

Information Technology and Its Role in Administrative Decision-Making

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Received: 28/09/2025

Accepted: 22/02/2026

Published: 09/06/ 2026

Abstract:

This study aims to identify the role that information technology can play in decision-making. In the age of information and digitisation, information technology has become one of the fundamental components of contemporary organisations. It is a decisive factor in supporting management processes, particularly in administrative decision-making. Thanks to information technology, managers can access accurate and timely data and analyse it using advanced methods that help them choose the best alternatives.

Keywords: Information technology, decision making

Introduction:

Since the mid-20th century, the world has witnessed a rapid scientific and technological revolution that has encompassed all areas of economic, social and political life, with repercussions on the lives of individuals and the performance of organisations in general. This scientific revolution has contributed to the development of many means of coping with the changes and transformations that the world has undergone during this period.

As a result of these major transformations, organisations of all sizes and with diverse objectives and tasks are no longer able to meet economic and social challenges, as the traditional methods used to run and manage these organisations

are no longer able to keep pace with the scientific and technological developments that the world has witnessed in recent years, forcing them to keep up with technological developments.

Information technology is considered a necessary requirement for overcoming the increasing challenges facing organisations today, which requires quick and effective decision-making in order to continue operating in an environment characterised by constant change and intense competition. Therefore, providing decision-makers with the necessary information in the appropriate quantity and quality, at the right time and using the appropriate means, is a priority for management. Relying on personal experience and trial and error in decision-making is no longer sufficient to achieve the organisation's objectives, which now require new methods and approaches to decision-making based on accuracy and speed in accessing the information and data needed by decision-makers. This can only be achieved through an efficient and advanced information system.

The problem:

Information technology has become a reality and a necessity for all economic and administrative institutions, regardless of their different systems and methods of operation, due to its great importance in processing data and providing results in a short time and at the lowest cost. In order to understand the role and importance of information technology, as well as the extent to which modern technologies are used and employed to access the information needed for administrative decision-making, the following problem can be posed: How does information technology contribute to administrative decision-making?

The following sub-questions branch off from this problem:

What is the concept of information technology?

What is the concept of administrative decision-making?

What is the importance of relying on modern technologies in administrative decision-making?

To answer this question, this study has been divided into three sections:

Section 1: The concept of information technology

Section 2: The concept of administrative decision-making

Section 3: The role of information technology in administrative decision-making

Based on the question posed, the following hypothesis can be proposed:

The optimal use of information technology leads to effective administrative decision-making.

Section One: The Concept of Information Technology

Definition of Information and Communication Technology:

McMillan's Dictionary defines information technology as: 'The acquisition, processing, storage and transmission of information in various forms (spoken, visual, textual and digital) using a combination of computers and telecommunications based on microelectronics.'¹

The Organisation for Economic Co-operation and Development (OECD)* defines information technology as: " a set of technologies that allow the collection, storage, processing and transmission of information in the form of sounds, data and images. It includes microelectronics, cybernetics and related technologies."²

It is defined as: 'a combination of electronic computers and various means of communication such as fibre optics and satellites, as well as miniaturised film technologies'. That is, various types of discoveries, developments, inventions and products that deal with various types of information in terms of collecting, analysing and organising it (documenting, storing and retrieving it at the right time and in the appropriate and available manner).³

Sanders defined it as: 'The technological ability to obtain, process and exchange information for the purpose of making effective decisions.'⁴

Characteristics and importance of information technology:

¹ Mohamed Al-Sairfi, **Information Technology Management**, Alexandria: Dar Al-Fikr Al-Jami'i, 2009, p. 19

² Bachir Kaouja, '**The Role of Information and Communication Technology in Improving Internal Communication in Public Healthcare Institutions**' (unpublished master's thesis, Faculty of Economics, Business and Management Sciences, University of Ouargla, 2013), p. 25.

³ Ben Brika Abdelwahab, Ben Turki Zainab, '**The Impact of Media and Communication Technology on Driving Development**,' Al-Bahith Magazine, Faculty of Economics, Business and Management Sciences, University of Biskra, Issue 7, 2010, p. 246

⁴ Ahmed Musa Farajallah, '**The Role of Investment in Information Technology in Developing Institutional Performance in Palestinian Higher Education Institutions**' (unpublished master's thesis, Islamic University, Gaza: Faculty of Commerce, 2012), p. 26.

Information and communication technology is a key enabling tool for individuals, governments and institutions, contributing to improved performance, faster transactions and reduced costs. It can therefore be highlighted as follows:

Characteristics:

Modern digital tools have a bunch of features that make them super useful for processing and sharing info. They're really fast at processing data, which means they can get stuff done way quicker than humans, and they help bring people closer together by letting them send loads of info instantly between anywhere in the world. In addition, they offer high storage capacity, enabling efficient data storage, management and access. These tools are also flexible in their use in a variety of fields, as well as interactive, enabling the exchange of roles between sender and receiver, creating a lively communication environment. Asynchronous communication allows messages to be sent and received at different times without the need for time synchronisation, while decentralisation supports network continuity by not relying on a single centre. These tools also offer the feature of non-centralisation, which allows messages to be customised for specific users, in addition to commonality and dissemination, which ensures a wide-ranging impact. Finally, it enables the sharing of intellectual tasks with the machine, allowing for joint interaction and analysis that enhances efficiency and innovation.⁵

The importance of information technology lies in the following: ⁶

- Increased sales and profits: Information and communication technology reduces production costs and satisfies consumer desires and needs.
- Gaining competitive advantages: Organisations use information and communication technology to improve their position in the competitive environment by designing programmes and applications or producing innovative goods and services that enable them to compete effectively.

⁵ Slimani Monira, 'The Role of Information Technology in Achieving Competitive Advantage' (unpublished master's thesis, University of Biskra: Faculty of Economics, Business and Management Sciences, 2013), p. 21.

⁶ Belkidoum Sabah, 'The Impact of Modern Information and Communication Technology on the Strategic Management of Economic Institutions' (unpublished doctoral thesis, University of Constantine 2: Faculty of Economics and Management Sciences, 2013), p. 135

- Reducing costs: Reducing production costs is one of the most important benefits that organisations gain from using information and communication technology in production and control processes.
- Improving quality: One of the most important uses of information technology is to improve the quality of goods and services.

Section Two: The Concept of Administrative Decision-Making

Definition of Administrative Decision-Making:

It is the rational and prudent process of choosing between multiple alternatives with characteristics that are commensurate with the available resources and desired objectives.⁷

Decision-making is defined as: ‘A process of careful selection after an extensive analytical study of a number of available alternatives that can be followed to achieve the desired goals.’⁸

Zahir Al-Kalaldeh defines the decision-making process as: ‘the analysis and evaluation of all common variables, which are subject to scrutiny and examination so that they can be introduced and subjected to measurement and scientific research equations, scientific theory, and quantitative and statistical methods to arrive at a solution or result, and finally to conclusions and recommendations for the development of solutions in the field of scientific application and implementation.’⁹

Or: ‘The process of selecting one alternative from several possible alternatives, whereby the selection is made after an extensive study of all aspects of the problem under consideration.’¹⁰

⁷ Zaid Munir Aboudi, Sami Hariz, **Introduction to Public Administration**, Amman: Dar Al-Shorouk Publishing and Distribution, 2006, p. 77.

⁸ Barkan Delila, ‘**The Impact of Informal Communication on Decision-Making**,’ Journal of Economic and Administrative Research, University of Biskra: Faculty of Economics, Business and Management Sciences, Issue 10, December 2011, p. 218.

⁹ Ismail Manasria, ‘**The Role of Management Information Systems in Improving the Effectiveness of Administrative Decision-Making**’ (unpublished master's thesis, University of M'Sila: Faculty of Commercial Sciences, Management Sciences and Economic Sciences, Department of Commercial Sciences, 2004), p. 3.

¹⁰ Fayhan Muhya Al-Otaibi, ‘**The Role of Information in Administrative Decision-Making**’ (unpublished master's thesis, Naif Arab University for Security Sciences, Riyadh: Department of Security Sciences, 2004), p. 39.

The importance of decision-making

The decision-making process is considered the core of the administrative process, as it is intertwined with all management functions and activities. Decisions are made when performing all administrative functions. When management performs the planning function, it makes decisions to develop plans. In the organisation process, management makes various decisions to organise its activities and tasks appropriately. When management performs the control function, it also makes decisions regarding the appropriate criteria for measuring performance and correcting errors. Thus, the decision-making process is a continuous cycle that continues as long as the administrative activity continues. Furthermore, a problem cannot be resolved unless a decision is made about it¹¹. Decision-making is the basis of a manager's work, through which all the organisation's activities can be accomplished and its future determined. The organisation's functions can only be performed through the decision-making process.¹²

The decision-making process includes several key elements, the most important of which are:¹³

the existence of a clear goal and a motive for making the decision, in addition to the ability to predict the future outcomes of the decision. There must be a person or entity responsible for making decisions within the organisational structure, and accurate information and data must be available to understand the problem that is the subject of the decision. The available alternatives must also be studied and the most appropriate one selected, taking into account potential constraints such as risk, financing, and experience. The importance of administrative decisions lies in their role as a tool for achieving goals, solving problems, utilising resources, and keeping pace with changes, thereby enhancing the efficiency of the organisation and supporting its competitiveness.

Section Three: The Role of Information Technology in Decision Making

¹¹ Sheikhi Ghania, 'The Integration of Information Systems and Its Impact on Rational Decision-Making' (unpublished doctoral thesis, University of Boumerdès: Faculty of Economics, Business and Management Sciences, 2015), p. 166.

¹² Ahmed Maher, Ahmed Maher, **Management: Principles and Skills**. Vol. 3, Alexandria: Dar Al-Jami'ah, 2008, p. 280 .

¹³ Ali Abbas, **Fundamentals of Management Science**. 8th edition, Amman: Dar Al-Masira Publishing and Distribution, 2014, p. 102.

Information technology plays an important role in the decision-making process through what are known as decision support systems, which are the latest IT-based systems that directly support the decision-making process in an organisation. In this section, we will highlight this role.

Decision support systems have emerged as a result of advances in information technology, as management information systems are no longer able to provide managers with the data and information they need, on the one hand, and the lack of time allocated to decision-making, on the other. Here, it is important to note that decision support systems are not intended to make decisions for managers, but rather to provide managers with a set of tools to generate the information and data they need at various administrative levels within the organisation. In other words, support systems support decision-makers with data and information rather than providing them with a means of replacing them.

Lucos defines decision support systems as: ‘A computer system that helps decision makers use data and models to solve unstructured problems.’¹⁴

Ludon defines them as: ‘An integrated set of software, models, and processing tools that interact with data, information, and knowledge to provide proposed solutions and form an integrated model for solving semi-structured and unstructured problems.’¹⁵

Characteristics and features of decision support systems:

Decision support systems emerged to meet the need of senior management to make unstructured decisions, as traditional information systems were no longer sufficient for this purpose. Their most notable characteristics and features are:¹⁶

Decision support systems contribute to enhancing the quality of strategic and tactical decisions by integrating data processing with advanced management information systems. These systems are characterised by their ability to deal with semi-structured and unstructured problems, making them an effective tool in complex decision-making environments. They also rely on systematic analytical methods without relying entirely on automation, which keeps the human role

¹⁴ Henry, C, Lucos, **information technology for Management**, McGraw-Hill, 2009 ,p560.

¹⁵ Sheikhi Ghania, Sheikhi Ghania, ‘**The Integration of Information Systems and Its Impact on Rational Decision-Making**’ (unpublished doctoral thesis, University of Boumerdès: Faculty of Economics, Business and Management Sciences, 2015), p. 78.

¹⁶ Saad Ghalib Yassin, **Organising Support for Decisions**, Vol. 1, Amman: Dar al-Manahij Publishing and Distribution, 2000, p. 30

active in the decision-making process. These systems offer ease of use and flexible interactive interfaces that facilitate access to and analysis of information. They also provide effective analysis tools based on mathematical models and integrated databases. Through their advanced capabilities, they contribute to expanding the limited mental capacities of decision-makers, thereby enhancing the accuracy and quality of outputs. They also enable the utilisation of other information system resources and support individual and collective work in dealing with complex organisational problems, making them a fundamental pillar in contemporary business environments.

Components of the decision support system:

The decision support system consists of three interacting elements, including the database, the model base, and the dialogue base, in addition to the system resources of working individuals, the organisational environment, and the procedures and rules of work related to implementation.

The interaction between these three elements is achieved through the use of software systems called database management systems, model base software systems, and dialogue base management software systems.¹⁷

It should be noted that software is at the heart of the interaction between the main components of a decision support system, linking the components of the system with integrated interactive relationships, which maximises the efficient and effective use of resources, software, data resources and analytical capabilities.

1. Database management subsystem: The database management system includes a database containing data relevant to the problems for which the decision support system was designed. This system provides the information used by the models in the analysis and enables the decision maker to make direct inquiries about the problem at hand. The database includes a set of facts and figures related to the organisation in general, as well as organisational data and documents related to activities, functions, data, procedures, and relationships with suppliers, customers, and other parties. Database management refers to the organisation of the collection, classification, scheduling, and processing of this data in a way that makes it more suitable for supporting decision-making.¹⁸

¹⁷Maha Mahdi Al-Khafaf, Ghassan Ahmad Al-Otaibi, **Introduction to Information Technology and Fundamentals of Information Retrieval**, Alexandria: Dar Al-Thaqafa Al-Ilmiya, 2003, p. 94.

¹⁸ Najm Aboud Najm, **Knowledge Management: Concepts, Strategies, and Processes**, Vol. 2, Amman: Al-Waraq Publishing and Distribution, 2008, p. 364

The database management system consists of the following elements:¹⁹

- **Database:** Databases are the repository where information and data about the organisation and its **activities are stored**.
- **Software:** This refers to the programs through which users interact with databases. These programs act as a conduit between the database and application programs, allowing users to search the contents of databases and enabling the system to recognise all data elements.
- **Data dictionary:** This is a manual or automatic (automated) file that stores the definitions and characteristics of data elements and describes the programs and applications that use them. The data dictionary contains a complete definition and description of the database in terms of the structure of the file in the database, the type and format of storage, and data constraints. This information is called data about data or a description of the database.²⁰

2. Subsystem for managing the model database: The model database is defined as: 'A package of analytical, statistical, and planning models that enable the user to deal with the problem and represent it in a specific form that can be analysed.'²¹

- **Strategic models:** These are a set of models used at the senior management level in the organisation and are useful in supporting strategic decisions such as strategic situation analysis and performance evaluation.

- **Tactical models:** These models are related to the middle management levels in the organisation and support tactical decisions for functional areas such as operations management, marketing, finance and human resource management. These models are less complex than strategic models.

- **Operational models:** These are a set of models used at the executive levels of the organisation and support programmed decisions. They are characterised by being easy, simple and uncomplicated.

- **Analytical models:** These analytical models are used to perform certain analyses on data and include statistical models, algorithms, and administrative models. Sometimes, all of these models are integrated with other models, such as strategic communication models.

¹⁹ Hamid Abdelaziz Bashir, op. cit., p. 48

²⁰ Khairi Mustafa Katana, Ziad Akram Dudin, **Modern Methods in Information Systems Analysis and Design**, Amman: Dar Jarir Publishing and Distribution, 2013, p. 277.

²¹ Khairi Mustafa Katana, Ziad Akram Dudin .op. cit.p 69.

Interactive dialogue management subsystem: The user interface is part of the information system, which includes all the mechanisms, commands, and requests through which data and information are entered into the system. The user interface also includes the resources through which the system outputs results and information, enabling the user interface to interact with the decision support system and control system operations.²²

In general, if the resources and components of decision support systems constitute the physical or cognitive structure of the system, whether these resources are technical, such as devices, computers, databases, and means of communication, or cognitive, such as data and programmes that are of great importance in decision-making, the system's human resources, or what are known as IT knowledge creators, are the most important resources available. These individuals are primarily responsible for the success or failure of the system in providing effective and influential support for unstructured or semi-structured decision-making processes within the organisation.²³

Types of decision support systems:

Many researchers in the field of information systems and technology distinguish between different types of decision support systems. Although databases and model rules are the basic components of decision support systems, many authors and researchers classify them according to their components into several types, which can be explained as follows:

A. Types of decision support systems according to focus: These are divided into:²⁴

- Model-driven decision support systems: These are systems that rely on the use of models to prepare various analyses for the decision-making process through

²² Vicki L. Sauter, **Decision Support Systems for Business intelligence**, 2^{ed}, Canada: Wiley, 2010, p 215.

²³ Al-Wafi Al-Tayeb, 'The Role and Importance of Information Systems in Decision-Making in Economic Institutions: The Case of the Algerian Eastern Cement Complex' (unpublished doctoral thesis, Farhat Abbas University, Setif: Faculty of Economics, Business and Management Sciences, 2012), p. 162.

²⁴ Fayez Juma Al-Najjar, **Management Information Systems: An Administrative Perspective**, Amman: Dar Al-Hamed Publishing and Distribution, 2009, p. 154.

‘what if’ scenarios. They rely on mathematical, statistical, and other models to propose specific solutions to the decision maker.

- **Data-driven decision support systems:** These are systems that support the decision-making process by allowing users to query and analyse useful information stored in databases. These systems include file management systems, data analysis systems, analytical information systems, data mining systems, etc.

B Types of decision support systems according to scope of use: Decision support systems are divided according to this criterion into:²⁵

- **Individual decision support systems:** These are systems that rely on the presence of an individual user in the decision-making process, where these systems support individual decisions related to activities (semi-structured decisions) that are repeated at different time intervals.

- **Collective decision support systems:** These are systems that support a group of individuals as users of the system, where each individual in the group is responsible for performing tasks that are independent of those performed by others but are highly related to them. An example of this is typical financial management, where these systems support employees in preparing budgets. Group decision support systems include communication systems and multiple software systems for group work in order to arrive at solutions to highly complex problems.

- **Organisational support systems:** These are support systems that focus on organisational tasks and activities involving a series of processes in different functional areas, such as planning decisions, resource allocation and task distribution at work.

- **Expert systems:** Expert systems are the most widespread application of artificial intelligence in various fields. Expert systems are based on collecting data, models, rules, etc. etc., in a knowledge base and use them to find possible solutions to problems. These systems transfer knowledge and experience from individuals to the knowledge base, making it widely available throughout the organisation.

Expert systems are based on electronic models built on the accumulated knowledge of individuals and then used to find solutions to various problems in a manner similar to the methods used by human experts in assisting decision-makers, Knowledge system experts store knowledge obtained from human

²⁵ Sheikh Ghani, op.cit, p. 84.

experts in the form of facts and rules in the expert system's knowledge base. The experts then feed this knowledge into computer software, which enables managers to refer to it by asking a series of questions directed at the expert system, which in turn provides answers and advice and identifies possible alternatives to the problem at hand.²⁶

Expert systems have several characteristics and features, the most important of which are:²⁷

- The ability to obtain and preserve rare human expertise and facilitate its use in various fields.
- Providing solutions based on knowledge and technical expertise for complex problems.
- Achieving human participation in benefiting from rare human expertise by providing and making this expertise available to individuals in the organisation at various levels and at all times.
- The expert system can use high-tech systems and good software and utilise various data and information (data, information, speculation, intuition, etc.) to support decision-making.
- Expert systems provide the necessary support for making informed decisions through a set of software that enables access to previous knowledge and experience.

Components of expert systems:

Expert systems consist of an integrated set of subsystems, which include:²⁸

- **Knowledge base:** This contains the facts and specialised knowledge that are derived and collected from the expert through the techniques used by the knowledge engineer. The knowledge base contains the knowledge and experience necessary to solve the set of problems represented by a set of logical and mathematical rules and assumptions that describe the facts about the problem at hand.

²⁶ Alaa Abdel Razzaq Al-Salmi, **Decision Support Systems**, Vol. 3, Doha: Arab Administrative Development Organisation, 2013, p. 150

²⁷ patrick MCKEWN, **information technology and the networked economy**, USA ; Course technology , 2002, P 170.

²⁸ Al-Wafi al-Tayeb, op.cit, p. 170.

- **The inference engine:** This is part of the expert system that uses the knowledge base to select the appropriate knowledge to solve the problem at hand and deduce the methods and approaches that lead to the solution. This is done by selecting the rules in the knowledge base through a set of programmed procedures that control the process of effectively selecting knowledge and rules and searching for possible scenarios that lead to the desired solution.

- **User interface:** The user receives expert advice from the expert system from different workstations, where the user interface allows the user to enter comments and information into the system, obtain information, and interact with the system in a simplified dialogue style and in natural language.

- **Knowledge acquisition facility:** These are specialised programs that allow the creation and modification of a knowledge base with the aim of facilitating the acquisition and storage of knowledge in an easy way through programming languages and ready-made, specialised expert systems

Conclusion:

The use of information technology has had a significant impact on the performance of organisations, as the rapid development of information and communication technology has contributed to modernising management methods and techniques by shifting from traditional work systems to the use of modern systems in performing administrative tasks with the aim of achieving efficiency and effectiveness. Electronic management systems have contributed to the provision of services, saving effort and time and reducing labour costs.

In addition, management information systems and related technologies play a major role in supporting organisations in performing their core functions efficiently and effectively by supporting administrative decision-making and providing the information and data necessary for decision-making. The emergence and development of innovative systems and applications geared towards supporting management and decision-making, and the use of artificial intelligence technologies and knowledge bases in supporting administrative decision-making processes, have contributed to rationalising and increasing the effectiveness and efficiency of the decisions taken.

Bibliographie:

1. Ahmed Musa Farajallah, 'The Role of Investment in Information Technology in Developing Institutional Performance in Palestinian Higher

- Education Institutions' (unpublished master's thesis, Islamic University, Gaza: Faculty of Commerce, 2012).
2. Alaa Abdul Razzaq Al-Salmi, *Information Systems and Artificial Intelligence*, 1st edition, Amman: Dar Al-Manahij Publishing and Distribution, 1999.
 3. Ali Abbas, *Fundamentals of Management Science*. 8th ed., Amman: Dar Al-Masira Publishing and Distribution, 2014.
 4. Bashir Kaouja, 'The Role of Information and Communication Technology in Improving Internal Communication in Public Healthcare Institutions' (unpublished master's thesis, Faculty of Economics, Commerce and Management Sciences, University of Ouargla, 2013).
 5. Barkan Delila, 'The Impact of Informal Communication on Decision-Making,' *Journal of Economic and Administrative Research*, University of Biskra: Faculty of Economics, Business and Management Sciences, Issue 10, December 2011.
 6. Ben Brika Abdelwahab, Ben Turki Zainab, 'The Impact of Information and Communication Technology on Driving Development,' *Al-Bahith Magazine*, Faculty of Economics, Commerce and Management Sciences, University of Biskra, Issue 7, 2010.
 7. Belkidoum Sabah, 'The Impact of Modern Information and Communication Technology on the Strategic Management of Economic Institutions,' (unpublished doctoral thesis, University of Constantine 2: Faculty of Economics and Management Sciences, 2013).
 8. Fayhan Mahya Al-Atiabi, 'The Role of Information in Administrative Decision-Making' (unpublished master's thesis, Naif Arab University for Security Sciences, Riyadh: Department of Security Sciences, 2004).
 9. Cheikhi Ghania, 'The Integration of Information Systems and Its Impact on Rationalising Decision-Making' (unpublished doctoral thesis, University of Boumerdes: Faculty of Economics, Business and Management Sciences, 2015).
 10. Fayez Juma Al-Najjar, *Management Information Systems: An Administrative Perspective*, Amman: Dar Al-Hamed Publishing and Distribution, 2009
 11. Henry, C., *Lucos, Information Technology for Management*, McGraw-Hill, 2009, p. 560.
 12. Ismail Manasseria, 'The Role of Management Information Systems in Improving the Effectiveness of Administrative Decision-Making'

- (unpublished master's thesis, University of M'Sila: Faculty of Commercial Sciences, Management Sciences and Economic Sciences, Department of Commercial Sciences, 2004).
13. James A. O'Brien, George M. Marakas, *Managing Information Systems*, 10th ed., New York: McGraw-Hill, 2011.
 14. Khairi Mustafa Katana, Ziad Akram Dudin, *Modern Methods in Information Systems Analysis and Design*, Amman: Dar Jarir Publishing and Distribution, 2013.
 15. Najm Abboud Najm, *Knowledge Management: Concepts, Strategies and Processes*, 2nd ed., Amman: Al-Waraq Publishing and Distribution, 2008.
 16. Patrick McKewn, *Information Technology and the Networked Economy*, USA; Course Technology, 2002 .
 17. Vicki L. Sauter, *Decision Support Systems for Business Intelligence*, 2nd ed., Canada: Wiley
 18. Slimani, Mounir, 'The Role of Information Technology in Achieving Competitive Advantage' (unpublished master's thesis, University of Biskra: Faculty of Economics, Business and Management Sciences, 2013).
 19. Zaid Munir Aboudi, Sami Hariz, *Introduction to Public Administration*, Amman: Dar Al-Shorouk Publishing and Distribution, 2006.