THE RELATIONSHIP BETWEEN THE HISTORICAL DEVELOPMENT OF THE ACCOUNTING INFORMATION SYSTEM and ITS APPLICATIONS and INFORMATION TECHNOLOGIES

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ABSTRACT

Information technologies are those that collect, process, store and communicate “information” to anywhere, and consist of computer technologies with software and hardware, and communication technologies. The developments in information technologies, which have had numerous impacts on both individual and social life and businesses, have also had an important impact on accounting information systems and accounting applications in terms of every aspect such as concept, scope and operation. Accounting which communicates the information that is produced to the interest groups has developed in the form of an “information communication system” as a sub-system of a management information system. In the beginning, accounting provided information for business owners and the state; however, when it turned into a system, it broadened its function to meet the information needs of all interest groups. Such applications as preparing financial statements and tax statements, planning, consultancy and auditing which are carried out by accountants can be called accounting applications. The developments in information technologies affected the accounting information system in terms of eliminating the problems related to human errors and insufficiency, productivity, quality, cost and effectiveness; the accounting applications in terms of new areas of specialization in the profession of accounting; and the accounting system in terms of new types of applications and notions. The following can be given as examples of the new areas of specialization in the profession of accounting: information technology services (ITS), electronic commerce expertise, international accounting and forensic accounting; and as examples to the new developments in accounting applications: just-in-time production (JIT), activity-based costing (ABC), total quality management, human resource accounting and quality costs. Electronic book, electronic document, electronic record, electronic accounting, electronic auditing, electronic tax system, and electronic archiving may be given as examples of the concepts put forth by developments in information technologies.

Keywords: Information technology, accounting, accounting information system, accounting applications and profession.

1. Introduction
Since the 1950s, scientific works have resulted in technological advances by producing suitable data and technological advances have accelerated scientific developments by creating more suitable opportunities for scientific research, which has been the natural cycle since then. This cycle has had an important impact on the current structures and systems in both individual and social lives and business world and state administration, and the main thrust for this cycle has been the “Information technologies”.

“Information technologies” are divided into two: computer technologies and communication technologies, and refer to the computer-based tools that make it possible to collect, process and store information; communicate information to anywhere in the world and retrieve this information from anywhere in the world.

The developments in information technologies, together with globalization and international legal arrangements, have generated such notions as “new economy”, “e-commerce” and “new accounting”. In addition, these developments have been useful in saving time and money and reducing the costs by accelerating transactions and communication. The developments in information technologies have caused all or some of the financial transactions in a business to be carried out in such different forms in electronic environments as electronic commerce and electronic data exchange. This, as a result, caused the financial transactions to be removed from the traditional paper-based activity environment to the electronic environment in the accounting information system, which is described as the language of a business, and therefore, resulted in changes in all processes such as recording, classification, reporting and analysis. At the same time, this change has also affected such accounting applications as keeping the books, preparing financial statements and tax statements, auditing activities and, therefore, the activities of the members of the accounting profession.

The above-mentioned developments in information technologies, which made the changes in accounting information system, applications and profession inevitable, also created a change in the demands of the society and an increase in the expectations from the members of accounting profession. The global change in the notion of business administration forced the members of accounting profession to perceive the economic, social and political changes being experienced in the world, to have the accumulation of knowledge about different cultures, and to be able to look at the events with a global perspective.

2. Developments in Information Technologies

The advances in scientific research also bring with them the technological developments which are in a continuous renewal, change and development. This makes it more and more difficult to follow and understand sufficiently the developments in information technologies. This process has been explained as follows: “As soon as you understand one product or concept, new and improved versions are created within the next few years, people will use new and innovative technologies in ways we currently can not imagine” (HOLLANDER-DENNA-CHERRINGTON, 2000, p.511).

The developments in information technologies cover a very large area from the defence technologies to space technologies, from the medical technologies to the robot and communication technologies. The interaction between these technologies cannot be undervalued. A detailed study of this wide-scope development in technology is both very difficult and beyond the scope of this study. For this reason, due to their close relationship with the topic of the study, only the developments in computer and information technologies will be dealt with; and in this context, first the developments in computer technologies and then the developments in the information technologies will be summarized below.

When they were first developed, computers became very popular tools for calculations; however, as a result of scientific and technological advances, they have had a widespread use and
application as information producing, sharing, and communication tools.

The first attempt to process data by using electronic devices was made by Herman HOLLERITH to be used in 1890 American census. The distinguishing characteristic of HOLLERITH’s machine is that it is a tabulating machine based on C. BABBAGE’s punched-card system, which reads the data on these cards. This machine saved 2/3 of the time in business transactions and was used for many years. The first analogue computer was developed by V. BUSH in 1931, and the first digital computer was developed by G. STIBITZ in 1939. The first working electronic digital computer was developed by J. ATANASOFF in 1942. The first operational electronic digital computer was built by J. MUCHLY and J.P. ECKERT in 1946. This computer weighed more than 30 tonnes and more than 18 000 radio relays were used in this computer (TEKİN - GÜLEŞ - ÖĞÜT, 2003, p. 160). We can describe the computers in terms of their generations as in Table 1.

Table 1: Computers in Terms of Their Generations

<table>
<thead>
<tr>
<th>Computers</th>
<th>Period</th>
<th>Characteristics</th>
</tr>
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<tbody>
<tr>
<td>First generation</td>
<td>1951-1958</td>
<td>Vacuum tubes consuming too much electricity, generating too much heat, and having a short life; maximum 2 KB of memory capacity, magnetic cylinder for internal storage, punched cards for external storage, manual printouts; awkward-looking, difficult to program, low problem-solving capacity, mostly used in scientific and engineering domains.</td>
</tr>
<tr>
<td>Second generation</td>
<td>1959-1963</td>
<td>Use of small transistor technology consuming less electricity and generating lower heat; 32 KB of memory, speeds of 200 000-300 000 commands per minute, magnetic cores for internal storage, magnetic tapes and discs for external storage.</td>
</tr>
<tr>
<td>Third generation</td>
<td>1964-1979</td>
<td>Simple integrated circuits consisting of silicon chips with thousands of tiny transistors; 2 MB of processor capacity; 5 MIPS processor speed. The distinguishing characteristic of this generation is that several programs could be run simultaneously and that no experts were required to use the computers.</td>
</tr>
<tr>
<td>Fourth generation</td>
<td>1980-2005</td>
<td>Complex integrated circuits with very large capacity with chips each containing from 200,000 up to 1 000 000 circuits. from several MBs to GBs and EBs of memory capacity through the use of memory cards; supported by numerous different computer technologies such as scanners, printers, displays (monitors), sound-to-text converters. This is the period in which personal computers developed and on which the foundations of today’s computers are based.</td>
</tr>
<tr>
<td>Fifth generation</td>
<td>2006-...</td>
<td>Mass and fast processing of information, capable of human-like reasoning; capable of inferencing; capable of perceiving the environment: In summary, the period of “biocomputers” that is called artificial intelligence.</td>
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</tbody>
</table>


In terms of the number of processes, main memory capacities and data processing capabilities, computers are classified in 4 groups as, micro computers (personal computers or PCs), mini computers, mainframe computers and supercomputers.

The following can be said about the developments in computer software that accelerated even pioneered the advancement in information technologies.

Software which is defined as a component that guides a computer to any direction through the use of a series of commands and programs can be divided into two as system software and application software. System software is responsible for controlling, integrating, and managing hardware components of a computer system. It consists of an operating system and some essential utilities such as disk formatters, file managers, display managers, text editors and
management tools, and networking and device control software. On the other hand, application software is used to accomplish specific tasks for computer users other than just running the computer system.

As in computer hardware, the developments in computer software are divided into certain periods. The developments in computer software are shown in Table 2.

**Table 2 : Developments in Computer Software**

<table>
<thead>
<tr>
<th>Software development</th>
<th>First generation</th>
<th>Second generation</th>
<th>Third generation</th>
<th>Fourth generation</th>
<th>Fifth generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Programs written by the users</td>
<td>- Package programs</td>
<td>- Operating systems</td>
<td>- Database management systems</td>
<td>- Natural languages</td>
<td></td>
</tr>
<tr>
<td>- Machine languages (codes)</td>
<td>- High-level languages</td>
<td>- High-level languages</td>
<td>- Fourth generation languages</td>
<td>- Multi-purpose</td>
<td></td>
</tr>
<tr>
<td>Talking Natural Programming Languages</td>
<td></td>
<td></td>
<td>- Package programs</td>
<td>- Graphic</td>
<td></td>
</tr>
<tr>
<td>User friendly multi-purpose package programs</td>
<td></td>
<td></td>
<td></td>
<td>- interface</td>
<td></td>
</tr>
</tbody>
</table>

Source : TEKİN, GÜLEŞ, ÖĞÜT, 2003, p. 166.

As seen in Table 2, the developments in computer software show a continuum between generations from single- or fewer-purpose use to multi-purpose use. In addition, while in the beginning computer software was developed by the users of the computers, in time software programming required expertise in the field which, as a result, separated the users and software developers.

Similar to the developments in computer hardware and software explained above, the following points can be made about the developments in communications technologies.

Communication is the transmission of data, sounds or images across distances via communications tools. Communications tools consist of such tools as the telephone, fax, television, computer, the Internet and telecommunication which help people to be informed in verbal, printed and visual forms.

The developments in communications technology can be chronologically summarized as follows (Cogito, 2002, pp. 80-175):

1836 Invention of the telegram
1866 Completion of the first transatlantic cable installation
1876 Invention of the telephone
1900 Sound transmission through radio waves
1923 Introduction of the television
1939 Beginning of the commercial television broadcasting
1951 Beginning of the first color television broadcasting in the USA
1957 Launch of the first artificial satellite, Sputnik, into the space by the Soviet Union
1960 Development of the video network, and later on TV broadcasting to areas through cable network where normal TV signals were not received
1962 Development of the ARPANET (Advanced Research Projects Agency Network) in the USA.
1969  Creation of the ARPANET (birth of the Internet)
1970  Broadcasting of sounds and images to all over the world via the satellites.
1972  Beginning of communication over a network
1974  The development of the first commercial version of the ARPANET.
1977  Widespread use of e-mail
1980  Use of computers in communications, sending data with and without sound through the use of high-capacity fiber-optic nets.
1982  The development of the Internet as a result of the development of such Internet architectures as OSI (Open Systems Interconnections), which is used as the common language of the computers, and the TCP/IP (Transmission Control Protocol/Internet Protocol)
1982  Development of the digital telephone
1985  Development of the mobile telephone
1986  Beginning of CD-ROM broadcasting

In later years, the innovations in digital technology, fiber optics and lazer technologies; the developments in such office equipment as intelligent terminals, the telephone and fax; and the developments in other communications equipment can be added to the above mentioned developments.

Among the communications technologies, the internet is without doubt the one that recorded the greatest improvement. The Internet (interconnected network) can be defined as the networks through which the computers all over the world communicate and share sources of data with each other through a common protocol. Intranet, which is used together with the concept of internet, is a private computer network that uses internet protocols, network connection, and public telecommunication system to share part of an organization’s information with its employees. On the other hand, an extranet is a private network that uses internet protocols, network connection, and public telecommunication system to share part of an organization’s information with partners, customers, suppliers, retailers, or other businesses.

Another internet-related concept is “net”. The term “net” denotes the connection of many computers to each other either directly or using telephone cables, and is variously called “net”, “network”, “web”. Depending on the geographical area that they cover, nets are divided into three: LAN (Local Area Network), WAN (Wide area Network) and MAN (Metropolitan Area Network). A LAN is a computer network between the computers in a limited local area, like a home, office, or group of buildings; a WAN is a computer network between computers in different cities, regions and countries; and a MAN is a computer network between the various branches of an organization in a city or between different organizations in a city.

3. The Historical Development of The Accounting Information System and Applications

Information system is the whole of the related components that are working together to collect, store and disseminate data for the purpose of planning, control, coordination, analysis and decision making (MUĞAN-AKMAN, 2000, p. 103).
On the other hand, an Accounting Information System (AIS) is the whole of the related components that are put together to collect information, raw data or ordinary data and transform them into financial data for the purpose of reporting them to decision makers (KARACAER–IBRAHIMOĞLU, 2003, p. 214).

The most important and oldest of the present systems in businesses is certainly the Management Information System. “Management” and “information” are two inseparable concepts and show the impossibility of the rational execution of management activities without information (CIVAN-KARA, 2003, p. 111). Management Information System consists of many subsystems. Accounting Information System is one of these subsystems and the oldest one.

The accounting information system that is created in a business is directly related to the organizational culture, level of strategic planning and the information technologies that this specific business has. It is possible to obtain healthier information about the financial structures of the businesses that have set up a good accounting information system. Some of the important functions that an accounting information system perform in a business are: collecting and recording data about the activities and transactions; planning; processing the data and turning it into information to be used in decision-making for planning, application and control activities; and carrying out the necessary controls in order to protect the business assets (PARLAKKAYA-TEKİN, 2002, p. 676).

It has been stated that the systems approach to accounting was established by “A Statement of Basic Accounting Theory”, a study carried out by American Accounting Association, and that this “accounting declaration” is the confirmation of the belief that accountancy is an information system (ERDOĞAN et al., 2000, p. 114). The transformation of accounting into a system eventually changed the original function of accounting as information provider for determining the tax due for both business owner and state into information provider for all interest groups.

Accounting applications can be described as the whole of the functions that have to be implemented by the accounting function in the businesses or as the whole of the activities that have to be carried out by the members of accounting profession.

By looking at the definition of accounting, its functions in the business and activity areas of the members of accounting profession, accounting applications can be defined as the preparation of financial statements and tax statements, planning and consultancy, auditing and certification.

Preparing financial statements and tax statements; the member of the profession determines, first of all, the transactions of financial character that affect the business which is an economic unit. Having determined the transactions, he carries out the tasks of evaluation, classification and recording of data. After this, financial statements are prepared and finally, by doing the necessary adjustments, tax statements are prepared.

Planning and consultancy; planning consists of the processes of preparing the documents about the future investments, transactions and negotiations of the natural and legal entities. On the other hand, consultancy is the whole of the activities that are carried out with the aim of providing expert advice about certain matters in business activities in the long run. The subject matter of planning and consultancy services, which are in the operation area of the members of accounting profession, consists of decisions of the enterprise to be taken for future investments, financing policies of the enterprise, and helping the enterprise in solving the problems that the enterprise encounters in its relations with the tax office and with other institutions.

Auditing is an evaluation of an organization, system or a process, which is an independent assessment of the fairness by which a company's financial statements are presented by its management. It is performed by competent, independent and objective person or persons, known as auditors or accountants, who then issue a report on the results of the audit. (TÜREDİ, 2000, p.6).
The aim of auditing is to find out whether the information recorded during an activity period reflects the financial and commercial transactions that took place during the accounting period.

Certification can be defined as the process of investigating the natural and legal entities or their enterprises and businesses by sworn-in certified public accountants according to the principles and standards of auditing in terms of their suitability; and, based on the findings of investigation, of determining and reporting, by using signature and stamp, whether or not the issues under investigation reflect the truth (TÜREDİ, 2000, p. 8).

In the light of the descriptions made above, accounting applications can be summarized as follows: determining the transactions of financial quality and collecting, classifying and recording the data about them; preparing and presenting financial statements based on these records; preparing tax statements with the help of the data in the financial statements; offering consultancy services to persons, institutions and organizations; carrying out planning activities for the future for the related units; and auditing and certifying.

The following remarks can be made about the historical development of accounting applications. It is possible to understand from Kutadgu Bilig, written by Yusuf Has Hacib in 1070, that the statesmen appreciated the importance of accounting and created the “clerkship” position in the palace. A clerk is defined in this book as “He has to be very trustworthy, reliable, well-mannered and honest. He has to be contented, his attitudes and character must give a sense of reliability. He has to be modest as well as wise. He has to record all kinds of transaction, and must not rely on mind” (SÜRME, 2002, p. 2). Before the commerce and industry developed the economic power was collected in the hands of the state authorities. This caused the accounting profession to be the “State Accountancy”. The economic, social and political developments after the industrial revolution brought about in the accounting profession a change from state accountancy into enterprise accountancy. With the development of the profession, the profession of accounting started to execute as well the functions of investigating the business activities, taxation, financial consultancy, auditing, etc.

In this framework, while in the beginning the accounting applications were limited to bookkeeping and preparing tax statements, in time accounting applications took the form in which analysis, interpretation, consultancy and advising came to the fore.

4. The Effects of the Developments in Information Technologies on Accounting Information System and Applications

40. Effects on Accounting Information System

It is stated that the first applications of computer systems in enterprises were in accounting information system and therefore accounting transactions. It is claimed that in the historical process, although the computers were used in solving some accounting problems in the 1950s, the active use of computers as a business management tool was in the 1960s, and therefore the setting up of the accounting information system, the most important sub-system of management information system, and the use of computers in its implementation were also in the same years (GÖKTAN, 1983, p.297; HYVONEN, 2003, p.155).

In parallel with the developments in accounting standards, uniform chart of accounts and computer software, the packet programs, which in the beginning covered only such less complex processes as recording and preparing trial balance and balance sheet, now include such modules as financing, budgeting, production, and cost accounting. This made the profession of accounting and therefore the accounting information system turn into a decision support system beyond
simple book keeping thanks to the developing technology. Parallel to the efficient employment of computers in accounting in a very short period of time, the importance of accounting information system increased day by day.

The contribution of the developments in information technologies to accounting information system can be listed as follows:

- Such developments in production technology as automation, just-in-time production, zero stock, computer aided design and production have had a direct effect especially on cost accounting system, a sub-system of accounting information system, in terms of many aspects and mainly in terms of determining costs.
- Computerization and the developments information and communication tools such as the Internet have had a direct impact on the structure of accounting information system in terms of collecting, processing, recording, classifying, storing and communicating data (KARAKAYA, 1994, p. 51).
- Technological advancements made it possible to transfer the data simultaneously into the journal, ledger and current account and therefore to prepare financial statements and other reports as soon as they are entered into accounting receipts.
- In addition to preparing the reports faster and more effectively, preparing incredibly more specific and more detailed reports was also made possible compared to the manual preparation.
- The use of information technologies has eliminated the limitations of time, data density and data diversity in the accounting system, and allowed the data to be arranged and to be presented to the management (USLU, 1983, p. 319).
- Beyond its traditional function, accounting, which is an information communication system, has become a decision support system that is integrated with technology
- The developments in information technologies made it possible to obtain different data at the point where they are created, to store them in a single database and to report them when necessary in the forms that are suitable for different purposes.
- The developments in information technologies made it possible to save on personnel and shortened the transaction times in accounting because of easy and fast processing of the data, and therefore made it possible to save on time.
- Following the branch transactions from the central office and, if necessary, intervening in them was made possible. In this context, the accounting function has become centralized and consequently a standardization was introduced into the accounting transactions.

In summary, it can be said that the incorporation of information technologies into the accounting information system contributed in a positive way to such aspects of accounting as eliminating the problems stemming from human errors and human inefficiency as well as to productivity, quality, cost and effectiveness.

41. Effects on Accounting Applications

Information technologies have had numerous impacts on both individual and social life and organizational structures of the enterprises. Therefore, one cannot think that information technologies did not have any impact on accounting applications. Bob ELLIOT commented on this as “IT changes everything” (BORITZ, 1999). The developments in information technologies which affect and change or force to change every aspect of life have also affected and are still affecting the accounting applications in terms of such aspects as concept, scope and process.
The relationship between the information technologies, which has been in a continuous
development after the 1950s, and accounting applications are studied in three periods which are
called “the first kiss”, “the separation” and “the courtship and marriage” (HOLLANDER–
information technologies were first used in such routine transactions of accounting as preparing
payrolls, preparing receipts, monitoring the current accounts was called the first kiss, and this
period was considered by many to be the summit of the relationship between accounting and
information technology. The period between 1970 and 1980 when less than necessary
information was presented to the information users from the information technology-based
systems was called “the separation”. In this period, the managers started to demand information
that were necessary and useful for them and that could only be obtained through the use of
information technologies such as client profile, production faults, cost analyses, and personnel
productivity. Such demands or this kind of thoughts created pressures for important changes in
the structure of accounting information system. However, during this process of transformation,
the members of the accounting profession and the then-present understanding of accounting
preferred to go away from these demands instead of reconsidering the then-present structure.

In parallel to the developments in information technologies, the developments in and widespread
use of communication technologies result in communicating and sharing of information
simultaneously, and this had an important impact on the process of “collecting, processing,
reporting and analyzing the data”. This process forced accounting academicians, members of the
profession and experts of information technologies to work together to develop new methods,
and the structure that was created by this process was called the courtship and marriage. Such
concepts and applications as e-commerce, e-business, etc. are the products of this period.

It should be emphasized here that the interaction between information technologies and
accounting applications created new areas of specialization in the profession of accounting, and
new application types and concepts in the accounting system.

The following can be given as the new areas of specialization that appeared in the profession of
accounting after the global change and technological innovations: information technology
services (ITS), e-commerce expertise, insurance services (in the areas of risk management,
performance assessment and information technology), personal financial planning, international
accounting, environmental accounting (EA), and forensic accounting.

In the International Education Guide 11 of the International Federation of Accountants (IFAC),
the developments in information technologies and the opportunities presented to the accounting
profession are evaluated as follows:

- **Accountant as a user of the information technologies**: As users of information technologies,
  the members of accounting profession must be literate about such areas as data entry,
electronic filing, computers, package programs, the Internet, which are all related to
information technology and which are necessary for their activities.

- **Accountant as a manager of information technology systems**: members of the accounting
  profession must be literate about such matters as approach, development of the personnel,
  performance assessment, procedures, control, backing up, archiving and project management
  methods that will be applied in the use of information technologies.

- **Accountant as the designer of information technology systems**: members of the profession
  must have a knowledge about the techniques for alternative system design approaches, their
  sufficiency, and their suitability for the field.

- **Accountant as an evaluator of information technology systems**: members of the profession
  are in a position to know about the information technologies, educate themselves about them
  and to be able to apply the technology tools and techniques in information technologies.
The following can be given as the new developments in accounting applications: just-in-time production, activity-based costing, total quality management, human resources accounting, benchmarking and quality costs, which was developed and improved after the 1980s. And the following are the concepts that were created by the developments in the information technologies: e-book, e-document, e-record, e-accounting, e-auditing, e-tax system, and e-archiving. ÖZER, who states that information technologies are interested not in the formal descriptions but in the information itself, stresses that in parallel to the developments in information technologies such concepts as book, document and record must be redefined (ÖZER, 2002, p. 484).

Article 242 of the Tax Procedure Law (Vergi Usul Kanunu) defines an e-book as “independent of the formal descriptions, the whole of the electronic records that contain all the information that have to be found in the books that have to be kept according to this law”; an e-document as “independent of the formal descriptions, the whole of the electronic records that contain all the information that have to be found in the documents that have to be prepared according to this Law”; and an e-record as “the smallest unit of information that is kept in an electronic environment which is easy-to-access and process through electronic methods and which forms the e-books and e-documents”. Similarly, e-accounting can be defined as the type of accounting process that starts from pure information which applies accounting in the electronic environment with all its theory and principles without changing the rules of accounting and which shows difference only in terms of its application. Taxpayers’ preparing of the tax statements through the Internet and payment of the taxes automatically through e-banking is called electronic taxation system, and entering, indexing and storing the data into the optical environment and displaying the document in the optical environment is called electronic archiving.

In the traditional system, the concepts of document, record and book reminds us of paper, and because they are perceived by human brain better, they are interested in the arrangement of the data. On the other hand, there are pure, raw data in the electronic system. If needed, information technologies present these pure data in the format required. The data take the form of a book if one wants to see them in book format, they take the form of a record if one wants to see them in record format.

Every year, AICPA carries out research in order find out the effects of developing information technologies on the business world and especially on the accounting applications. These researches have been carried out since 1990 and each year’s research determines the most important technological applications for the next year. The applications that are determined by the AICPA every year are called the “Top 10 Technologies”, and a list of the applications determined in this way in the last 3 years are given below(www.aicpa.org):

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Information Security</td>
<td>Information Security</td>
<td>Information Security</td>
</tr>
<tr>
<td>2</td>
<td>Spam Technology</td>
<td>Electronic Document Management</td>
<td>Assurance and Compliance Applications</td>
</tr>
<tr>
<td>3</td>
<td>Digital Optimization</td>
<td>Data Integration</td>
<td>Disaster and Business Continuity Planning</td>
</tr>
<tr>
<td>4</td>
<td>Database And Application</td>
<td>Spam Technology</td>
<td>IT Governance</td>
</tr>
<tr>
<td></td>
<td>Integration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Wireless Technology</td>
<td>Disaster Recovery</td>
<td>Privacy Management.</td>
</tr>
<tr>
<td>6</td>
<td>Disaster Recovery</td>
<td>Collaboration and Messaging Applications</td>
<td>Digital Identity and Authentication Technologies</td>
</tr>
</tbody>
</table>
The following are the short explanations of 2006 Top 10 Technologies.

1. **Information Security**: The hardware, software, processes, and procedures in place to protect information systems from internal and external threats. It includes routers, perimeter firewalls, IP strategy, intrusion detection and reporting, content filtering, anti-virus, anti-spyware, password management, vulnerability assessment, patch management, personal firewalls, wireless security strategies, data encryption, locked facilities and user education.

2. **Assurance and Compliance Applications**: Collaboration and compliance tools that enable various stakeholders to monitor, document, assess, test and report on compliance with specified controls.

3. **Disaster and Business Continuity Planning**: The development, monitoring, and updating of the process by which organizations plan for continuity of their business in the event of a loss of business information resources due to impairments such as theft, virus infestation, weather damage, accidents, or other malicious destruction.

4. **IT Governance**: IT governance is a structure of relationships and processes to direct and control the enterprise in order to achieve the enterprise's goals by adding value, while still balancing risk versus return over IT and its processes.

5. **Privacy Management**: Privacy encompasses the rights and obligations of individuals and organizations with respect to the collection, use, disclosure, and retention of personal information. As more information and processes are being converted to a digital format, this information must be protected from unauthorized users and from unauthorized usage by those with access to the data. This includes complying with local, state, national and international laws.

6. **Digital Identity and Authentication Technologies**: A way to ensure users are who they say they are—that the user who attempts to perform functions in a system is in fact the user who is authorized to do so. This includes hardware and software solutions that enable the electronic verification of a user's identity or a message's validity, for example, digital certificates. This technology includes the use of bar codes, magnetic stripe, biometrics, tokens and access control for authentication, non-repudiation, and authorization.

7. **Wireless Technologies**: Connectivity and transfer of data between devices via the airwaves, i.e. without physical connectivity. Wireless technologies include Bluetooth, infrared and satellite.

8. **Application and Data Integration**: Using current and emerging technologies, including, net, web-services, Java, XML (the foundation for XBRL) & Ajax, to facilitate integration of data between heterogeneous applications. In its most basic format, XBRL focuses on the agreement to improve gathering, analyzing and sharing business reporting data. For example updating a field in one application and have it automatically synchronize with other applications. This allows organizations to select and seamlessly integrate "best of breed" applications.

9. **Paperless Digital Technologies**: Document and content management includes the process of capturing, indexing, storing, retrieving, searching, and managing documents electronically.
including database management (PDF and other formats). Knowledge management then brings structure and control to this information, allowing organizations to harness the intellectual capital contained in the underlying data.

10. **Spyware Detection and Removal**: Technology that detects and removes programs attempting to covertly gather and transmit confidential user information without his or her knowledge or permission. Spyware applications are typically bundled as a hidden component of freeware or shareware programs or attached to malicious websites. Once installed, spyware can monitor user activity, gather information about e-mail addresses, passwords, and credit card numbers in the background, then transmit this information to someone else. Spyware can include Remote Access Trojans (RAT) and root kits.

Such characteristics of information technologies as collecting data, changing them into information, storing them in large quantities, ensuring their security, communicating them in different formats, and putting them into the educational service in terms of their usages make the information technologies important and put them on the foreground. Being available in a large area, easy-to-use, remote controllable, and independent of the space are other characteristics that can be considered among the characteristics of the information technologies.

The technological tools and similar developments whose names and characteristics were partly mentioned above have affected the global activities of the businesses and their adaptations to the technology, and the infrastructure works that they realized in this context. This has also affected directly the accounting function of the businesses and therefore the accounting processes and applications as well as the profession of accounting. Keeping the records in computer environment, keeping the data in magnetic media instead of physical media, the active even bigger role of the Internet in communication and data transfer than the traditional postal service can be given as examples to these effects.

The effects of the developments in information technologies on accounting applications can be listed as follows\(^1\):

- The most obvious effect of the developments in information technologies on accounting applications is the applicability of various technological tools in the accounting profession. Tools such as computer-based production, communication technologies, the Internet, specialist systems which all help obtain and communicate detailed and timely information can be given as examples to this effect.

- Information technologies have affected the structures, managements and functions of the organizations, and changed the structure of accounting activities and the competitive environment in which members of accounting profession were. BORITZ states that the developments in information technologies have affected the businesses in terms of three important areas: electronic trade, enterprises resources planning (ERP) and data management, and that this has been reflected in accounting applications.

- The developments in information technologies have reduced the workload of the accounting function in terms of recording, classification and reporting the data, and therefore changed the role of the accounting profession in the business into designing management systems and analyzing, interpreting and using the data obtained

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In addition to designing, developing, managing, controlling and evaluating information technologies, information technologies have also created some other opportunities for the members of the profession such as finding new clients and opening to new geographical areas.

The developments in information technologies have resulted in the existence of such new areas of specialization as forensic accounting, information technology, e-trade, and some other multi-disciplinary applications.

In addition, the developments in e-trade and presenting the accounting services in electronic environment have created important tasks and opportunities for the profession.

Accessing the publications about the accounting profession in the Internet increased the opportunity of being better-informed. This affected the activities positively and provided the members of the profession with superiority in competitiveness.

Although the type of management of a business changes according to the institutional structure and environmental factors, the developments in information technologies affected the financial reporting in terms of form and content; conversely, the change in the demands for reporting increased the use of information technologies in financial reporting. In this context, as a result of the technological advances, “periodic financial reporting” in the businesses was replaced by “continuous financial reporting” and the presentation of the financial reports in the electronic media.

Based on the developments in electronics, the process of auditing has also been carried out in electronic media.

Such applications as e-statement and e-tax report are the results of the developments in information technologies, and they introduced accuracy and effectiveness into information as well as helping members of the profession save on both money and time.

With the developments in information technologies, the areas that pose risks in accounting applications can be listed as follows: others’ access to personal and occupational information and weaknesses in the characteristics and reliability of the electronic information and documents in the present system to be proofs. On the other hand, compared to the electronic accounting system, it can be said that in terms of being a proof the traditional accounting system is stronger because of such factors as signature, seal, confirmation by the notary public, etc. In terms of reliability, paper-based transactions seem more reliable at first sight. However, it has been stated that in case the necessary technical conditions are met, electronic data will be more reliable, and in this context, the reliance of individuals on the records of money withdrawal from the automated teller machines (ATMs) is given as an example. For the accounting information to be considered as proofs and reliable, it was proposed to use “discs at once” or “closed discs” or “discs sealed by a notary public” in recording information (ÖZER, 2002, p. 487).

CONCLUSION

Suitable information that is produced through scientific research results in technological developments, and technological developments accelerate scientific developments by creating more opportunities. Societies that appreciate the importance of information technologies, that produce science and technology and that use this technology in all fields and export it have attained the state of “information society” that denotes the social progress after the industrial society.

Elimination of the international limitations, introduction of free trade, and the coexistence of the developments with globalization have had a deep impact on business and its environment. This impact has resulted in radical changes in the transactions and processes in business world.
Naturally, this change has affected the accounting profession and accounting applications, and made it inevitable for the profession to renew itself and to adapt itself to the change. The new mission imposed on the accounting profession and the change in the social expectations from the members of the profession were reshaped in this context.

The effects of the developments in information technologies on accounting information system can be summarized as follows: communicating the data and information to the journals, ledgers and current accounts simultaneously once they are entered into accounting receipts, which enable fast preparation of financial statements and other reports whenever needed; enabling the preparation of specific and detailed reporting which is difficult to prepare by hand; obtaining different types of data in places where they occur and saving them in a single database allowing reporting in suitable formats for different purposes; saving on personnel and time due to recording the data more easily and in a much shorter time.

The effects of technological developments on accounting applications can be summarized as follows: the change of the role of accounting in the business into the design of management systems due to the reduction in the workload of accounting in such functions as recording, classification and reporting; presenting the members of the profession the opportunity to find new clients and to open to new geographical areas; creating new areas of specialization such as forensic accounting, information technology and e-commerce in the accounting profession; presenting the services in the profession in electronic environment; helping members of the profession to save on time and money through such applications as e-statement and e-tax report; bringing accuracy and effectiveness to the information; and allowing some of the auditing techniques to be carried out automatically with information processing systems in computer environment.

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