, creative thinking activities, and research and development methods to this end (Ramsay, 2008: 18). Productivity means achieving the highest production level possible with the highest level of employee and customer satisfaction, highest level of quality, within the shortest time and at the lowest cost possible. Hence, productivity is not merely a material component, but is a concept which has a personal and social aspect (National Productivity Centre, 2004).

### 1.6.2. Importance of Productivity

The increasingly challenging competition conditions today have caused the market conditions even more challenging. In this respect, the companies and

institutions have to improve their qualities, act more quickly and use their resources better. In addition, the institutions have to boost their productivity to gain competitive advantage. The reason for this is that productivity plays a crucial role in determination of revenue and investment policies and in identification of the changes emerging in the production factors utilized within the scope of production inputs and in taking the relevant measures (Mirze, 2010).

There are numerous benefits that productivity offers to the institutions. At top of them are the components such as easy handling of the works, reducing of costs, rising of quality, increasing of production, operation of quick decision-making mechanisms and providing input and energy saving. Based on such components, one can speak about productivity on differing market conditions (Mirze, 2010). Therefore, the institutions and enterprises have to leverage the components which will continuously increase their productivity.

### 1.6.3 EDMS Domains

There are four main domains within the scope of activities carried out over the electronic document management systems in public institutions. These can be outlined as follows (Baştan and Gökbunar, 2012):

- Public institution - citizen interaction,
- Public institution - company interaction,
- Public institution - public institution interaction,
- Public institution - employee interaction.

Figure 12 demonstrates the electronic domains of public institutions.

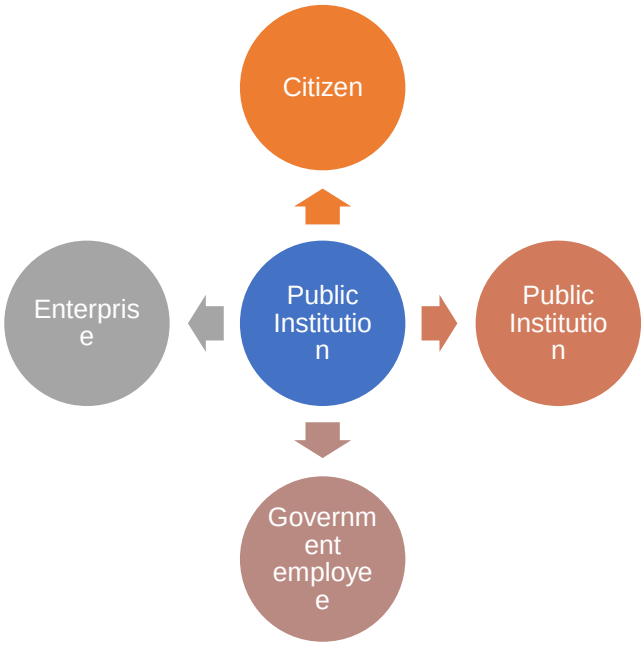


**Figure 12:** EDMS Domains in Public Institutions.
*(Erdal, 2004)*

Public institutions are composed of units offering service to the citizens. These units have to offer citizen-oriented service. All the citizens have interaction with the government in relation to certain transactions. That the transactions of citizens are similar to each other and the number of citizens filing application is very high leads to the rise of costs and loss of great time, if such transactions are performed on paper. In this respect, EDMS systems enable the transactions of citizens to be performed more quickly and easily, thereby providing saving from cost and time (Arifoğlu, 2004).

Public institutions can collaborate in their operations and activities and can request information from each other regarding the transactions they will carry out. While in the past the correspondences made over paper would require longer periods for information requesting or information presenting, today, the electronic correspondence and electronic mails within EDMSs and the transactions between/among the public institutions through electronic mails can be made within just minutes. It is possible to quickly obtain submit and receive petitions, notifications, approvals and announcements over the EDMS systems (Erdal, 2004). These explained components have features similar to

the interaction domains established between the public institutions and enterprises.

The interaction domain between the public institutions and government employees functions to perform the transactions easily and quickly, such as the production, storing, transmission and retrieval of documents facilitated by transition to the electronic environment through the EDMS. Thus, the employees have more time to develop themselves.

### 1.6.4. Advantages of Electronic Document Management System

With the advancement of technology and spread of the Internet usage, the information technologies have become indispensable for the individuals, governments and institutions. Today, being able to communicate fast and at low cost thanks to the Internet has enabled to take a step further the advantages brought by information technologies.

Information technologies and the EDMS structures which are commonly used today has eliminated the complications emerging in the government management due to the overwhelming volume of information and enabled the government, state, citizens and companies to have easier and quicker access to information. Such case has allowed for increase of effectiveness and productivity. Thanks to the EDMS systems, it has been possible for public institutions to provide service to the citizens more easily. In addition, such systems have increased access to public institutions and played role in provision of transparency in public institutions (Yıldırım, 2007). EDMS applications in public institutions allows also for preventing misconduct and corruption, reducing the authoritarian structure and enables citizens to obtain more information. Thus, the tie between the government and the citizen gets reinforced and the citizen comes closer to the government (Balcı, 2003). With EDMSs, positive practices emerge, making it possible to experience ease, standardization, speed, productivity in government activities and ensure resource procurement and confidentiality.

It is possible to list the advantages offered by EDMS applications in public institutions as follows (Yıldırım, 2007):

- Diminishing of numerical gap: Gradual reduction of unfair elements in access to information technologies and thus, citizens' benefitting from such components more easily.
- Achieving cost productivity within the scope of services: That the government services can now be provided over the digital platforms have minimized the different expenses such as the stationery. Such situation enables cost productivity.
- Ensuring transparency in government sector: Recording of data and information electronically makes it possible to easily access and easily inspect such information. Thus, transparency in government transactions increases.
- Reinforcement of participatory democracy: It is possible for citizens to seek their rights and share and convey their opinions in decision mechanisms more quickly. Consequently, a more democratic service approach is ensured.
- Public institutions' maintaining their activities fast and efficiently: EDMS systems also enables quicker production, transmission, storage of and access to information, and hence more efficient functioning.
- Increase of corporate and individual welfare: It is possible to make investment in different areas in the public by virtue of efficient resource usage and reduction of costs. Furthermore, such case reflecting positively to the government is also experienced positively by the citizens and enables individual welfare to rise up.

### 1.6.5. EDMS Applications Across the World

There are different EDMS applications across the world. For example, it is possible to summarize some developments related to such applications in Singapore (Demirel, 2006; Uçkan, 2003):

- In year 1981, Singapore government put into implementation the Government Services Computerization Program. This project aims to develop the technology and communication infrastructure. In addition,

with the program, the structures such as Trade Network, Medicine Network, School links, Wholistic Land Utilization System started to be used.

- In year 1992, the goal was to become the distributer of the Far East in the field of communication and information with "Smart Island Vision" within the scope of "IT 2000" plan. Accordingly, the government services and individuals and institutions were desired to in interaction with the networks.
- The e-citizen application in Singapore was especially outstanding. This application ensures administrative services to be handled in a single portal.

It is possible to suggest that the far eastern countries have great influence in the world's transition to the electronic system. Among such countries, especially Japan has made breakthroughs in information technologies. The movement of advancement in information technologies with the influence of Japan gradually spread to the whole world.

In the United Stated of America (USA) different applications were introduced in the government for the purpose of promoting e-government approach. Especially in 2001 and 2002 period, the government focused on the electronic information management systems allowing for citizens to access to the federal and central public institutions. In this scope, the topics such as democratic accountability, easy access to information were focused on (Oğurlu, 2010: 41). Here are some studies conducted in the USA for the development of electronic information management systems (Güreler, 2011):

- On the date of 03.10.2003, "E-Government Strategy Report" was published for the purpose of ensuring that the institutions can provide service to the citizens and the public institutions can work together with them. Within the scope of such report, the interaction domains of public institutions were addressed.
- The "USA.gov" portal used to access the services provided by public institutions has been created for citizens to receive easy service and

information. Though such portal is frequently updated according to the needs, it also offers video and audio service.

- There are also system providing federal level service. The "on-line store" structures established by USA Ministry of Defence offers the buyers of defence devices the opportunity to do trading from a single point.

The initiatives on electronic document systems started in French public institutions in year 1998. For the relevant systems to be used in public institutions the units called DIRE and MTIC were put into operation. Under such operations, it was aimed to provide information to the public institutions, citizens and companies. Other than that, a domain as www.service-public.fr which is accessible to the citizens, companies and varying public institutions was created for the execution of government services. Furthermore, a program called ADELE Programme (Administration Electronique) was engaged so that the citizens can remotely access all the components related to the government services (Güreler, 2011).

### 1.6.6. EDMS Applications in Turkey

In Turkey, various studies were conducted to develop the EDMS applications and e-government applications. One of these studies is Turkey's National Information Infrastructure Master Plan (TUENA) which was adopted by the Ministry of Transportation on July 1999. Then, in early 2000s, on June 15th-16th, 2001, during the European Union Leaders Summit, Turkey appended signature on "e-Europe+" project and within this scope started "e-Turkey" initiatives. In year 2003, with "e-Transformation Turkey Project", all the studies related to such transformation was tried to be gathered under the single structure. The Prime Ministry Circular Note dated 27.02.2003 and numbered 2003/12 notified the goals and purposes of such project to all public institutions. Furthermore, with the circular note it has been decided to establish a Department of Information Community (BTDB) to sustain the eDTR Project under the State Planning Organization (DPT) (Balcı, 2008).

The steps taken by Turkey in electronic information management systems started to manifest early in public institutions and agencies. Such case accelerated with the spreading of such systems gradually in different areas.

One of the important changes Turkey made related to the electronic information management systems is the e-government applications. Such applications cover certain services which can be summarized as follows (Güreler, 2011):

1. E-Taxation system
    - Tax Administration Full Automation Project (VEDOP; VEDOP I, VEDOP II, VEDOP III): E-Declaration, Client Server Based Tax Administration Automation (VDO), Web Based Tax Administration Automation (e-VDO), Tax Warehouse Project (VERIA), Internet Tax Administration, Electronic Invoice (E-Invoice) and Electronic Invoice Registry System (EFKS), Tax Inspectors Automation System (VEDOS), Electronic Bank Collections Processing System (EBTİS), Customs Consultancy Connection System (GÜMBS), Electronic Accounting Record Archiving System (EMKAS), E-Confiscation.
2. E-Audit: Cost Inspection Board Tax Administrations Audit System (MT VEDEBİS), Cost Inspection Board Accountancies Audit Information System (MTK SADEBİS) and Web Based Accountancy Automation Project (Say2000i), Financial Inspection Board National Real Estate Audit Information System (MTK MİDEBİS) and National Real Estate Automation Project (MEOP), Financial Inspection Board Audit Information System (DEBİS)
3. Some important other applications
    - Central Population System Project (MERNİS),
    - Identity Sharing System,
    - National Justice Network Project (UYAP)
    - Electronic Signature
    - E-health.

### 1.6.7. Positive and Negative Impacts on Employees

It is possible to suggest that the EDMS structures increase the motivation levels and job satisfactions of government employees. The reason is that the employees have lesser work load and more opportunity to develop themselves as a result of doing their more quickly and efficiently. Furthermore, the employees using the EDMS structures can follows the technology more closely. Apart from this, with EDMS structures, the employees can have higher access to information. That the employees can access more information through EDMS may positively influence their sense of belonging. The rising of employees' sense of belonging positively supports their perception of satisfaction for their job and may increase their productivity.

EDMS is highly beneficial for increasing the work performances and productivity of employees. However, this situation might also involve some particularities which are detrimental to the health of employees. Now, the employees handle all their works on the desk and so spend all their worktime with no movement. Such case may negatively influence the health of employees. Especially, back pain and dorsalgia may occur due to sitting without moving for the whole day, and eye problems due to looking to the computer screen for the whole day. Apart from this, the employees who cannot catch up with the work load accelerating due to EDMS structures can start experiencing social problems (Öztoprak, 2001).

### 1.6.8. Positive and Negative Impacts on the Institution

EDMS systems enhance very much the productivity and effectiveness of public institutions. These structures at the same time ensure that the public institutions get into close interaction with the other companies and government institutions and thus enable quick information flow. In this respect, it becomes possible to take quick decisions and start the implementations fast. This reflects positively to the services. Thus, the prestige of public institutions in the eye of the citizens increase.

EDMS systems require certain investment cost initially, while they help reducing the operating costs. Such case requires to bear a certain level of cost

in usage of these structures. Apart from this, the hardware and software which are used under such structures must be renewed in line with the technological developments and they must be subjected to maintenance at certain regular intervals. This causes additional costs. Moreover, any breakdown or problem occurring in the main systems of such structures will cause disruption of the whole functioning. To remedy such breakdown and disruptions, persons who will stay the institution all the time must be employed. This causes additional costs. To be able to use the EDMS systems properly, the employees must be trained at certain periods. The employee trainings will return as additional cost to the public institutions (Öztoprak, 2001).

İn light of experiences in the sector, the significant problems that are probably faced and need to be addressed during the implementation process of EDMS in public institutions can be listed as follows :

• Personnel resistance (personnel do not want to give up their usual way of doing business, using paper). This problem is considered one of the most important problems.

• Computer anxiety and the low rate of computer literacy in public institutions.

• Lack of complete support of top/senior management (for some reason, senior managers do not want to use EDMS, and they ask for some exceptions to work on paper).

• Undefined and/or nonstandardized records management processes

• Role conflict (role conflicts occur during the implementation process of EDMS because of the duties and responsibilities that had not been clarified).

• Software problems (EDMS technology runs slowly, causes errors often, and is not user friendly. This problem is considered as one of the most important problems as well).

• Increased work load (procedures related to records are done both in the electronic environment and the physical environment).

• Lack of experience (the institution and/or the firm personnel who implement EDMS in public institutions are inexperienced).

In conclusion, the acceptance and adoption of EDMS is an important and timely aspect of transformation at the institutional and country levels in Turkey.

Accordingly, the road ahead is not a short and straight but a long (Medeni at al., 2013).

### 1.6.9. EDMS and Productivity in Public Institutions

Public Institutions are the areas where structurally there is so much bureaucracy. In public institutions, correspondence, notification, petition transactions are performed very heavily. This case causes a huge volume of document usage in public institutions. EDMS systems allow on paper transactions to be handled in the electronic environment and therefore, they enable the transactions to be performed more quickly and easily. Therefore, the production, transmission, storing and archiving of documents are concluded over the computers with no loss of time (Özbek, 2007).

With transition to EDMS systems in public institutions, their skills have improved. With EDMS, a service-oriented approach is adopted in public institutions. The government's operating as a whole and the citizens' receiving the service they need in the best possible way can be realized only through an electronic system. Enabling communication between the citizens and the government sector gains importance to ensure that the citizens feel trust in the government services (Pappel, 2014).

Considering that in the past the information request among the institutions could be replied after weeks, it is possible to understand the extent of quick transfer allowed by EDMS structures such as in hours. Thus, the public institutions may perform a lot of work within a short time. Such case means that the public institutions can reach a lot more citizens (Uzay, 2005).

### 1.6.1. EDMS Preparations in the Ministry of Science, Industry and Technology

In terms of information processing, infrastructure preparations, servers, computers and so on technical materials have been provided. The Ministry's network infrastructure was strengthened and 10 Mbs data lines were placed

between the units. Work flow processes were established. Pilot training was given before pilot use.

- These trainings are;
- Superuser training: These are trainings given to the staff who manage and define the processes belonging to the application in that unit and implement the processes smoothly.
- Unit recruitment training; This training is the training given to the user in that unit, which handles all the records of the documents received and enables them to be carried out in electronic environment.
- End user training: these users include all staff working in that unit.
-

Problems and deficiencies encountered during the pilot trial process were eliminated, trainings were given all the staff training in the ministry before live use.

In the Live Use Transition Process of the Application;

- Whether there are deficiencies in the "Standard File Plan" which constitutes the sub-structure of the EDMS application,
- According to the standard File Plan subject codes and each group of grades, whether folders are automatically opened in units,
- Whether or not there are any deficiencies in the "Administrative Identity Codes" in the State Organization Data Base belonging to public institutions and organizations,
- It was checked whether the electronic document record, the scanning application that composes the entrance part, and the scanners were installed in the document services of our units.
- The necessary information and announcements were made to the ministry units regarding the subject and it was requested to inform the deficiencies,
- The business processes belonging to the ministry units were re-examined and the final tests were carried out on the application and the practice of passing the application of the phantasy was completed.

EDMS was opened on 05/03/2013 by the Computer Centre Directorate and on 12/03/2013 by the Ministry's headquarters and 81 provincial directorates.

# 2. CHAPTER
# METHODS

## 2.1. Research Model

Although different methods have been used in the literature, the right method used to obtain quantitative data is the questionnaire study. Many studies have been conducted to determine the efficiency of EDMS by using the questionnaire study. This study was also be carried out by evaluating the results of the questionnaire survey in relation to the productivity of EDMS in the MSIT.

## 2.2. Research Design and Hypotheses

Reference point of this study is to determine the effectiveness of EDMS application of the Ministry, concerning the managerial control, productivity, job satisfaction, efficiency and safety provision topics throughout the process management and the assumption of it would be effective. This study is based on the hypothesis that the administration of electronic document management systems applications through process management approach, positively contributes to EDMS management process and sustainability.

Systematic control of the electronic document management system cannot be performed in EDMS applications that are not yet associated and unmanaged in terms of how effective they are in managerial control, productivity, job satisfaction, efficiency and safety provision topics. For this reason, problems that occur during the processes cannot be detected on time thus improvements either cannot be made on time or cannot be made at all, therefore delays/slowdowns occur in the transactions and works that carried out in the system and the system sustainability cannot be accomplished. In

this study it is attempted to answer the following questions in line with this problem:

In this context the following are the designed research problems:

1. Can the management bodies of institutions carry out inspections effectively through EDMS?

2. Does EDMS save time and provide extra speed for moving and saving the documents in the institution?

3. Does EDMS reduce the workload thanks to effective document management?

4. Does EDMS enable inspection in the institution and creation of institutional memory?

5. Does EDMS enhance the service quality in the institution?

6. Does EDMS provide user safety?

Perception levels, the problems experienced and expectations are determined. Technical and legal framework was examined and what needs to be done was presented as recommendations.

- $H_1$: EDMS ensures managerial control.
- $H_2$: EDMS ensures productivity of work.
- $H_3$: EDMS ensures job satisfaction.
- $H_4$: EDMS ensures efficiency.
- $H_5$: The personal information security of the employee's computer is safeguarded by using the EDMS.

The research model is as follows.

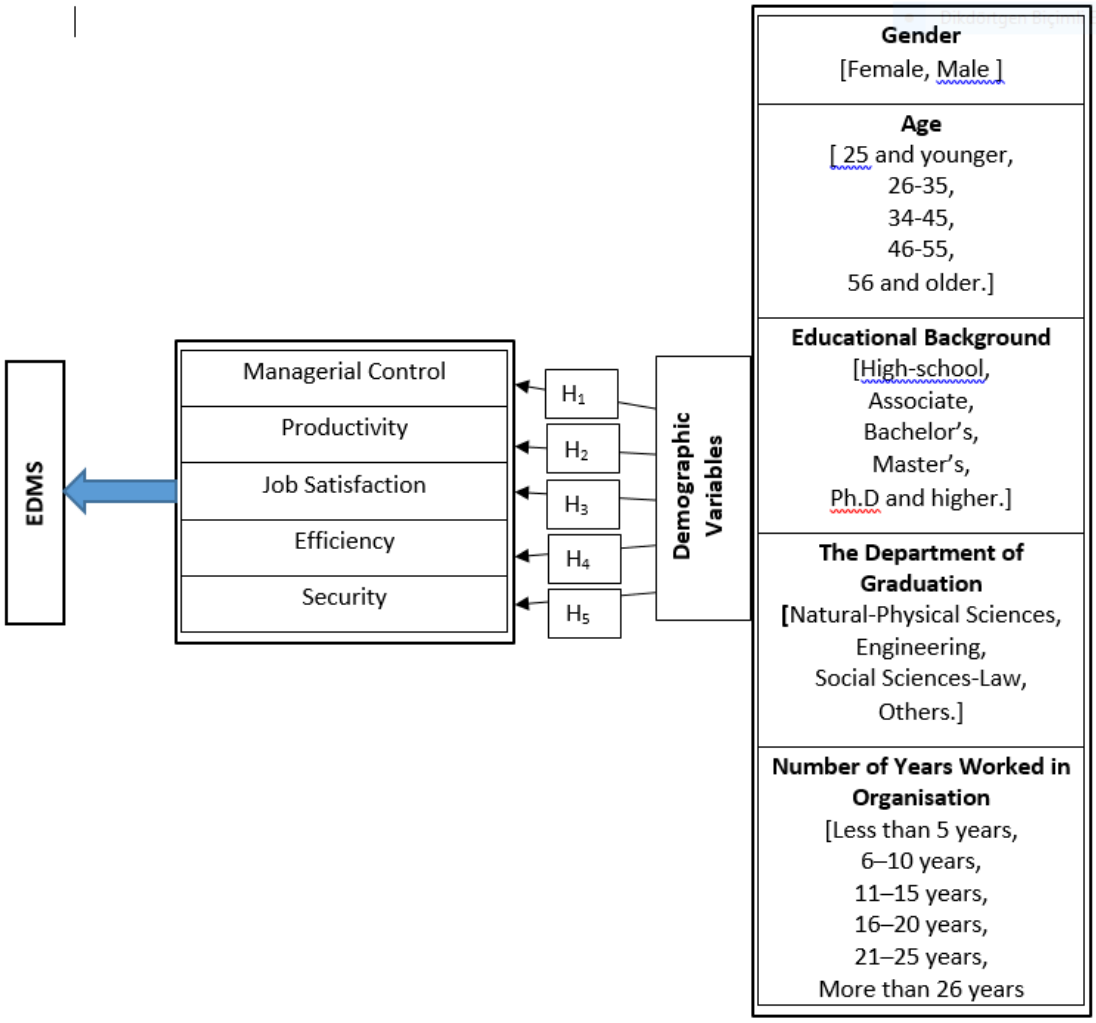

**Figure 13:** Research Model.

| Research Questions | Academic Ground | Hypothesis |
|---|---|---|
| **1. Can the management bodies of institutions take the healthiest decision through inspection and verification feature of EDMS?**<br><br>**2. Can the management bodies of institutions realize inspection efficiently through EDMS?** | Gülenç (2011) suggested in a study that EDMS allowed institutions to better operate their inspection and verification channels and such case enables the decision-making process more reliable.<br>Alır (2008) states in a study that the inspection productivity of the management increased with EDMS.<br>Howard (2001) indicated in a study that e-application systems led to change in the managements and increased the effective controlling mechanisms of managements. | $H_1$: EDMS ensures managerial/executive control. |
| **3. Does EDMS encourage collaboration in the institution?**<br><br>**4. Does EDMS enable gaining time and speed in the delivery and recording of documents in an institution?**<br><br>**5. Is is possible to work independently of time and space via EMDS?**<br><br>**6. Does EDMS prevent repetitive performance of any task?** | Özdemirci (2013) stated in a study that the document management systems enable to gain time in production, receiving, preserving and storage of the documents.<br>Chowdhury and Satter (2013) stated in their studies that EDMS provides productivity to the institutions in accessing to the documents and in practice.<br>Fang (2002) stated in a study that electronic document management systems enable institutions to gain speed in proper recording, transfer and storing of the documents.<br>Zantout and Marir (1999) pointed out in their studies that document management systems speeded up the work flow and so improved the productivity.<br>Kandur (2011) suggested in a study that the costs in storing and arrangement of | $H_2$: EDMS ensures business productivity. |

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|---|---|---|
| **7. Does EDMS reduce complication in accessing and recording the documents and provide ease of use with its technical infrastructure adequacy and software up-to-dateness.**<br><br>**8. Does EDMS shorten the reporting, initialling/signature periods?** | documents were eliminated thanks to EDMS.<br>Özdemirci (2013) stated that the costs were reduced upon transfer of the services and activities to the electronic environment.<br>Sallam (2006) stated in a study that the document management systems eliminated the need for physical storage of documents reducing the space costs.<br>Altay et al. (2013) stated in their studies that the document management systems reduced the complication in documents and gained speed to the employees.<br>Titinen, Lyytikainen, Paivarinta, Salminen (2000) detected in their studies that the document management systems contributed standardization on the documents and increased the ease of use.<br>Abeysingher (2001) stated in a study that the e-documents have given facility in access to the document. | |
| **9. Does EDMS reduce the work load by virtue of efficient document management?**<br><br>**10. Does EDMS increase the motivation, sense of belonging and success?** | Özden (2015) stated as follows in a study: "as the employees can perform their tasks in a much more efficient and effective way through certain opportunities offered by the modern conditions, they have the opportunity to actualize and develop themselves."<br>Singh and Sharma (2009) pointed out that the employee satisfaction increased in the institutions where e-initiatives are applied.<br>Javadi-Etebarian stated in their study that the e-application systems diminished the work load of employees. | $H_3$: EDMS improves job satisfaction |

| | | |
|---|---|---|
| | Stuurman (2013) indicated in a study that the e-document systems eliminated the file load of employees. | |
| **11. Does EDMS help supplying of needed information and documents?**<br><br>**12. Does EDMS help in performing inspection and creating corporate memory in an institution?**<br><br>**13. Does EDMS increase the service quality in an institution?**<br><br>**14. Does EDMS assist in catching up with the changing conditions?** | Klischewski (2003) found that it a study he conducted in Germany that the e-document systems ensure efficient usage of information and documents and boost service quality of an institution.<br>Panayiotou, Gayialis and Tatsiopoulos (2004) determined that usage of e-tender system in procurement processes increased the service quality on Greek government.<br>Wang (2014) noted in a study that the document management systems facilitated the inspection thanks to the determination of application rules.<br>Manikas (2015) stated in a study that recording of documents and reaching them quickly created corporate memory.<br>Yalçınkaya (2014) underlined in a study that document management systems ensured proper storage of documents and fulfilled the principles of uniqueness for the documents.<br>Carvalho and Ferreira (2001) stated that generally the information management tools are important to combine the information together, organize the information, group the information and activate the information when they are needed. | $H_4$: EDMS provides productivity. |
| **15. Is EDMS a reliable system in access to the system, backing up and document record?** | Abeysingher (2001) stated that e-document systems enabled protection of documents.<br>Munetsi (2011) noted that digital document registry systems have been efficient in protection of the documents. | $H_5$: It provided personal data safety in the computer of the officer using the EDMS. |

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|---|---|---|
| **16. Does EDMS provide user security?** | Abri (2009) stated in a study that the e-initiative applications were effective on e-confidentiality. | |

**Table 4:** The Research Questions, Hypotheses and Academic Ground.

### 2.3. Studies Conducted on the Problem

The studies which were previously conducted regarding the research problem have been presented in the following table. The reasons for conducting the previous studies and the used methods are also presented.

| Author | Date | Reason for the Article/Thesis Study | Method Used |
|---|---|---|---|
| Björk B. | 2002 | The study aimed to assess the usefulness of Electronic Document Management Systems in the Construction Sector. | Survey Analysis |
| Hielt M., Björk B. | 2006 | The study aimed to reveal the differences offered by EDMS compared to the methods used in the past in the construction sector. | Literature Review |
| Gabrielaitis L. Banšys R. | 2006 | The managing the digital design data including the drawing, technical features and other technical data becomes a big issue for the companies doing building design, especially when it is a requirement for the design structure. The main difficulty of such information management is to be able know how the digital design data can most effectively combined together, archived and presented. The phenomenon focused by the study is to be able to standardize the design data definitions. | Literature Review |
| Rezgui Y., Cooper G., Bjöerk B., Escudie J. | 1995 | This study was conducted for the purpose of researching the productivity of Consistent Project Document Approach, which is an extension of EDMS in European Esprit Condor Project. | Literature Review |
| Carvalho R. B., Ferreira M. A. T. | 2001 | Generally, the information management tools are important to combine the information together, organize the information, group the information | Literature Review |

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| | | and activate the information when they are needed. Considering the abundance of existing information, the software under the information management might be confusing. Therefore, the reason for conducting the study is to reveal the benefits offered by the usage of information system for supporting of information transformation processes. | |
| Allen B. A., Juillet L., Paquet G., Roy J. | 2001 | They dwelled on Canadian e-management and e-government issues. The articles aimed to understand to what extent the Canadian government is dependent on the information technologies and in alignment with today's digital world's changing circumstances. | Literature Review |
| Singh A. K., Sharma V. | 2009 | The reason for conducting this study is to identify the satisfaction levels of those using the e-initiatives in India. In this respect, the e-government initiatives in India and China were focused on in the study. | Statistical Analysis |
| Pablo Z. D., Pan S. L. | 2002 | The reason for conducting the study is to understand the electronic management (e-management) and electronic government (e-government) components. | Literature Review |
| Kashem M. A., Akhtar N., Rahman A. | 2014 | The reason for conducting the study is to develop an e-management system for Bangladesh. This system was called as "Digital Bangladesh." | Literature Review |
| Saparniene D. | | The reason for conducting the study is to reveal the characteristics of transition from E-government systems to E-governance systems in Europe. | Statistical Analysis |
| Chowdhury M. M. H., Satter A.K.M. Z. | 2013 | The reason for conducting the study is to evaluate how a model similar to the e-governance models in developing countries can be implemented in Bangladesh. | Survey Study |
| Howard M. | 2001 | The reason for conducting the study is to reveal how the increasing globalization of e-management system can change the "e" system managements. | Literature Review |
| Fang Z. | 2002 | The reason for conducting the study is to investigate the e-government system from a | Literature Review |

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|---|---|---|---|
| | | conceptual, implementation and developmental aspect. | |
| Javadi S., Etebarian A. | 2014 | The reason for conducting the study is to determine the impact demographic features of citizens on the e-management systems. | Statistical Analysis |
| Klischewski R. | 2003 | The reason for conducting the study is to ensure that e-document system is efficiently used in government management in Germany. | Literature Review |
| Panayiotou, N. A., Gayialis, S. P., Tatsiopoulos, I. P. | 2004 | The reason for conducting the study is to analyze how the Trade General Secretary, which is an integral part of Ministry of Development, identifies the procurement processes of Greek government on e-tender system. | Literature Review |
| Anderson, D. P. | 2004 | The reason for conducting the study is to determine how the Berkeley Open Infrastructure for Network Computing (BOINC) system can be used in the projects. | Literature Review |
| Zantout, H., Marir, F. | 1999 | The reason for conducting the study is to reveal the contributions of document management systems in work flow management. | Literature Review |
| Titinen, P., Lyytikainen, V., Paivarinta, T., Salminen, A. | 2000 | The reason for conducting the study is to ensure that Finnish language is included to the e-document system and standardization is achieved in Finnish documents. | Literature Review |
| Abeysingher R. | 2001 | The reason for conducting the study is to enable that systems are created to provide easy access to the electronic documents when they are needed and to be able to create the systems for protection of e-documents. | Program Investigation |
| Munetsi N. | 2011 | The reason for conducting the study is to reveal the features of Digital Registry System in Provincial Public Administrations. | Survey Study |
| Kwatsha N. | 2010 | The reason for conducting the study is to determine the factors influencing the electronic document and registry management systems. | Literature Review |
| Katani M. | 2014 | The reason for conducting the study is to determine the difficulties encountered in the usage of Electronic Document Management systems in a broad range of health institutions. | Survey Study |

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|---|---|---|---|
| Manikas K. | 2015 | The reason for conducting the study is to determine the limitations and capabilities of Registry Management and Electronic Registry Management. | Interview technique |
| Uys J.W. | 2010 | The reason for conducting the study is to reveal whether or not the electronic documentation undertakes a supportive role in innovation processes. | Literature Review |
| Akashah P.A., Rizal R. S., Jusoff K., Christon E. | 2011 | The reason for conducting the study is to outline a framework as regards with the usage of Electronic Document Management System (EDMS) under the Supply Chain Management. | Literature Review |
| Ubogu F. N. | 2003 | The reason for conducting the study is to reveal how the document management is shaped in the period of transition from DATAD system to ETD system. | Literature Review |
| Edminster J. | 2003 | The reason for conducting the study is to reveal the resistance against the ETD systems in the academic field and that the innovative approach gradually became widespread in the field of ETDs. | Literature Review |
| Sallam S. A. | 2006 | The reason for conducting the study is to outline the framework of a new system encompassing the paper and digital documents related to the document management system. | Literature Review |
| Stuurman P. | 2013 | The reason for conducting the study is to reveal the impacts of e-government system usage in Employee Self-Service system on the government management. | Survey Analysis Under the Quantitative Research |
| Guragain K. K. | 2010 | The reason for conducting the study is to reveal how the document management and production systems can be used for special documents. | Literature Review |
| Pellet-Lastra E. J. | 2003 | The reason for conducting the study is to determine whether or not the system configuration can be made within the scope of e-government structuring in Argentina. | Literature Review |
| Zuena O. A. | 2010 | The reason for conducting the study is to determine whether or not the selected five African | Literature Review |

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|---|---|---|---|
| | | countries can leverage the e-government systems in the most efficient way. | |
| Abri D. S. S. A. | 2009 | The reason for conducting the study is to determine the impacts of e-government and e-services usage on e-confidentiality and whether or not such usages cause any risk regarding the private information of citizens. | Survey Study |
| Hıtz O. | 2005 | The reason for conducting the study is to be able to outline a framework related to the Interactive Document Identification systems. | Literature Review |
| Po-hung L. | 2006 | The reason for conducting the study is to reveal the case of e-government application in Hong Kong. | Literature Review |
| Wang X. | 2014 | The reason for conducting the study is to determine implementation rules of ETDs structures and the reveal the functioning and responsibilities in such structure. | Literature Review |

**Table 5:** Studies Conducted on the Problem

### 2.4. Universe and Sampling

The study population consisted of employees working in the central and provincial offices of the MSIT. With the official approval number 164 and dated 26/09/2016 from the MSIT, a survey work permit was obtained. The universe of the workforce is composed of staff working in the central and provincial offices of the Ministry of Science, Industry and Technology as of 09/03/2017.Number of staff working at the centre; 1421 (43.75%) and the number of personnel working in the provinces; 1827 (56,25%), 3248 employees in total.

Stratified sampling method was used in the sample calculation. Stratified sampling is used in cases where there are substrates or subunit groups in a defined universe. Person was selected from each layer according to its ratio in the universe. (Yıldırım and Şimşek, 2005).

In the current study, strata consisted of units, and the population size was 3,248. According to Yazıcıoğlu and Erdoğan (2004), the sample size is

calculated as at least 340 at the sampling error of 5% and as at least 800 at the sampling error of 3% in the research population of 3,428 people. In the present research, a survey study was carried out with 880 people to ensure the reliability of the sample. Even though 1500 people were asked to fill in the questionnaires via Google Drive, 880 people participated in the research.

### 2.5. Data Collection Tool

The questionnaire form, which had a total number of 53 questions, was used as a data collection tool. There were 10 personal information questions, 42 questions related to EDMS and productivity and 1 open ended question on the questionnaire form. The 42 questions about EDMS were constructed using a 5-point Likert-type scale consisting of 5 subscales: Managerial Control, Efficiency, Job Satisfaction, Productivity and Security.

The questionnaire forms were developed by the researcher with the help of studies conducted by Kashem et al. (2014), Chowdhury and Satter (2013), Javadi and Etebarian (2014) and Manikas (2015). The questions regarding the effects of EDMS applications on job satisfaction, managerial control, efficiency, productivity and security were also designed using a 5-point Likert-type scale.

### 2.6. Pilot Study Findings

Validity and reliability study was conducted in relation to the pilot study. The factor analysis as to the validity study has been presented below.

| | **Factor Load** | | | | |
|---|---|---|---|---|---|
| | **Factor 1** | **Factor 2** | **Factor 3** | **Factor 4** | **Factor 5** |
| **MANAGEMENT CONTROL** | | | | | |
| 1. Electronic document management systems are used to control business processes | 0,754 | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 2. Electronic document management systems provide business processes with follow-up. | 0,797 | | | | |
| 3. Electronic Document Management Systems provide employee supervision. | 0,791 | | | | |
| 4. Electronic Document Management Systems increase controllability as more documents are accessed faster. | 0,790 | | | | |
| 5. Electronic Document Management Systems facilitate the follow-up of the business calendar. | 0,786 | | | | |
| 6. Electronic Document Management Systems increase the work performance. | 0,845 | | | | |
| 7. Electronic Document Management Systems increase the efficiency of management activities. | 0,859 | | | | |
| 8. Electronic Document Management Systems; accurate, effective and fast decision making. | 0,812 | | | | |
| 9. Electronic Document Management Systems increase the influence of management on employees. | 0,824 | | | | |
| **PRODUCTIVITY** | | | | | |
| 1. Electronic Document Management Systems save time. | | 0,765 | | | |
| 2. Electronic Document Management Systems will do more work in a shorter time. | | 0,793 | | | |
| 3. Electronic Document Management Systems facilitate business department and organization. | | 0,723 | | | |
| 4. Electronic Document Management Systems provide the cooperation of personnel. | | 0,754 | | | |
| 5. Use of Electronic Document Management Systems; increase productivity in our institution. | | 0,744 | | | |

| | | | | | |
|---|---|---|---|---|---|
| 6. Electronic Document Management Systems provide convenient access to past information and documents. | | 0,682 | | | |
| 7. Electronic Document Management Systems and information and documents are regularly classified and stored according to the relevant Kan / Regulations. | | 0,699 | | | |
| 8. Electronic Document Management Systems provide quick access to information and documents. | | 0,712 | | | |
| 9. With Electronic Document Management Systems, it provides the opportunity to work outside the institution, ie time and space independent. | | 0,710 | | | |
| 10. Electronic Document Management Systems enable more than one person to access the same information and document and work on the same document. | | 0,693 | | | |
| 11. After the software update in the electronic document management systems, the system is working hard. | | 0,725 | | | |
| 12. All transactions made with Electronic Document Management Systems are recorded. | | 0,698 | | | |
| 13. Electronic document management systems prevent duplicate work. | | 0,757 | | | |
| 14. Electronic Document Management Systems prevent errors related to filing. | | 0,763 | | | |
| 15. Since the number of prints required at each stage of the Electronic Document Management System is reduced, paper is saved. | | 0,676 | | | |
| 16. Electronic Document Management System reduces the courier and mail costs. | | 0,670 | | | |

| | | | | | |
|---|---|---|---|---|---|
| 17. With Electronic Document Management System, the physical archive is decreasing. | | 0,655 | | | |
| 18. Electronic Document Management Systems provide personnel savings due to the availability of labour productivity. | | 0,762 | | | |
| **JOB SATISFACTION** | | | | | |
| 1. With the Electronic Document Management System, my motivation to work is increasing. | | | 0,853 | | |
| 2. Thanks to the Electronic Document Management System, I work in an environment full of files. | | | 0,882 | | |
| 3. Thanks to Electronic Document Management System, I am doing my job lovingly and willingly. | | | 0,855 | | |
| 4. The Electronic Document Management System increases the sense of belonging to the people. | | | 0,874 | | |
| 5. The Electronic Document Management System has reduced the liability for work. | | | 0,883 | | |
| 6. The Electronic Document Management System ensures that corporate control mechanisms work more efficiently. | | | 0,765 | | |
| **ACTIVITY** | | | | | |
| 1. Electronic Document Management System creates corporate memory. | | | | 0,849 | |
| 2. Electronic Document Management Systems are easy to use. | | | | 0,859 | |
| 3. In Electronic Document Management System, information and documents are completely correct. | | | | 0,894 | |
| 4. In Electronic Document Management Systems, reporting is working properly. | | | | 0,881 | |
| 5. I think that paraph / signature processes are shortened in Electronic Document Management Systems. | | | | 0,841 | |
| **SECURITY** | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 1. The Electronic Document Management System is more secure as it gives each user a separate password in the system and allows only concerned persons to login to the system. | | | | | 0,794 |
| 2. Electronic Document Management Systems and electronic backups are taken. | | | | | 0,793 |
| 3. My documents are secured in the Electronic Document Management System. | | | | | 0,781 |
| 4. In Electronic Document Management Systems, while writing in the draft; the loss of the text and its attachments in the draft due to the fact that the electricity is cut off or ejected from the system negatively affects me. | | | | | 0,695 |
| **KMO:0,906**<br>**Barlett's Test p:0,000** | | | | | |

**Table 6:** Results of Factor Analysis.

Five factors were obtained as a result of factor analysis. The factors meet the hypotheses.

As a result of the factor analysis, the factor loads of 3 problems remained under 0.500, so they could not be involved in any dimension and they were excluded. The 3 questions are as follows:

- Technical infrastructure for Electronic Document Management Systems is sufficient.
- I believe that the Electronic Document Management Systems will not be used after a certain period (the old system will start to be used again)
- I know all the features of Electronic Document Management Systems which are necessary for my use.

Item analysis was made upon omitting the subtracting the 3 questions from the survey. Item analysis is an analysis conducted to monitor the validity of tests and items, determine their fitness for the purpose, inspects their reliability, difficulty level, quality and discrimination power and whether or not the distractor questions run well (Yıldırım and Şimşek, 2005). The results of item analysis is presented below.

The results as to the reliability analysis is presented below.

| Question | Total Correlation | Question | Total Correlation |
|---|---|---|---|
| **Q1** | 0.607 | **Q22** | 0.709 |
| **Q2** | 0.648 | **Q23** | 0.763 |
| **Q3** | 0.656 | **Q24** | 0.695 |
| **Q4** | 0.630 | **Q25** | 0.684 |
| **Q25** | 0.624 | **Q26** | 0.699 |
| **Q6** | 0.634 | **Q27** | 0.723 |
| **Q7** | 0.603 | **Q28** | 0.760 |
| **Q8** | 0.684 | **Q29** | 0.642 |
| **Q9** | 0.634 | **Q30** | 0.635 |
| **Q10** | 0.770 | **Q31** | 0.690 |
| **Q11** | 0.752 | **Q32** | 0.610 |
| **Q12** | 0.711 | **Q33** | 0.620 |
| **Q13** | 0.659 | **Q34** | 0.658 |
| **Q14** | 0.783 | **Q35** | 0.671 |
| **Q15** | 0.739 | **Q36** | 0.660 |
| **Q16** | 0.762 | **Q37** | 0.659 |
| **Q17** | 0.768 | **Q38** | 0.647 |
| **Q18** | 0.632 | **Q39** | 0.652 |
| **Q19** | 0.768 | **Q40** | 0.684 |
| **Q20** | 0.680 | **Q41** | 0.625 |
| **Q21** | 0.748 | **Q42** | 0.608 |

**Table 7:** Results of Item Analysis.

According to the results of item analysis, the total correlation coefficient of all questions is above 0.600. This case indicates that the test and the items are reliable and valid.

| Scale Types | Cronbach's Alpha |
|---|---|
| Managerial Control | 0.857 |
| Productivity | 0.868 |
| Job Satisfaction | 0.857 |
| Effectiveness | 0.852 |
| Security | 0.821 |
| Scale Total | 0.866 |

**Table 8:** Cronbach's Alpha Coefficient.

According to the results of reliability analysis, Cronbach's Alpha coefficient is above 0.80. The reliability and validity of the scale has been achieved.

### 2.7. Data Analysis

Data analysis was conducted via the SPSS 16 package programme. After the pilot scheme, factor analysis and item analysis were conducted to test the reliability and validity. Cronbach's alpha values of the sub-dimensions were also investigated. We used descriptive statistics and indifference tests in the analysis of the actual application data. The frequency, percentage, mean and standard deviation were used as descriptive statistics in the study. The mean values represent the total scores collected from the subscales related to the EDMS scale. In addition, the standard deviation refers to the mean standard deviation values used to indicate the range, in which scores from subdivisions varied.

The question of whether indifference tests would be a parametric or nonparametric test was solved based on the result of the Kolmogorov–Smirnov Test. This was done to determine whether the sub-dimensions could meet the normal distribution conditions by considering the Kolmogorov–Smirnov Test results, 'Normal Distribution Z' and 'p' statistics. According to the test results, given that 'p' values were at the 5% significance level, the sub-dimensions did not meet the normal distribution conditions, indicating that the parametric tests could not reveal the statistically significant results. Therefore, the

nonparametric tests, namely, Mann–Whitney U Test and Kruskal–Wallis H tests, were applied.

Mann-Whitney U test is used to detect the median differences of two groups and its significance is measured according to the “Z Normal Distribution” statistic. The Kruskal Wallis H test is used to detect the median differences of three and more groups and to this end, the “$X^2$” distribution is used.

To determine which group was seen to have statistically significant differences at the 5% significance level according to Kruskal–Wallis H test results, the Ben Horn test was used as a post hoc test.

# 3. CHAPTER

# FINDINGS

## 3.1. Results on the Demographic Variables

The research results are presented in this chapter.

| **Gender** | **Frequency** | **%** |
|---|---|---|
| Female | 178 | 20.2 |
| Male | 702 | 79.8 |
| Total | 880 | 100.0 |
| **Age** | **Frequency** | **%** |
| 25 and younger | 33 | 3.8 |
| 26-35 | 288 | 32.7 |
| 34-45 | 311 | 35.3 |
| 46-55 | 189 | 21.5 |
| 56 and older | 59 | 6.7 |
| Total | 880 | 100.0 |
| **Educational background** | **Frequency** | **%** |
| High-school | 69 | 7.9 |
| Associate degree | 87 | 9.9 |
| Bachelor's degree | 536 | 60.9 |
| Master's degree | 171 | 19.4 |
| PhD and higher degree | 17 | 1.9 |
| Total | 880 | 100.0 |
| **The departments from where the graduation degree were obtained** | **Frequency** | **%** |
| Natural-Physical Sciences | 34 | 3.9 |
| Engineering | 415 | 47.2 |
| Social Sciences-Law | 243 | 27.6 |
| Others | 188 | 21.3 |
| Total | 880 | 100.0 |
| **The number of years worked in the organisation** | **Frequency** | **%** |
| Less than 5 years | 88 | 10.0 |
| 6-10 years | 172 | 19.5 |
| 11-15 years | 260 | 29.5 |
| 16-20 years | 185 | 21.0 |

| | | |
|---|---|---|
| 21-25 years | 102 | 11.6 |
| More than 26 years | 73 | 8.4 |
| Total | 880 | 100.0 |

**Table 9:** Demographic Variables.

As presented in Table 9, 79.8% of the participants were male, 35.3% were male, 34 and 45 years of age, 60.9% were undergraduate, 47.2% were engineering graduates and 29.5% were employed in the organization for 11-15 years.

### 3.2. Results to EDMS Applications

| **Expectations** (Question 8) | **Frequency** | **%** |
|---|---|---|
| Improved service | 360 | 40.9 |
| Quality and rich information communication | 231 | 26.2 |
| Decrease in costs | 102 | 11.6 |
| Equal access for everyone | 97 | 11.0 |
| Efficiency and productivity increase | 41 | 4.7 |
| Speed of service delivery | 32 | 3.6 |
| Transparency in public administration | 14 | 1.9 |
| Did Not Answer | 3 | 0.1 |
| Total | 880 | 100.0 |

**Table 10:** Most Important Expectations from the EDMS Applications in the Organisation.

As presented in Table 10, When the most important expectations regarding EDMS applications in the organisation were reviewed, only 1.9% of the participants expected transparent public administration via EDMS. The most important expectations of the participants from EDMS applications are improved service (40.9%) and quality and rich information communication

(26.2%). There is no transparent public provision among participants' expectations from EDMS implementations. The most important expectations of the participants from EDMS applications are improved service understanding, quality and rich information communication.

| **Services Provided in the Institution in Electronic Environment** | **Frequency** | **%** |
|---|---|---|
| Services offered for providing/giving information | 714 | 81.3 |
| Electronic document management system | 618 | 70.2 |
| Services offered in the form of inquiry and answer | 358 | 40.7 |
| Services offered as online transactions | 384 | 43.6 |
| General document management and archiving service | 6 | 0.7 |
| No service | 5 | 0.6 |
| Note: More than one option is marked by a participant. | | |

**Table 11:** Services Provided Electronically in the Organisation.

As presented in Table 11, When the findings related to the services provided in the electronic environment in the institution are examined, 81.3 % of the participants stated that they are for providing / giving information.

| Obstacles to EDMS Applications | Minimum | Maximum | Mean | Standard Deviation | Order of Obstacle |
|---|---|---|---|---|---|
| Technical infrastructure inadequacy | 1 | 8 | 6,16 | 2,136 | 1st |
| Inability to give up old Abandonment of resident bureaucratic habits | 1 | 8 | 5,77 | 2,08 | 2nd |
| Employing qualified technical staff | 1 | 8 | 5,76 | 2,205 | 3rd |
| Security and hackers problems | 1 | 8 | 4,75 | 2,328 | 4th |
| The pressure of higher priority issues | 1 | 8 | 4,36 | 2,123 | 5 th |
| Public administrators should not look at the EDMS system warmly (lack of leadership support) | 1 | 8 | 4,09 | 2,401 | 6 th |
| Lack of legal regulations | 1 | 8 | 3,96 | 2,115 | 7 th |
| Inability of appropriation | 1 | 8 | 3,74 | 2,362 | 8 th |

**Table 12:** Obstacles to EDMS Applications.

As presented in Table 12, when the questions are given to the participant, it was asked to score from 1 to 8 which is 1 is representing minimum score and 8 is representing maximum score. Each participant scored the questions based on their own perceptions. The higher the score, the more important it is for them. When the obstacles to EDMS applications were reviewed, it can be seen that “technical infrastructure deficiency” the first place.

### 3.3. Findings on Perception of EDMS

| Survey Questions | Minimum | Maximum | Mean | Standard Deviation |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| 1. Electronic document management systems provide business processes with follow-up. | 1 | 5 | 4,07 | 0,84 |
| 2. Electronic document management systems are used to control business processes. | 1 | 5 | 4,06 | 0,874 |
| 3. Electronic Document Management Systems increase controllability as more documents are accessed faster. | 1 | 5 | 4,03 | 0,903 |
| 4. Electronic Document Management Systems facilitate the follow-up of the business calendar. | 1 | 5 | 3,98 | 0,94 |
| 5. Electronic Document Management Systems increase the work performance. | 1 | 5 | 3,95 | 0,994 |
| 6. Electronic Document Management Systems increase the efficiency of management activities. | 1 | 5 | 3,94 | 0,929 |
| 7. Electronic Document Management Systems provide employee supervision. | 1 | 5 | 3,85 | 0,99 |
| 8. Electronic Document Management Systems; accurate, effective and fast decision making. | 1 | 5 | 3,81 | 0,984 |
| 9. Electronic Document Management Systems increase the influence of management on employees. | 1 | 5 | 3,78 | 0,979 |
| **Total** | **9** | **45** | **35,47** | |

**Table 13:** Findings elated to Management Control in EDMS Applications.

When the questions are answered, it is asked to score from 1 to 5. Each participant scored points from 1 to 5 according to his own thinking. The minimum score is 1 and the maximum score is 5. The higher the score, the more important it is for them. 5 point represents the most important value, while 1 point represents the most worthless one.

When the findings related to management control in EDMS applications are examined, it is seen that the averages for the items are bigger than 3. This suggests that there is a positive attitude towards management control in EDMS applications. With EDMS, activities such as control of work processes, follow-up, employee supervision, controllability, workforce performance and decision making are realized more effectively. The total scores of all questions were

given on the management control sub-dimension. According to this, it is understood from the values of minimum (9 questions * 1 point = 9) and maximum (9 questions * 5 points = 45) that the employees have given the answers "strongly disagree" and "strongly agree" This shows that some employees are very satisfied with the sense of managerial control and some employees are not satisfied at all. However, when the mean value (35,47 ± 7,30) is examined, it is seen that the majority of the participants are satisfied.

| **Survey Questions** | **Minimum** | **Maximum** | **Mean** | **Standard Deviation** |
|---|---|---|---|---|
| 1. All transactions made with Electronic Document Management Systems are recorded. | 1 | 5 | 4,15 | 0,959 |
| 2. Electronic Document Management Systems and information and documents are regularly classified and stored according to the relevant Kan / Regulations. | 1 | 5 | 4,14 | 1,011 |
| 3. Electronic Document Management System reduces the courier and mail costs. | 1 | 5 | 4,11 | 1,078 |
| 4. Electronic Document Management Systems save time. | 1 | 5 | 4,09 | 0,991 |
| 5. Electronic Document Management Systems provide convenient access to past information and documents. | 1 | 5 | 4,08 | 1,071 |
| 6. Electronic Document Management Systems provide quick access to information and documents. | 1 | 5 | 4,06 | 1,081 |
| 7. Use of Electronic Document Management Systems; increase productivity in our institution. | 1 | 5 | 4,03 | 1,035 |
| 8. Electronic Document Management Systems enable more than one person to access the same information and document and work on the same document. | 1 | 5 | 4,02 | 1,024 |
| 9. Electronic Document Management Systems will do more work in a shorter time. | 1 | 5 | 3,98 | 1,112 |
| 10. Since the number of prints required at each stage of the Electronic Document Management System is reduced, paper is saved. | 1 | 5 | 3,96 | 1,211 |

| | | | | |
|---|---|---|---|---|
| 11. With Electronic Document Management System, the physical archive is decreasing. | 1 | 5 | 3,91 | 1,217 |
| 12. Electronic Document Management Systems facilitate business department and organization. | 1 | 5 | 3,89 | 1,069 |
| 13. Electronic Document Management Systems prevent errors related to filing. | 1 | 5 | 3,89 | 1,077 |
| 14. Electronic document management systems prevent duplicate work. | 1 | 5 | 3,69 | 1,166 |
| 15. With Electronic Document Management Systems, it provides the opportunity to work outside the institution, ie time and space independent. | 1 | 5 | 3,67 | 1,299 |
| 16. Electronic Document Management Systems provide the cooperation of personnel. | 1 | 5 | 3,66 | 1,202 |
| 17. Electronic Document Management Systems provide personnel savings due to the availability of labour productivity. | 1 | 5 | 3,66 | 1,25 |
| 18. After the software update in the electronic document management systems, the system is working hard. | 1 | 5 | 3,43 | 1,334 |
| **Total** | **18** | **90** | **70,42** | |

**Table 14:** Findings Related to Effectiveness of Productivity in EDMS Applications.

When the findings on productivity are examined in EDMS applications, it is seen that the average of the items is bigger than 3 in all. This suggests that productivity in EDMS applications is on the positive side. With EDMS, time saving is provided, cooperation between personnel is increased, documents are provided quickly, working is possible without time and space, and all transactions can be recorded. The total scores of all the questions were given over the productivity sub-dimension. According to this, in terms of productivity, it is understood from the minimum (18 questions * 1 point = 18) and maximum (18 questions * 5 = 90) that the employees are the ones who give the answers "strongly disagree" and "strongly agree" to each question. This shows that some employees are very satisfied with the productivity and some employees

are not satisfied at all. However, when the mean value (70,42 ± 16,21) is examined, it is seen that the majority of the participants are satisfied.

| **Survey Questions** | **Minimum** | **Maximum** | **Mean** | **Standard Deviation** |
|---|---|---|---|---|
| 1. With the Electronic Document Management System, my motivation to work is increasing. | 1 | 5 | 3,61 | 1,208 |
| 2. The Electronic Document Management System ensures that corporate control mechanisms work more efficiently. | 1 | 5 | 3,47 | 1,131 |
| 3. Thanks to the Electronic Document Management System, I work in an environment full of files. | 1 | 5 | 3,4 | 1,188 |
| 4. Thanks to Electronic Document Management System, I am doing my job lovingly and willingly. | 1 | 5 | 3,33 | 1,181 |
| 5. The Electronic Document Management System has reduced the liability for work. | 1 | 5 | 3,32 | 1,228 |
| 6. The Electronic Document Management System increases the sense of belonging to the people. | 1 | 5 | 3,25 | 1,237 |
| **Total** | **6** | **30** | **20,38** | |

**Table 15:** Findings Related to the Effect of EDMS Applications on Job Satisfaction.

When the effect of EDMS applications on job satisfaction is examined, the highest average is motivation perception with 3.61. Participants think that working with EDMS generally increases motivation. However, all the averages are over 3. It is possible to say that EDMS applications have positive effects on job satisfaction in general. The total scores of all the questions were given on the job satisfaction sub-dimension. According to this, it is understood from

the values of minimum (6 questions * 1 point = 30) and maximum (6 questions * 5 points = 30) that the employees have given the answers "strongly disagree" and "strongly agree" This shows that some employees have a high level of job satisfaction and some employees have a low level of job satisfaction. However, when the mean value (20,38 ± 6,12) is examined, it is seen that the majority of the participants are satisfied.

| **Survey Questions** | **Minimum** | **Maximum** | **Mean** | **Standard Deviation** |
|---|---|---|---|---|
| 1. In Electronic Document Management System, information and documents are completely correct. | 1 | 5 | 3,99 | 1,01 |
| 2. Electronic Document Management Systems are easy to use. | 1 | 5 | 3,97 | 1,069 |
| 3. I think that paraph / signature processes are shortened in Electronic Document Management Systems. | 1 | 5 | 3,83 | 1,077 |
| 4. In Electronic Document Management Systems, reporting is working properly. | 1 | 5 | 3,8 | 1,117 |
| 5. Electronic Document Management System creates corporate memory. | 1 | 5 | 3,6 | 1,133 |
| Total | 5 | 25 | 19,19 | |

**Table 16:** Findings Related to Effectiveness of EDMS Implementations.

When the effect of EDMS applications on effectiveness is examined, it has ease of use with the highest average of 3.97. However, all the averages are over 3. It is possible to say that EDMS applications generally have positive effects on efficiency. Personnel involved in the survey indicate that EMS applications create institutional memory, facilitate ease of use, allow for proper reporting, and shorten paraph / signature processes. In addition, he thinks that information and documents are correct in EDMS. Total scores of all the questions were given on the activity sub-dimension. According to this, it is

understood from the values of minimum (5 questions * 1 point = 5) and maximum (5 questions * 5 points = 25) that the employees have given the answers "strongly disagree" and "strongly agree" This shows that some employees have a high perception of activity and some employees have a low performance. However, when the mean value (19,19 ± 4,42) is examined, it is seen that the majority of the participants are satisfied.

| **Survey Questions** | **Minimum** | **Maximum** | **Mean** | **Standard Deviation** |
|---|---|---|---|---|
| 1. The Electronic Document Management System is more secure as it gives each user a separate password in the system and allows only concerned persons to login to the system. | 1 | 5 | 3,88 | 1,033 |
| 2. In Electronic Document Management Systems, while writing in the draft; the loss of the text and its attachments in the draft due to the fact that the electricity is cut off or ejected from the system negatively affects me. | 1 | 5 | 3,26 | 1,308 |
| 3. Electronic Document Management Systems and electronic backups are taken. | 1 | 5 | 2,79 | 1,183 |
| 4. My documents are secured in the Electronic Document Management System. | 1 | 5 | 2,47 | 1,312 |

**Table 17:** Findings on Security Perception in EDMS Applications.

When the findings related to security perception are examined in EDMS applications, participants have negative perception about EMS and electronic backups and document security. The averages of the items regarding the electronic backup and the security of the documents are below 3. The total scores of all questions were given on the security sub-dimension. According to the security dimension, it is understood from the values of minimum (4

questions * 1 point = 4) and maximum (4 questions * 5 points = 20) that the employees have given the answers "strongly disagree" and "strongly agree" to each question. This suggests that some employees have high security perceptions and some employees are low. However, when the mean value (12,40 ± 3,59) is examined, it is shown that participants have negative attitudes towards safety in general.

### 3.4. Perception of EDMS by Demographic Aspects

| **Dimensions** | **The Mean** | **Standard Deviation** | **Normal Distribution 'Z'** | **p** |
|---|---|---|---|---|
| Managerial Control | 35,45 | 7,3 | 5,36 | 0 |
| Productivity | 70,42 | 16,21 | 3,371 | 0 |
| Job Satisfaction | 20,45 | 6,21 | 4,1 | 0 |
| Efficiency | 19,22 | 4,42 | 3,891 | 0 |
| Security | 12,4 | 3,59 | 2,708 | 0 |

**Table 18:** Results of the Kolmogorov–Smirnov Test.

As presented in Table 18, the Kolmogorov–Smirnov Test was used to test the normal distribution in the study. According to the results of the Kolmogorov–Smirnov test, the sub-dimensions of managerial control, productivity, job satisfaction, efficiency and security sub-dimensions failed to meet normal distribution conditions ($p < 0.05$). In this case, the Mann–Whitney U Test and the Kruskal–Wallis H Test were used as parametric or nonparametric tests.

The $H_1$ hypothesis was accepted in the study. When the mean value (35,45 ± 7,30) is examined, it is seen that the majority of the participants are satisfied. With EDMS, activities such as control of work processes, follow-up, employee supervision, controllability, workforce performance and decision making are realized more effectively.

The $H_2$ hypothesis was accepted in the study. When the mean value (70,42 ± 16,21) is examined, it is seen that the majority of the participants are satisfied. EMS shows that productivity is positive in terms of productivity. With EDMS, time saving is provided, cooperation between personnel is increased, documents are provided quickly, working is possible without time and space, and all transactions can be recorded.

The $H_3$ hypothesis was accepted in the study. When the mean value (20,45 ± 6,21) is examined, it is seen that the majority of the participants are satisfied. Personnel involved in the survey indicate that EDMS applications create institutional memory, facilitate ease of use, allow for proper reporting, and shorten paraph / signature processes. In addition, it is thought that information and documents are correct in EDYS.

The $H_4$ hypothesis was accepted in the study. When the mean value (19.22 ± 4.42) is examined, it is seen that the majority of the participants were satisfied. It can be said that EDMS applications generally have positive effects on efficiency. Personnel involved in the survey indicate that EDMS applications create institutional memory, facilitate ease of use, allow for proper reporting, and shorten paraph / signature processes.

The $H_5$ hypothesis was rejected in the study. When the mean value (12,40 ± 3,59) is examined, it shows that participants have negative attitudes towards safety in general. When the findings related to security perception are examined in EDMS applications, participants have negative perception about EDMS and electronic backups and document security.

| **Dimensions** | **Gender** | **The Mean ± SD** | **Z** | **p** |
|---|---|---|---|---|
| Managerial Control | Female | 37,336 ± 6,70 | 3,595 | 0 |
| | Male | 34,97 ± 7,38 | | |

| | | | | |
|---|---|---|---|---|
| Productivity | Female | 73,35 ± 13,68 | 1,932 | 0,053 |
| | Male | 69,67 ± 16,72 | | |
| Job Satisfaction | Female | 20,88 ± 6,86 | 1,537 | 0,124 |
| | Male | 20,33 ± 6,04 | | |
| Efficiency | Female | 20,08 ± 3,58 | 1,937 | 0,053 |
| | Male | 19,00 ± 4,58 | | |
| Security | Female | 13,10 ± 3,88 | 2,333 | 0,02 |
| | Male | 12,23 ± 3,49 | | |

**Table 19:** Mann–Whitney U Test for the Perception of EDMS Based on Gender.

As presented in Table 19, When the perception of the EDMS based on gender was reviewed, there was no significant difference in the scores for efficiency, job satisfaction and productivity sub-dimensions between different gender groups ($p > 0.05$). However, there was a statistically significant difference in scores for managerial control and security ($p < 0.05$). In the managerial control (37.336 ± 6.70) and the security (13.10 ± 3.88) sub-dimensions, women obtained higher scores of perception than men.

| **Dimensions** | **Age** | **The Mean ± SD** | **$x^2$** | **P** |
|---|---|---|---|---|
| Managerial Control | 25 and younger | 32,60 ± 8,10 | 17,215 | 0 |
| | 26–35 | 34,78 ± 7,67 | | |
| | 34–45 | 35,08 ± 8,11 | | |
| | 46–55 | 36,02 ± 4,82 | | |
| | 56 and older | 38,44 ± 5,98 | | |
| Productivity | 25 and younger | 65,60 ± 14,39 | 20,578 | 0 |
| | 26–35 | 69,11 ± 15,61 | | |
| | 34–45 | 71,04 ± 16,29 | | |

| | | | | |
|---|---|---|---|---|
| | 46–55 | 72,83 ± 13,86 | | |
| | 56 and older | 73,49 ± 23,95 | | |
| Job Satisfaction | 25 and younger | 17,09 ± 5,50 | 15,147 | 0 |
| | 26–35 | 18,92 ± 6,16 | | |
| | 34–45 | 20,99 ± 6,47 | | |
| | 46–55 | 22,49 ± 4,37 | | |
| | 56 and older | 22,53 ± 7,87 | | |
| Efficiency | 25 and younger | 16,54 ± 5,29 | 18,009 | 0 |
| | 26–35 | 18,12 ± 5,26 | | |
| | 34–45 | 19,79 ± 3,76 | | |
| | 46–55 | 20,23 ± 3,11 | | |
| | 56 and older | 20,77 ± 4,64 | | |
| Security | 25 and younger | 10,45 ± 3,01 | 20,835 | 0 |
| | 26–35 | 11,77 ± 3,42 | | |
| | 34–45 | 12,32 ± 3,82 | | |
| | 46–55 | 12,62 ± 3,00 | | |
| | 56 and older | 13,84 ± 3,99 | | |

**Table 20:** Kruskal–Wallis H Test for the Perception of EDMS Based on Age.

When the perception of EDMS based on age is reviewed, we can see a significant difference between age groups in terms of the managerial control, productivity, job satisfaction, efficiency and safety sub-dimensions ($p<0.05$). According to the Bonferroni test results, the perception scores of individuals from the age group of 25 and younger and those of individuals from the age group of 46 years and over differ in all the subscales. Younger individuals' perception scores for the EDMS in managerial control, productivity, job satisfaction, efficiency and security are lower than those from the older age groups.

| **Dimensions** | **Educational background** | **The Mean ± SD** | **$x^2$** | **p** |
|---|---|---|---|---|
| Managerial Control | High-school | 36,08 ± 6,67 | 1,159 | 0,763 |
| | Associate | 35,66 ± 3,20 | | |

| | | | | |
|---|---|---|---|---|
| | Bachelor's | 35,44 ± 7,48 | | |
| | Master's | 35,16 ± 8,76 | | |
| | PhD and higher | 35,29 ± 1,95 | | |
| Productivity | High-school | 73,05 ± 13,63 | 4,995 | 0,172 |
| | Associate | 73,49 ± 11,95 | | |
| | Bachelor's | 70,43 ± 16,43 | | |
| | Master's | 68,30 ± 17,93 | | |
| | PhD and higher | 64,94 ± 16,72 | | |
| Job Satisfaction | High-school | 20,73 ± 5,85 | 6,226 | 0,092 |
| | Associate | 22,22 ± 3,79 | | |
| | Bachelor's | 20,37 ± 6,60 | | |
| | Master's | 19,63 ± 6,19 | | |
| | PhD and higher | 20,82 ± 3,02 | | |
| Efficiency | High-school | 19,18 ± 4,00 | 5,375 | 0,146 |
| | Associate | 20,35 ± 2,93 | | |
| | Bachelor's | 19,23 ± 4,56 | | |
| | Master's | 18,70 ± 4,81 | | |
| | PhD and higher | 18,29 ± 2,64 | | |
| Security | High-school | 11,71 ± 3,86 | 5,742 | 0,125 |
| | Associate | 12,83 ± 2,35 | | |
| | Bachelor's | 12,48 ± 3,68 | | |
| | Master's | 12,38 ± 3,81 | | |
| | PhD and higher | 10,64 ± 3,59 | | |

**Table 21:** Kruskal–Wallis H Test for the Perception of EDMS Based on Educational Background.

As presented in Table 21, when the perception of EDMS based on educational background was reviewed, we found no significant difference between the groups with different educational backgrounds in the managerial control, productivity, job satisfaction, efficiency and security sub-dimensions ($p>0.05$).

The scores for the EDMS perception of the employees did not vary by educational background.

| Dimensions | The Department of Graduation | The Mean ± SD | $x^2$ | P |
|---|---|---|---|---|
| Managerial Control | Natural-Physical Sciences | 36,12 ± 6,12 | 3,694 | 0,158 |
| | Engineering | 35,68 ± 3,63 | | |
| | Social Sciences-Law | 35,72 ± 7,85 | | |
| | Others | 35,35 ± 8,71 | | |
| Productivity | Natural-Physical Sciences | 72,52 ± 11,22 | 2,963 | 0,227 |
| | Engineering | 70,48 ± 16,52 | | |
| | Social Sciences-Law | 68,27 ± 17,82 | | |
| | Others | 68,52 ± 16,93 | | |
| Job Satisfaction | Natural-Physical Sciences | 22,18 ± 3,63 | 2,705 | 0,259 |
| | Engineering | 20,42 ± 6,72 | | |
| | Social Sciences-Law | 19,58 ± 6,22 | | |
| | Others | 21,92 ± 3,82 | | |
| Efficiency | Natural-Physical Sciences | 20,22 ± 2,92 | 3,074 | 0,215 |
| | Engineering | 19,58 ± 4,45 | | |
| | Social Sciences-Law | 18,96 ± 4,85 | | |
| | Others | 18,52 ± 2,14 | | |
| Security | Natural-Physical Sciences | 11,85 ± 2,62 | 4,4 | 0,111 |
| | Engineering | 11,27 ± 3,52 | | |
| | Social Sciences-Law | 12,42 ± 3,73 | | |
| | Others | 10,81 ± 3,14 | | |

**Table 22:** Kruskal–Wallis H Test for the Perception of EDMS Based on The Department of Graduation.

As presented in Table 22, When the perception of EDMS based on the department of graduation degree was reviewed, we found no significant difference between the groups graduated from different departments in the managerial control, productivity, job satisfaction, efficiency and security sub-dimensions ($p>0.05$). The scores for EDMS perception of the employees did not vary by the department of graduation degree. It is thought that the perception of the EDMS may vary depending on the educational situation, as

the tendency of individuals to access information and to use the information effectively increases as the educational status of the individuals increases. However, when the results are analysed, it is determined that the EDMS perception does not vary according to the educational status.

| **Dimensions** | **Number of Years Worked in Organisation** | **The Mean ± SD** | **$x^2$** | **p** |
|---|---|---|---|---|
| Managerial Control | Less than 5 years | 32,59 ± 8,12 | 20,521 | 0 |
| | 6–10 years | 34,77 ± 7,58 | | |
| | 11–15 years | 36,08 ± 8,22 | | |
| | 16–20 years | 36,21 ± 8,82 | | |
| | 21–25 years | 37,52 ± 6,51 | | |
| | More than 26 years | 38,42 ± 6,84 | | |
| Productivity | Less than 5 years | 65,68 ± 8,63 | 22,563 | 0 |
| | 6–10 years | 66,52 ± 8,51 | | |
| | 11–15 years | 67,39 ± 5,74 | | |
| | 16–20 years | 70,52 ± 8,32 | | |
| | 21–25 years | 71,84 ± 7,63 | | |
| | More than 26 years | 72,20 ± 8,23 | | |
| Job Satisfaction | Less than 5 years | 17,20 ± 3,68 | 21,583 | 0 |
| | 6–10 years | 18,81 ± 4,52 | | |
| | 11–15 years | 20,98 ± 5,21 | | |
| | 16–20 years | 21,15 ± 6,27 | | |
| | 21–25 years | 21,62 ± 8,41 | | |
| | More than 26 years | 22,84 ± 6,18 | | |
| Efficiency | Less than 5 years | 16,55 ± 6,24 | 23,541 | 0 |
| | 6–10 years | 18,12 ± 5,61 | | |

| | | | | |
|---|---|---|---|---|
| | 11–15 years | 19,77 ± 3,52 | | |
| | 16–20 years | 20,28 ± 3,54 | | |
| | 21–25 years | 20,77 ± 6,52 | | |
| | More than 26 years | 21,79 ± 4,31 | | |
| Security | Less than 5 years | 10,43 ± 2,52 | 23,621 | 0 |
| | 6–10 years | 11,72 ± 3,41 | | |
| | 11–15 years | 12,38 ± 2,69 | | |
| | 16–20 years | 12,39 ± 5,21 | | |
| | 21–25 years | 12,85 ± 6,52 | | |
| | More than 26 years | 13,80 ± 8,12 | | |

**Table 23:** Kruskal–Wallis H Test for the Perception of EDMS Based on the Number of Years Worked in Organisation.

When the perception of EDMS based on the number of years worked in organisation was reviewed, we find a significant difference between the groups which worked for different number of years worked in the organisation in the managerial control, productivity, job satisfaction, efficiency and security sub-dimensions ($p<0.05$). According to the Bonferroni test results, in all sub-dimensions, the perception scores of individuals who worked in the organisation for less than 5 years were different from those of individuals who worked in the organisation for 21 years and over. Those who worked in the organisation for a short time have lower scores of EDMS perception than those who worked in the organisation for a long time in the managerial control, productivity, job satisfaction, efficiency and security sub-dimensions.

### 3.5. Analysis of the Relation among Sub-dimensions of EDMS

| **Dimensions** | | Managerial Control | Productivity | Job Satisfaction | Efficiency | Security |
|---|---|---|---|---|---|---|
| | **r** | 1 | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Managerial Control | **p** | . | | | | |
| | **n** | 880 | | | | |
| Productivity | **r** | 0,564 | 1 | | | |
| | **p** | 0 | . | | | |
| | **n** | 880 | 880 | | | |
| Job Satisfaction | **r** | 0,369 | 0,616 | 1 | | |
| | **p** | 0 | 0 | . | | |
| | **n** | 880 | 880 | 880 | | |
| Efficiency | **r** | 0,417 | 0,508 | 0,535 | 1 | |
| | **p** | 0 | 0 | 0 | . | |
| | **n** | 880 | 880 | 880 | 880 | |
| Security | **r** | 0,253 | 0,341 | 0,465 | 0,517 | 1 |
| | **p** | 0 | 0 | 0 | 0 | . |
| | **n** | 880 | 880 | 880 | 880 | 880 |

**Table 24:** Analysis of Relationship Between EDMS Sub-dimensions Spearman Test.

The relationship between subscales of EDMS was examined by Sperman test and it was determined that all sub-dimensions were related to each other ($p < 0,05$). There is a statistically significant and positive relationship between managerial control, productivity, job satisfaction, efficiency and security sub-dimensions. Administrative control, productivity, job satisfaction, efficiency and security perceptions affect each other positively. All "r" coefficients are positive. This indicates that all sub-dimensions are influencing each other positively.

### 3.6. Opinions on EDMS Applications

Within the scope of the study, the personnel working at the Ministry of Science, Industry and Technology were requested to state their opinions regarding EDMS. Some employees expressed various opinions regarding EDMS. Such opinions have been presented below.

The technical problems were expressed in the context of EDMS. The technical problems about the running and usage of EDMS applications have negative impacts on productivity. Some technical problems experienced in EDMS was explained as follows by an employee:

Technical Opinions: *"-Some browsers terminated their agreements with Java, and considering the fact that e-signature process with Java support is an indispensable part of EDMS, the problems occur due to inability to engage Java.*

*- Likewise, there are certain problems which are assumed to stem from the browsers and prevent adding file to the system and so far, no solution has been found to these problems (Again browser or java related)."*

Personal Opinions:
*"-Furthermore, it is observed that the system gained speed with the engagement of quick and efficient servers.*

*-Also, it is thought that the system is control oriented. Therefore, it is mandatory that the control-oriented interfaces are developed. Likewise, even currently, some paper enquires do not yield any reply."*

Infrastructure insufficiency of EDMS and not running efficiently has caused it to be evaluated as a weak and slow system by some employees.

Opinions on Technical Problems:
*"EDMS used by the Ministry of Science, Industry and Technology has a weaker and slower infrastructure than the EDMSs of other institutions that we have seen. Its reporting is so inadequate, its enquiries are so slow and insufficient and it is not possible to customize it in a practical manner. Instead o designing a new program for EDMS, it would be much better if a common program to be used by all the official institutions could use. The institutions could have special modules. Unfortunately, EDMS used by our Institution is not enough to meet the requirements."*

*"After any update in Electronic Document Management Systems, it should be inspected whether each employee have the same level of command of system.*

*Otherwise, the disproportionate level of information about the system among the personnel causes unnecessary occupation of the entire personnel regarding the issue.*

Another employee expressed the need for training as follows:

*"To be able to use this system efficiently, I believe that a good training is necessary."*

A lot of problems can be encountered within the scope of EDMS applications. Such case sometimes increases the workload of the institution and adversely affect the productivity. Various problems experienced in EDMS applications from the perspective of personnel opinions have been presented below:

*"All the staff can see every document in the Electronic Document Management System used by our Ministry. In addition, when an employee performing the document registration enters the personnel filing code wrong, it appears wrong in all archives. It is possible to reply back over a document which was responded and closed and this may cause repetition of the same transaction*

*.*

*"The most significant problem regarding EDMS in corporate sense is that it takes a very long time to reach a document. To access a document, only the parameters belonging to the relevant document must be entered and the system remains weak in terms of speed.*

*"In current situation, we cannot use the Electronic Document Management System very efficiently. We are having difficulty especially in finding the past dated correspondence. Therefore, we feel ourselves obliged to physical archive keeping. In addition, I believe that all the staff including myself do not have enough knowledge accumulation on EDMS.*

*"I am an Officer for Measurements and Adjustments. The document transferred to me does not have enough coding at the stage of recording.1. It should be stated whether it is a stamp removing minutes or a declaration. The stamp removing minutes must be closed within 3 months. 2. Repetitive entries were made to the sender's index during the registry of incoming document.*

*There are tens of person and institution information with the same name. They have to be cleaned. 3. While the documents are searched, entries specific to the topic titles should be allowed. Such as the examination request, government marker request, complaint examination.... etc. 4. The computer software given for remote access to EDMS and the capabilities of wifi modem Ethernet should be revised. They cannot be used for months, despite their costs were already paid.5. The importance of the system must be explained again to the paper recorders. 6. The Provincial Directorates and Branch Directorates should be expected more than being merely a paper dispatcher, but should be made a stakeholder of the working group. 7. The system should actively follow whether or not the incoming document has been closed. 8. The scenario in rural areas from the entry of document until the closing of document must be monitored on-site, and improvements must be made, if necessary.*

More efficient running of EDMS applications will boost the productivity of institution. Within this framework, some recommendations have been developed for efficient running of EDMS applications. Such recommendations can be enumerated as follows based on the opinions of staff:

*"Gathering all EDMS Systems of all public institutions under the same roof will be beneficial both for security and saving.*

*EDMS software system should be accessible from everywhere.*

*EDMS software should run as integrated with the e-government project.*

*"For the realization of expectations related to the "Electronic Document Management System, it should be supported with an active portal inside the institution and integrity and unity should be ensured."*

*"EDMS is a necessity for our country. Returning to the old system is an outdated thought. All the institutions should pass to this system. Regular trainings should be delivered on EDMS. System should be updated. It should be integrated with the other systems, and with Pardus or Office system."*

# CONCLUSION

The information and communication technologies has become a part of daily life in parallel with the advancing technologies. In public institutions, quick and efficient enterprise resource planning projects are implemented thanks to the increase of business productivity. Today, with EDMS, which is one of such projects, the processes related to document management have been moved to the electronic environment. Thanks to the EDMS projects, the information is sent or received in different formats both from inside and outside the institution, and they are converted into documents to qualify as legal evidence and then archived or destroyed in accordance with specific regulations. The most significant problem of EDMS in Turkey is that not enough people who graduated from the departments of information and document management are not employed at the units and therefore there is lack of specialist personnel. It is observed that in public institutions and agencies there are deficiencies in employment of information and document specialists who studied EDMS applications. With the efficient usage of electronic document management system in public institution, productivity increase is achieved.

This study scales the knowledge and opinions about EDMS of the central and rural personnel of the Ministry of Science, Industry and Technology for the purpose of determining the impact of EDMS on productivity in public institutions. In the light of the findings of study, some conclusions and recommendations have been set forth for the development of EDMSs and identifying and evaluating their competence and their impact on productivity

| Araştırma Soruları | Akademik Dayanak | Hipotez | Tablo | İspatlanma durumu |
|---|---|---|---|---|
| **1.EBYS ile kurumların yönetim organları etkin bir şekilde denetim gerçekleştirebilmekte midir?** | Gülenç (2011) çalışmasında EBYS ile kurumların denetim ve doğrulama kanallarının iyi bir şekilde işlediğini ve bu durumun yönetimin karar verme eylemini saha sağlıklı şekilde yapabilmesini sağladığını belirtmiştir.<br>Alır (2008) çalışmasında EBYS ile yönetimin denetim etkinliğinin arttığını belirtmiştir.<br>Howard (2001) çalışmasında e-uygulama sistemlerinin yönetimlerde değişime sebep olduğunu ve yönetimlerin etkin kontrol verme mekanizmalarının etkinliğinin arttığını belirtmişlerdir. | $H_1$: EBYS yönetsel kontrol sağlamaktadır. | Tablo 13 ve 18 | Hipotez ispatlanmıştır. |
| **2. EBYS kurumda belgeler ulaşımda ve belgelerin kaydında zaman ve hız kazandırmakta mıdır?** | Özdemirci (2013) çalışmasında belge yönetim sistemlerinin belgelerin üretilmesi, alınması, korunması ve saklanmasında zaman kazandırdığını belirtmiştir | $H_2$: EBYS iş verimliliği sağlamaktadır. | Tablo 14 ve 18 | Hipotez ispatlanmıştır. |
| **3.EBYS etkin belge yönetimi sayesinde iş yükünü azalmakta mıdır?** | Özden (2015) çalışmasında "iş görenin, modern koşulların sunmuş olduğu bir takım olanaklarla işlerini çok daha etkin ve efektif bir şekilde yerine getirmeleri sayesinde kendilerini gerçekleştirme ve geliştirme fırsatları da ortaya çıkmış olur." şeklinde belirtmiştir.<br>Singh ve Sharma (2009) çalışmalarında e-girişimleri uygulandığı kurumlarda çalışan tatmininin arttığını belirtmişlerdir.<br>Javadi ve Etebarian (2014) çalışmalarında e-uygulama sistemlerinin çalışanların iş yükünü azalttığını belirtmiştir.<br>Stuurman (2013) çalışmasında e-belge sistemlerinin çalışanların dosya yükünü ortadan kaldırdığını belirtmiştir. | $H_3$: EBYS iş memnuniyeti sağlamaktadır. | Tablo 15 ve 18 | Hipotez ispatlanmıştır. |
| **4. EBYS kurumda denetim yapılmasını ve kurumsal hafıza yaratılmasını sağlamakta mıdır?**<br>**5. EBYS kurumda hizmet kalitesini arttırmakta mıdır?** | Wang (2014) çalışmasında belge yönetim sistemlerinin uygulama kurallarının belirlenmesiyle denetim yapılmasını kolaylaştırdığını belirtmiştir.<br>Manikas (2015) çalışmasında belgelerin kayıt altına alınmasını ve hızlı bir şekilde ulaşılmasını kurumsal hafızayı yarattığını belirtmiştir.<br>Yalçınkaya (2014) çalışmasında belge yönetim sistemlerinin belgelerin doğru şekilde saklanmasını sağlayarak belgede özgünlük ilkelerinin yerine getirtildiğini belirtmiştir. | $H_4$: EBYS ile etkinlik sağlanmaktadır. | Tablo 16 ve 18 | Hipotez ispatlanmıştır. |
| **6. EBYS kullanıcı güvenliği sağlamakta mıdır?** | Abeysingher (2001) e-doküman sistemlerinin dokümanların korunmasını sağladığını belirtmiştir.<br>Munetsi (2011) çalışmasında dijital belge kayıt sistemlerinin belgelerin korunmasında etkin olduğunu belirtmiştir.<br>Abri (2009) çalışmasında e-girişim uygulamalarının e-gizlilik üzerine etkili olduğunu belirtmiştir. | $H_5$: EBYS'yi kullanan memurun bilgisayarında kişisel bilgi güvenliği sağlanmaktadır. | Tablo 17 ve 18 | Hipotez ispatlanamamıştır. |

**Table 25:** Control of Hypothesis.

The EDMSs which contain institutional information sources, provide the necessary information and documents to institution management for decision-making processes and institutional management activities. Therefore, electronic document management is of vital importance for institution management. The institutionalized research among EDMSs carried out in the Ministry, is an implementation which has features that can guide EDMSs both in development or to be developed in the future.

The foremost aim of this study is to determine how much effective the EDM application of the ministry in the context of managerial control, productivity, job satisfaction, efficiency and safety provision topics is and to prove that it has positive effects. For this purpose, many resources related to subject were utilized and processes, survey results and workflow associated with EDMS were examined. As a result of researches and examinations made; it has been determined that the EDMS application provides efficiency in managerial control, productivity, job satisfaction topics but it was not able to provide EDMS user safety to full extent. In this direction, it is expected that reviewing process management will contribute to development and sustainability of EDMS.

In brief, the factors hampering the sustainability and implementation of EDMS in the ministry, are the problems that related to training, hardware and software.

Based on the results obtained from evaluation of electronic document management systems in the ministry, the recommendations presented are as follows:

1. First thing should be done in the Ministry, is to establish a dedicated unit for document management processes to carry these tasks out, and have information and document management department graduates employed in this unit.

2. Supplementary documents associated with electronic document management systems should be made available and it should be ensured that these documents are delivered to all EDMS users.

3. As a result of evaluations, it is revealed that the Ministry carried out other inter-institutional correspondences via mail. It has been concluded that electronic document management systems have an integration problem with other systems within the institution. As a result, it is certain that some work will be disrupted. In order for document management processes to be carried out more accurately, systems such as KEP8 and DETSİS9 included in legal regulations, should be integrated as user friendly. For documents that cannot be send out via KEP, necessary warning systems should be developed in case the user forgets.

4. In order to enable inter-institutional interoperability of EDMSs, the Ministry firstly should begin working on to ensure coordination between its own units.

5. The Ministry, should make sure that all EDMS users are given adequate training and necessary technical support. In addition, users should be made more aware of interoperability and security issues.

6. The issue of integration of documents incoming via KEP with other documents should be worked on and the Ministry should employ specialist personnel in document management agency who will attend to KEP.

7. Having two counters for incoming and outgoing documents reduces the speed and efficiency of document searches in the system. There should be a single counter and incoming – outgoing documents, approval date and number should be given over this counter. Therefore, more efficient and rapid searching procedures could be established.

8. Date and number counter module should be in Directorate of State Archives. Because, in order to have a legal characteristic, the document must have a date and a number. The date and the number of documents whose process cannot be completed in time for some reason, can sometimes changed with a requested date and number. In order to prevent these inappropriate cases, the system should be in the Ministry and the document counter module should be in the Directorate of State Archives.

9. Electronic signature should only be obtained for users who have final signatory roles. It will increase the efficiency and will be more cost effective. Obtaining electronic signatures for all personnel in the Ministry has increased both the workload on the system and the cost.

Based on the collected results of the implemented survey, the possible recommendation has been derived for the EDMS applications:

1- Results revealed that the technological infrastructure and technical qualities are insufficient within the scope of the EDMS applications. Thus, improving the technological infrastructure is important to ensure the efficient operation of the system and the conduct of the necessary R & D activities. The technical infrastructure of the institution should be reviewed and updated if needed. Document and archival processes and workflows should be organised.

2- Some of the mistakes in the use of EDMS are caused by the human factor. To avoid mistakes arising from the personal preferences of employees, authorities should minimise the situations where personal preferences can be made. To solve this, standard templates can be created at the system inputs.

3- Security is one of the most important concerns of employees regarding EDMS. Organisations with similar administrative structures should be established to ensure information security. Responsibilities for the destruction of permanently erased data in the electronic environment should be determined, along with responsibilities for ensuring that information security would be shared among the units. While planning the measures to be taken, they should also be evaluated along with the technical and administrative aspects. While investments are made to ensure information security in organisations, it is important to consider user awareness. To overcome the legal weaknesses of information security, developing policies and organising awareness trainings on those policies should be considered.

To reinforce the security level, the document must be encrypted during the archiving and transferring. Security tests must be implemented on EDMS and EMDS infrastructure and if any, the deficiencies must be eliminated.

The level of seeing the content of documents must be regulated according to the authorization level.

4- A unit related to electronic document management should be established within the Institution, and the authorities should be extended on the implementation and control of specific standards. In the aforementioned units, a knowledge manager specialist should be employed and this person must be able to work in coordination with other related units in carrying out document management activities.

5- In-service training should be organised to ensure that employees work in accordance with regulations in the EDMS applications. Trainings must be delivered to the EDMS users in compatible with their roles and such trainings must be repeated at certain intervals.

6- For the system to be more effective and efficient, it must be possible to append signature on every platform without needing "Java", whether in web-based or desktop application. Within this scope, it must be ensured that Registered Electronic Mail (REM) application is integrated to the new system.

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# ANNEXES

## SURVEY FORM

Dear Participator

This interview form .... has been prepared to be used in the thesis study titled as "Creation of Electronic Document Management Systems: A Research on Productivity in Public Institutions". The data obtained as a result of the survey will be used only for purposes of scientific research. I would like to thank you for your attention and contribution.

NAME AND SURNAME

Doctoral Student

## Appendix-A: Questionnaire

1) Your gender:
( ) Woman () man

2) Your age:
() 25 and below
() 26-35
() 36-45
() 46-55
() 56 and above

3) Your Status of Education:
() Primary education
( ) High school
() Associate Degree
() License
() Graduate
() Doctorate and above

4) Last Graduated Area:
() Natural Sciences- () Engineering () Social Sciences- Law
() Other (Please specify) .....

5) Working at this institution:
() Less than 5 years () 6-10 years () 11-15 years () 16-20 years () 21- 25 () More than 26 years

6) Your title: .....

7) Unit you work in: .....

8) Select the most important expectation of your institution from the application of EDMS?
() Improved service

() Equal access for everyone
() Transparency in public administration
() Quality and rich information communication
() Decrease in costs
() Efficiency and productivity increase
() Speed of service delivery

9) **What are your services provided by your organization in electronic environment?**
() Services provided for providing / giving information
() Services offered in the form of inquiry and answer
() Services offered as online transactions
() Other (Please specify): .....

**10) Do you number the obstacles in front of the EDMS applications from 1 in order of importance? (1 = least important obstacle 8 = most important obstacle)**
() Inability of appropriation
() Security and hackers problem
() The pressure of higher priority issues
() Employing qualified technical staff
() Abandonment of resident bureaucratic habits
() Public administrators should not look at the EDMS system warmly (lack of leadership support)
() Lack of legal regulations
() Technical infrastructure inadequacy

**11)** On the basis of the EMS studies carried out at your institution, mark on the scale how much you participate in the following statements?

| | **I never agree** | **I do not agree** | **Undecided** | **I agree** | **I totally agree** |
|---|---|---|---|---|---|
| MANAGEMENT CONTROL | | | | | |
| 1. Electronic document management systems are used to control business processes | | | | | |
| 2. Electronic document management systems provide business processes with follow-up. | | | | | |
| 3. Electronic Document Management Systems provide employee supervision. | | | | | |
| 4. Electronic Document Management Systems increase controllability as more documents are accessed faster. | | | | | |
| 5. Electronic Document Management Systems facilitate the follow-up of the business calendar. | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 6. Electronic Document Management Systems increase the work performance. | | | | | |
| 7. Electronic Document Management Systems increase the efficiency of management activities. | | | | | |
| 8. Electronic Document Management Systems; accurate, effective and fast decision making. | | | | | |
| 9. Electronic Document Management Systems increase the influence of management on employees. | | | | | |
| PRODUCTIVITY | | | | | |
| 10. Electronic Document Management Systems save time. | | | | | |
| 11. Electronic Document Management Systems will do more work in a shorter time. | | | | | |
| 12. Electronic Document Management Systems facilitate business department and organization. | | | | | |
| 13. Electronic Document Management Systems provide the cooperation of personnel. | | | | | |
| 14. Use of Electronic Document Management Systems; increase productivity in our institution. | | | | | |
| 15. Electronic Document Management Systems provide convenient access to past information and documents. | | | | | |
| 16. Electronic Document Management Systems and information and documents are regularly classified and stored according to the relevant Kan / Regulations. | | | | | |
| 17. Electronic Document Management Systems provide quick access to information and documents. | | | | | |
| 18. With Electronic Document Management Systems, it provides the opportunity to work outside the institution, i.e. time and space independent. | | | | | |
| 19. Electronic Document Management Systems enable more than one person to access the same information and document and work on the same document. | | | | | |
| 20. After the software update in the electronic document management systems, the system is working hard. | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 21. All transactions made with Electronic Document Management Systems are recorded. | | | | | |
| 22. Electronic document management systems prevent duplicate work. | | | | | |
| 23. Electronic Document Management Systems prevent errors related to filing. | | | | | |
| 24. Since the number of prints required at each stage of the Electronic Document Management System is reduced, paper is saved. | | | | | |
| 25. Electronic Document Management System reduces the courier and mail costs. | | | | | |
| 26. With Electronic Document Management System, the physical archive is decreasing. | | | | | |
| 27. Electronic Document Management Systems provide personnel savings due to the availability of labour productivity. | | | | | |
| JOB SATISFACTION | | | | | |
| 28. With the Electronic Document Management System, my motivation to work is increasing. | | | | | |
| 29. Thanks to the Electronic Document Management System, I work in an environment full of files. | | | | | |
| 30. Thanks to Electronic Document Management System, I am doing my job lovingly and willingly. | | | | | |
| 31. The Electronic Document Management System increases the sense of belonging to the people. | | | | | |
| 32. The Electronic Document Management System has reduced the liability for work. | | | | | |
| 33. The Electronic Document Management System ensures that corporate control mechanisms work more efficiently. | | | | | |
| ACTIVITY | | | | | |
| 34. Electronic Document Management System creates corporate memory. | | | | | |
| 35. Electronic Document Management Systems are easy to use. | | | | | |
| 36. In Electronic Document Management System, information and documents are completely correct. | | | | | |
| 37. In Electronic Document Management Systems, reporting is working properly. | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 38. 39- I think that paraph / signature processes are shortened in Electronic Document Management Systems. | | | | | |
| SECURITY | | | | | |
| 39. The Electronic Document Management System is more secure as it gives each user a separate password in the system and allows only concerned persons to login to the system. | | | | | |
| 40. Electronic Document Management Systems and electronic backups are taken. | | | | | |
| 41. My documents are secured in the Electronic Document Management System. | | | | | |
| 42. In Electronic Document Management Systems, while writing in the draft; the loss of the text and its attachments in the draft due to the fact that the electricity is cut off or ejected from the system negatively affects me. | | | | | |

**If you have any opinion you would like to add, please state below.**

**……**
**……**
**……**

## Annex-2: Permission Letter

BÜNYAMİN RECEP KILINÇ

T.C.
BİLİM, SANAYİ VE TEKNOLOJİ BAKANLIĞI
Bilgi İşlem Dairesi Başkanlığı

Sayı : 37320017 - 705.01 -E.164 26/09/2016
Konu : Evrak Doküman Arşiv ve Süreç Yönetim Sistemi

BAŞKANLIK MAKAMINA

İlgi : a) Başkanlığımızın 20/05/2015 tarihli ve 705.01 - 82 sayılı onayı.
b) 22/09/2016 tarihli ve 705.01- 5944 sayılı yazınız.

Bakanlığımız Konya Bilim, Sanayi ve Teknoloji İl Müdürlüğünde, Şube Müdürü olarak çalışmakta olan 7650 sicil numaralı Sayın Kenan ABACI, okumak olduğu Yakın Doğu Üniversitesi İşletme Yönetimi doktora tezinin konusu olan ***"Elektronik Belge Yönetim Sistemlerinin Oluşturulması: Kamu Kurumlarında Verimlilik Üzerine Bir Araştırma"*** olarak belirlenmiş, bu çalışma kapsamında gerek üst veri analizi gerekse de, EBYS memnuniyet anketi yapılmasını planlamakta, Bakanlık Makamından konu hakkında izin istemektedir.

Söz konusu dokrora tez çalışmaları kapsamında gerekli izinlerin verilmesi hususunu, tensiplerinizi arz ederim.

Bünyamin KARAGÖZ
Şube Müdürü

O L U R
…. / …. / ……..

Yrd. Doç. Dr. Recep KILINÇ
Bilgi İşlem Dairesi Başkan V.

"Bu belge, güvenli elektronik imza ile imzalanmıştır."

Mustafa Kemal Mahallesi Dumlupınar Bulvarı Eskişehir Yolu 2151.Cadde No:154 06510 Çankaya /ANKARA
Bilgi İçin İrtibat: Bünyamin KARAGÖZ Şube Müdürü
Telefon : 03122015170 Faks : 3122196397
e-posta : bunyaminka@sanayi.gov.tr Elektronik Ağ : www.sanayi.gov.tr

Evrak bilgisine http://www.sanayi.gov.tr adresinden,"ututq146E93D" DYS No ve evrak tarihi ile erişebilirsiniz.ututq146E93D

## RESUME

I was born on August 15, 1972 in Ankara. I completed my primary education at Atatürk Primary School. I completed my high school education at Güven High School. In 1995, I graduated from Gazi University, Faculty of Business Administration. In 2014, I graduated from the management and organization department of Ahmet Yesevi University. I worked Turkey Halk Bank for three years. I am branch manager in the Republic Of Turkey Ministry of Industry and Technologyas. In 2016, I started my PhD studies at Near East University.

# PLAGIARISM REPORT

**CREATION OF ELECTRONIC DOCUMENT MANAGEMENT SYSTEMS:
A RESEARCH ON PRODUCTIVITY IN PUBLIC INSTITUTIONS**

KENAN, ABACI

DOCTORAL THESIS

DoktoraTezi

ORIJINALLIK RAPORU

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| BENZERLIK ENDEKSI | İNTERNET KAYNAKLARI | YAYINLAR | ÖĞRENCI ÖDEVLERI |

BIRINCIL KAYNAKLAR

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# ETHICS COMMITEE APPROVAL

YAKIN DOĞU ÜNİVERSİTESİ

**BİLİMSEL ARAŞTIRMALAR ETİK KURULU**

30.03.2017

Sayın Yar. Doç. Dr. I. Tolga Medeni,

Bilimsel Araştırmalar Etik Kurulu'na yapmış olduğunuz YDÜ/SB/2017/21 proje numaralı ve **"Elektronik Belge Yönetim Sisteminin Oluşturulması: Kamu Kurumlarında Verimlilik Üzerine Bir Araştırma"** başlıklı proje önerisi kurulumuzca değerlendirilmiş olup, etik olarak uygun bulunmuştur. Bu yazı ile birlikte, başvuru formunuzda belirttiğiniz bilgilerin dışına çıkmamak suretiyle araştırmaya başlayabilirsiniz.

Yardımcı Doçent Doktor Direnç Kanol

Bilimsel Araştırmalar Etik Kurulu Raportörü

Direnç Kanol

**Not:** Eğer bir kuruma resmi bir kabul yazısı sunmak istiyorsanız, Yakın Doğu Üniversitesi Bilimsel Araştırmalar Etik Kurulu'na bu yazı ile başvurup, kurulun başkanının imzasını taşıyan resmi bir yazı temin edebilirsiniz.