

The Impact of Accounting Information Technology on the Effectiveness of Decision-Making

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Abstract

This research has discussed a very important topic, which is the impact of accounting information technology (AIT) on the effectiveness of decision-making. It targeted the Saudi Authority for Data and Artificial Intelligence (SDAIA). In this research, the researcher relied on the desk research method. The importance of this work lies in that it coincided with the Kingdom of Saudi Arabia's reliance on a set of programs and applications that would help in obtaining important and necessary data and information for proper and correct decision-making. The research concluded with a set of recommendations that contribute to raising the awareness of managers, officials and decision-makers, at the level of a ministry or an organization and its employees, of the importance of activating AIT in the process of making various decisions in order to face obstacles and to address shortcomings and weaknesses, if any, as the success of the decision made depends on the correctness and accuracy of this information and its availability in a timely manner and with the necessary credibility and suitability.

Keywords: *Information Technology, Accounting Information, Decision-Making.*

ملخص

تناول البحث أثر تكنولوجيا المعلومات المحاسبية على فعالية اتخاذ القرارات، واستهدف الهيئة السعودية للبيانات والذكاء الاصطناعي (سدايا)، حيث اعتمد الباحثان على المنهج المكتبي، وترجع أهمية هذا الموضوع إلى تزامنه مع اعتماد المملكة العربية السعودية على مجموعة من البرامج والتطبيقات التي من شأنها المساعدة في الحصول على بيانات ومعلومات هامة وضرورية لاتخاذ القرارات الملائمة بالشكل الصحيح، بالإضافة إلى تقديم مجموعة من التوصيات التي تساهم في زيادة وعي المدراء والمسؤولين ومتخذي القرارات على مستوى الوزارة أو المنظمة والعاملين فيها بأهمية تفعيل تكنولوجيا المعلومات المحاسبية في عملية اتخاذ القرارات المختلفة لمواجهة العقبات وأوجه القصور والضعف في حال وجدت، حيث يتوقف نجاح القرار المتخذ على مدى صحة هذه المعلومات ودقتها ووصولها في الوقت المناسب وبالمصداقية والملاءمة المطلوبة.

الكلمات المفتاحية: تكنولوجيا المعلومات، المعلومات المحاسبية، اتخاذ القرارات

Chapter I: Introduction

I- Preface

Today's various business organizations are surrounded by a changing environment, which is getting stronger, tougher and more complex day by day, so the interest in accounting information technology (AIT) came as an effective tool that is relied upon to shape the present and draw a vision for the future.

In performing their business, organizations of all sizes and activities are now dependent on the use of information technology (IT); because of the essential and important role that IT plays in helping organizations develop plans and create programs based on accurate, objective, more in-depth and comprehensive data and information, which would contribute to making sound decisions based on scientific and realistic foundations. This is in order to keep pace with the various changes and developments, which in turn enable them to survive and continue in the market and to achieve their goals.

Given the important role of information, a priority had to be given to it. The information is a required and necessary reference for decision makers to achieve the goal they aspire to achieve through their decisions taken. In the event that a decision maker makes a decision in any area without using modern and reliable information, he will lose the benefit of a fundamental and decisive factor that ensured the achievement of the desired goals. The flow of management information to the decision-maker must therefore continue to help him/her to follow the various changes and developments in his/her work and to predict and recognize the expected deviations in a timely manner in order to take the necessary decision. The reasons for the weakness of some administrative decisions are often due to the inaccuracy of their timing and not due to the incorrectness of their information. Shidaifat & Al-Jaraidah (2003, p. 10) see that the role of information is similar to that of the nervous system in the human body as the control center for all functions and activities of the human body. The amount of success in reaching the desired goals has become linked to the efficiency and effectiveness of the information available as an essential and indispensable aspect.

The decision-making process is the heart of management and the centerpiece of the administrative process. The success or failure of any organization is largely related to the reasonableness and rationality of decisions taken by the relevant department officials, especially since the decision-

making process faces some difficulties because it takes place in a complex and highly changing and evolving environment.

This research also emphasizes that further attention should be paid to AIT because of its effective role in supporting the decision-making process and obtaining sound and extremely important results.

II- Study problem

In the context of globalization, the whole world is witnessing a huge development in all fields, especially in the field of information technology. Therefore, the term "information systems" has a vital and essential role in the contemporary thought of management and information, which necessitated being familiar with it, its various features and updates (Al-Tuba' & Abdullah, 2020: p.995). The Kingdom of Saudi Arabia (KSA) keeps pace with these developments, as the various ministries of the Kingdom have proceeded to develop their work techniques and principles, relying on the tested and true scientific methods that using technology in its various forms. This is because the necessary and urgent need for the Kingdom to confront the challenges and keep abreast of developments and environmental changes, according to clear strategic plans that those concerned contribute to their implementation, since they are aware of the importance of making sound decisions based on reliable data and information.

There is no doubt that in our time, information technology has become very important. This is because it is a competitive advantage for organizations that harness the technological factor to achieve their desired goals, mission and vision. The large size of the organizations, their work complexity and interdependence required the use of computerized systems and programs to verify the accuracy and reliability of information (Mustafa, 2019: p.2). Computer systems provide their users with many facilities that will contribute to saving time, effort and money during the process of collecting and analyzing the required data and information, and then classifying it to deliver it to the concerned authorities in a clear and orderly manner, which leads to easy, timely and correct decision-making. The success of organizations depends primarily on the availability of appropriate accounting information when making the various decisions that are relevant to the achievement of the desired goals (Al-Abbasi, 2016, p. 123).

The volume of data and information collected for SDAIA's programs and applications is many and varied. Therefore, it is necessary to pay attention to these applications and follow them up continuously and permanently, and do everything that would improve their performance and raise

their efficiency and effectiveness, especially modern applications related to decision-making, such as “Tawakkalna” application.

The research problem is represented in the following main question: “*What is the impact of AIT on the effectiveness of decision-making?*”

In light of the previous main question, the study tried to answer the following important sub-questions:

1. How important is AIT in making decisions in the SDAIA?
2. Do the administrative decision-makers in the SDAIA rely on the information collected through its programs and applications?
3. What is the role of AIT on the effectiveness of decision-making in the SDAIA?

III- Research objectives

Based on the research problem and its questions, the researcher aims to achieve the following objectives:

1. To identify the importance of AIT in making decisions in the SDAIA.
2. To determine the extent to which the administrative decision-makers in the SDAIA relay on the information resulting from its programs and applications.
3. To shed light on the role of AIT on the effectiveness of decision-making in the SDAIA.

IV- Study importance

1. Theoretical Importance

Given the limited number of recent studies that deal with the impact of AIT on the effectiveness of decision-making, this study is a scientific addition, through which the researcher hopes to enrich the Saudi library and provide clear and useful information to decision-makers in various areas.

2. Applied Importance

- The KSA is facing a reality characterized by continuous development and change, which requires obtaining information in the suitable quantity to take the appropriate decisions in the right manner.

- This research coincided with the KSA's reliance on the programs and applications of the SDAIA in making some decisions in light of the information collected through them.
- It clarifies the importance of using AIT for managers, officials, decision makers and employees to keep pace with changes and developments in the environment, and deal with and manage them efficiently and effectively.
- It presents a set of important recommendations that contribute to raising the awareness of managers, officials and decision-makers, at the level of a ministry or an organization and its employees, of the importance of activating technology in the process of making various decisions in order to face obstacles and to address shortcomings and weaknesses, if any.

V- Terms used in the study

- **Information:** It is the basic resource without which humans cannot invest other resources. It is a commodity that is usually produced in a common and agreed upon form so that it can be utilized under certain conditions or to provide rich and useful stimuli for making decisions in certain functional areas (Rashid, 2016: p.7).
- **Information technology (IT):** Al-Amin study (2016: p.123) stated a number of definitions of information technology (IT), including the following:
 1. IT is the search for the best means and ways to facilitate the process of obtaining data and information for the purpose of exchanging it and making the same available to its seekers quickly and effectively as well.
 2. IT is the various systems and tools that are used to receive, store, analyze and communicate information in all its forms (verbal, digital, visual, and text) and their applications to all aspects of our lives.
- **Decision:** It is the process of choosing course of action from among a set of available alternatives whether the decision-making process is to achieve a personal goal for an individual or to achieve the goals of the organization that the decision-maker joins or manages it. In all cases, the decision-making process means choosing a specific course of action in the future (Amer & Al-Masry, 2016: p.8).

VI- Study limit and limitations

Thematic limits: This study focuses on knowing the impact of AIT on the effectiveness of decision-making.

Spatial limits: The application of this study was limited to the SADA, and its applications and programs that contribute to making important and urgent decisions.

Time limits: The application of this study was limited to the year 2022.

Study Limitations: The researcher faced the difficulty of the limited number of recent Arabic and foreign scientific articles on the subject of research.

Chapter II

The First Topic: Accounting Information Technology (AIT)

I- The concept of AIT

Information technology (IT) is electronic means of collecting, processing, storing and disseminating data/information. This technology is originally designed on the basis of digital information stored electronically in the form of ones and zeros. IT also includes computer hardware and software, and information networks (Al-Shanati, 2011: p.336).

Abu Ghoneim (2007: p.94) defined IT as "the revolution based on the link between microelectronics technology with the information industry technology and the innovations they contain that allow for the processing, storage, and rapid dissemination of large amounts of information over the network.

The system, according to the general theory of systems, is defined as "a set of interrelated parts, or sub-systems, and each part depends on the other in achieving the goals sought by the comprehensive system; or it is a set of interconnected components aiming at achieving a specific goal." Applying this to the accounting information system (AIS), we find that it consists of the following components: Inputs, processes, procedures, outputs, and feedback; and that these components are interconnected and seek to achieve a specific goal, which is the motivating force that drives the system and directs its activity. Moskov & Symke (2002: p. 24) indicated that the goals of information systems are just a reflection of the goals of the organization, and because the organization does not exist in a vacuum,

so its goals and system goals can change over time as the surrounding environment changes, but they should be specific and identifiable in each period.

II- IT components

Information technology consists of a number of components, which are as follows (Walsham & Sahay, 2006):

1. **Hardware:** It includes all the tangible components that are utilized in the use of modern technological knowledge such as the computer and its accessories.
2. **Software:** The intangible components that can be employed by the human to benefit from the process of generating modern knowledge and it include software and the communication between people.
3. **Individuals:** This component refers to the employees of administrative organizations with sufficient experience and knowledge in the generation and processing of information.
4. **Data:** This component refers to the primary information that is stored and processed in order to transfer them to valuable information.

III- The Objectives of AIT

The main objective of AIT is to provide accounting information and data to decision-makers to benefit from in the organization, and there are a number of sub-objectives (Romney & Steinbart, 2012):

1. To assess problems and issues that occur in business organizations, through the collection, tabulate and storage of accounting data.
2. To communicate accounting data to all parties who may benefit from it, through documents, reports and records so they could use them in the process of evaluating performance and in making appropriate decisions.
3. To make sure of the internal auditing and the control of all material elements in the organization.

IV- AIT's importance

The lack of knowledge and the state of uncertainty in economic activities has created the need to establish accounting information systems (AISs). The goal of these systems is to provide decision makers with the necessary information and accounting knowledge that will enable them to make a decision or reduce the amount of variation in options (Abdulsalam, 2011: p.17).

The importance of accounting information is as follows:

1. AI is very important and an effective means for Administration to accomplish its tasks and achieve its goals.
2. The reasons for the failure of many administrative decisions are the lack of sufficient and correct information to support the decision-making process.
3. Accounting information measures the values of events on a monetary basis and processes them into valuable financial information, and then delivers the information to decision makers.

V- Accounting information characteristics

Accounting information is characterized by the following (Ahmed, 2019):

1. *Relevance*

It means that the accounting information helps in evaluating past, present and future events, is relevant to the decision and affects the economic decisions of its users.

2. *Faithful representation*

To ensure the faithful representation of accounting information, it must reliably reflect the financial operations and the events that take place in the facility.

3. *Neutrality*

It means accounting information is unbiased.

4. *Comparability*

The possibility of comparing accounting information from one period to another and from one facility to another to identify strengths and weaknesses and evaluate the work of institutions, in addition to the possibility of using it in making sound decision.

5. *Timelines*

It means that accounting information is available when needed.

6. *Understandability*

It means the accounting information is understandable and its implications can be understood so that decision makers can benefit from it.

7. *Reliability*

The accounting information must be characterized by a high degree of reliability and the financial information should have the following two characteristics:

- Reviewability and verifiability.
- Able to accurately depict the content that it aims to present.

8. *Correctness and accuracy*

Accounting information must be correct and accurate because the incorrect data leads to wrong decisions.

VI- Basic considerations for accounting information to play its role effectively

For the success of the accounting information work and the fulfillment of its role and goals, the following must be taken into consideration (Al-Rifa'i et al., 2009):

1. The system must achieve a high degree of accuracy and speed in processing the financial data when converting it into accounting information.
2. The system should provide the management with the necessary information, at the right time, for decision-making and selection of suitable alternative.
3. The accounting system used should be compatible with the needs and capabilities of the organization in terms of the volume of information, its cost, and the way it is organized.
4. The system must be flexible so as to allow modification to the data without losing its value and substance.
5. The organization of work must be commensurate with the experiences of the individuals.
6. The system must be viable and effective.

VII- Accounting system advantages

1. The completion of tasks and work accurately and at high speed.
2. The accuracy in recording financial transactions.
3. The possibility of preparing documents in the shortest possible time and the ease of extracting the required data.
4. Reducing time and cost.

VIII- The factors assisting the development of accounting information

1. The scientific and technological revolution

A great information revolution has spread all over the world, it is developing, accelerating and changing, this is evident in organizations and institutions that seek to develop and obtain a competitive advantage in their area of work.

2. Economic factors

The interest in accounting information increased after the emergence of electronic commerce, multinational companies, the economics of globalization, large-sized projects with various objectives, in addition to economic conditions and suffering from inflation. The need for an adequate AIS for planning, control and decision-making purposes in order to ensure the survival and continuity of companies has also increased (Shabeer, 2006).

3. Environmental and social factors

The diversity of the activities of business institutions and the expansion of their size has led to the necessity for them to pay attention to social responsibility and provide the community with social services as a contribution to alleviating the burdens on the State, protecting the environment and achieving the goals of society. All this requires an accurate information system in order for them to express their role and achieve their desired goals.

4. Legal and legislative factors

It expresses the extent to which companies and institutions comply with legislative laws, and with applying taxes and precautions.

5. Management factors

The need for an AIS has increased due to its direct influence on management and all its functions, as it assists all management levels in the decision-making process.

The second topic: Administrative decisions

I- The concept of administrative decisions

Decision-making means the process by which the best available alternatives are chosen to solve a specific problem or face a situation that requires making a decision, after studying the expected results of each alternative and their impact on achieving the desired goals within the parameters of the organization's environment (Abdulazim, 2005: p.14).

II- The importance of decision-making

The decision-making process is the focus of the administrative process, as it is embedded in all management processes and activities such as planning, organizing, coordinating and other administrative functions. It is a very complex process because it is related to the future, which cannot be accurately predicted. It is also very necessary for senior management in organizations and is the essence of the administrative process. The more informed the decisions made leads to the success, continuity, development and survival of institutions (Shaaban & Al-Fadl, 2003).

III- Difficulties in decision-making

There are a number of challenges and difficulties facing decision-makers, including the following (Ali, 2011):

1. Difficulty of identifying and understanding the problem

This difficulty usually arises when the problem is unable to be identified and understood, especially if there is more than one problem at the same time, or when it is not possible to distinguish between the main and subsidiary causes of the problem, or when it is not possible to distinguish between the causes and symptoms of the problem. This results in the inability to address the problem effectively.

2. *Difficulty of identifying and evaluating alternatives*

The decision maker may face difficulty in identifying alternatives due to their small number, or in defining criteria to evaluate them objectively.

3. *Difficulty of obtaining the necessary data*

The decision maker often finds it difficult to obtain the necessary information in terms of quantity and type and to provide it in a timely manner.

4. *Difficulty of implementing and evaluating the decision*

Decision makers face difficulties and challenges that prevent them from implementing the decisions either partially or completely, and these difficulties may be expected or unexpected.

5. *Difficulty of time constraints*

Some problems need quick decisions and to be addressed immediately, as there is no time for decision-makers.

IV- The stages of decision-making

The decision-making process is the process of differentiation between alternatives, that is, the process of selecting the best alternative, and it passes through a number of stages. These stages are as follows (Sabsabi, 2011):

1. *Identifying the problem*

The most important step in the decision-making process is to identify the problem accurately, and this is done by asking many questions, considering the existing institutional reality and identifying the factors that led to the inability to achieve the goals. The availability of an integrated information system helps to facilitate identification and definition of the problem.

2. *Identifying alternatives*

Identifying alternatives means finding different ways to come up with solutions to a problem.

3. *Assessing alternatives*

In this step, the negative and positive aspects of each alternative are clarified and a comparison is made between them in terms of achieving the desired goals, the costs associated with each alternative are determined, and then the best alternative that achieves the organization's goals is selected.

4. *Decision taking*

Beginning to implement the best selected alternative.

V- **AIT's role in Rationalizing administrative decision**

- The AIS is the means by which information is provided, analyzed, stored and communicated to the decision maker. Without it, it is difficult for the manager or individuals to make sound and effective decisions. The narrow distance between the information and the decision makers increases the efficiency and effectiveness of decision-making (Baghi, 2010).
- Accounting information is characterized as being quantitative and verifiable, so it is very effective in the decision-making process (Al-Badawi, 1987).
- Accounting information has an important and effective role in managing the functions of the organization, such as planning, implementation, control, and rationalizing the decision-making process. Through the planning function, the accounting information provides the planning budgets and it provides the necessary information on the extent and efficiency of the implementation of these plans, and then the control function operates through comparing the budget data with the actual performance data and evaluating and addressing deviations and problems (Ahmed, 2006).
- The accuracy of the decisions taken is strongly impacted by the quality of the accounting information used for these decisions, and this quality contributes to raising the level of knowledge and reducing the state of uncertainty (Shabeer, 2006).

The third topic: previous studies

Brobah (2020) study, which aimed at identifying the computerized information system and its vital role in making financial decisions, in addition to educating organizations about the need to keep pace with technological change that contributes effectively to the development of information systems and to making decisions accurately, objectively and quickly. The research relied on the descriptive analytical approach. It concluded that the use of a computerized information system that in line with technological novelties and developments in organizations has clear positive repercussions on the employee's performance and thus the performance of the organization as a whole in order to make sound decisions accurately and effectively, and requires redoubling efforts to create an appropriate environment within the organizations.

Khirmeet study (2020), which aimed at knowing the reality of the use of electronic information systems (EIS) and its role in administrative decision-making. The researcher relied on the questionnaire as a tool for collecting data from the sample, which was (65) individuals. The nature of the research necessitated the use of the descriptive approach as the appropriate method for achieving the objectives of the study. The study resulted in a set of results, the most important of which is that the level of using EIS in administrative decision-making and the level of appropriateness of information was with an arithmetic mean of 3.3, i.e. it falls within the option “agree to some extent”, and the gap between reality and hope was wide, as it was 34.08. Kharmeet study also reached many recommendations, the most important of which are:

- ✓ Having an information system helps to increase confidence in the decisions made because it provides the concerned persons with clear, up-to-date, accurate information and without any error or distortion information.
- ✓ The necessity of continuously and periodically training employees to increase their skills and abilities in electronic dealing, which would reduce resistance to change, in addition to the need to raise the efficiency and increase the experience of programmers, operators, communication network technicians and database administrators.
- ✓ The importance of having a tight security system to protect databases from unauthorized access.

Another study is the study of Al-Alwan & Ziyadat (2020) entitled "The Impact of Management Information Systems (MIS) on the quality of management decision making from the viewpoint of decision makers in Jordanian banks", which aimed to identify the impact of MIS (application requirements, reduction of organizational constraints, and support decision) on the quality of administrative decision-making process (diagnosis of the problem, finding alternative solutions, implementation and follow-up of the decision, and evaluation of results) in Jordanian banks from the viewpoint of decision-makers. The study used the survey analytical method. The study population consisted of managers of Jordanian banks operating in Amman and its branches. The sample size was 260 managers of branches of the working banks in Amman. The study reached several results that: the requirements of applying MIS and the role of MIS in reducing organizational constraints in Jordanian banks were met with a moderate degree, from the viewpoint of the managers; the role of management information systems in decision support in Jordanian banks was with a high degree. Its results also indicated that there is an impact of MIS (application requirements, decision support, and

reduction of organizational constraints) on the quality of the administrative decision making industry (diagnosis of the problem, finding alternative solutions, implementation and follow-up of the decision, and evaluation of results), at the ($\alpha \leq 0.05$) level in Jordanian banks from the viewpoint of the decision-makers. The study recommended intensifying training courses for decision makers in order to keep abreast of developments in MIS and conducting studies to identify the obstacles of applying MIS in Jordanian banks.

Al-Omari & Bilal (2019) conducted a study entitled "The impact of the characteristics of accounting information on the quality of decision-making". It aimed at identifying the effect of the characteristics of accounting information on the quality of decision-making in industrial companies in the Governorate of Dhofar. The study population consists of the highest administrative levels in industrial companies. The sample was 55 administrators in three companies working in the fields of cement, dairy and foodstuffs. The study concluded that there is a statistically significant effect of the comparability of accounting information on the quality of decision-making in the industrial companies surveyed. The study recommended the need to create an environment conducive to obtaining high quality accounting information as this information is useful in rationalizing and making decisions. It also recommended the need for industrial companies to pay attention to the requirements of users of accounting information with their various patterns by disclosing that information in quantity, type and time.

Abdulahkim & Marwan (2019) conducted a study entitled "the role of modern communication technology in improving the decision-making process from the point of view of the staff of the Directorate of Youth and Sports in the province of Khenchela". It aimed at knowing the correlation between communication technology and decision-making process from the viewpoint of the employees of the Directorate of Youth and Sports in the province of Khenchela. The study sample consisted of 30 employees. The descriptive method was used. The questionnaire was used as a research tool. The study found a strong correlation between the communication technology techniques used and the decision-making process among the employees of the Directorate of Youth and Sports in the province of Khenchela.

Mohammed & Sherif study (2019), which dealt with the effect of information technology on the quality of accounting information and investment decision-making. A set of results were reached, the most important of which are: The use of information technology in the accounting field has a positive effect on the quality of reports, which contributes to making investment decisions and aids the

accountant to store, process, and retrieve a huge amount of data and information easily and quickly.

The main recommendations were:

- ✓ The accountant in private and governmental organizations should keep pace with developments and changes in all fields, especially in terms of using information technology tools and equipment, as it has become an inevitable reality due to rapid developments.
- ✓ The researchers also recommend that new courses should be developed to teach the use of information technology because of its great importance.

Another study is Al-Shurman & Mashaqbeh (2017) study, which sought to investigate the extent to which heads of academic departments at Yarmouk University could use information technology and its relationship to the effectiveness of decision-making. The researchers relied on the questionnaire as a tool for collecting data from the sample, which was (52) individuals. The nature of the research necessitated the use of the descriptive survey method, as it was considered to be the most appropriate approach to achieve the objectives of the study. The study reached a set of results, the most important of which are:

- ✓ There was a positive and direct correlation between department heads' use of information technology and the effectiveness of their decision-making.
- ✓ The degree of using information technology among department heads was high.
- ✓ There were no statistically significant differences in the use of information technology due to the study variables (years of experience, age, the college).

Sawaig study (2017) highlighted the importance of information technology and its impact on decision-making within organizations. In this study the researcher used interviews to collect data from the sample, which was (60) individuals, chosen non-randomly (intentionally), with the aim to target respondents with specific characteristics. The nature of the research necessitated the adoption of the descriptive approach. The results of this study showed the importance of the technology in the speed of obtaining, selecting, processing, storing and timely retrieval of information, which led to the speed of decision-making as a result of the availability of a set of good options and alternatives contributed to making rational decisions that benefited all.

Al-Abbasi's (2016) conducted a study that dealt with the nature of the relationship between AISs and rational administrative decisions in organizations. Its problem focused on the extent to which administrative decision-makers in organizations depend on the outputs of AISs, in addition to

identifying the role of the AIS in the rational managerial decision- making process. It relied on a number of hypothesis that support the existence of a correlation and impact relationship between the AISs and the rational decision-making process. It adopted a hypothetical model that reflects the logical relationship between the study variables. A set of results were reached, the most important of which are: The adopted AIS in the surveyed organizations have an incorporeal effective connective relationship in the rational managerial decision making process. It presented a number of recommendations and suggestions for the surveyed organizations, the most important of which is that the senior management should provide more support to the AISs because of its strong impact on the rational managerial decision making process.

The study of Abdulrahman & Tadros (2014), which aimed to identify the role of information efficiency in administrative decision-making in public Jordanian universities from the viewpoint of academic leaders. The researchers relied on a questionnaire to collect data from the sample, which was (200) individuals chosen randomly. The nature of the research necessitated the use of the descriptive approach since it is the most appropriate for the study problem. Its results showed that the role of information efficiency in administrative decision-making in public Jordanian universities from the viewpoint of the academic leaders has a significant level in all its areas and paragraphs. In light of this result, the study reached a set of recommendations, the most important of which are:

- ✓ It is necessary to work on making information available in all cases and in exceptional circumstances for the purpose of supporting decision-making of the academic leaders as needed, it is that, management information systems be linked to crisis management.
- ✓ It is necessary to work on providing modern technologies and techniques in order to disseminate information at Jordanian public universities.

What distinguishes the current study from earlier studies?

The researcher of the current study reviewed several studies related to the researched subject. She believes that this study is distinguished from all previous studies in its modernity, and that it is unique in targeting the Saudi Authority for Data and Artificial Intelligence (SDAIA). It highlighted the importance of activating AIT for making more rational and effective decisions, as it is based on accurate and real-time analyzes of the current situation. The current study agrees with previous studies in that having an information technology system is a necessity as it helps to increase confidence in

the decisions made because it provides the concerned persons with clear, up-to-date, accurate information and without any error or distortion information.

Chapter III

A sample of SDAIA's applications and its impact on rationalizing and supporting decision-making in the KSA

Introduction

This chapter deals with the practical aspect of the role of accounting information technology in promoting and rationalizing decision-making in the KSA. The Saudi Data and Artificial Intelligence Authority (SDAIA), a quasi-governmental and support agency in the KSA, was chosen to be the subject for its initiatives included in "decision support", including the "Operations Center to Support Security and Health Authorities", in addition to its initiative to create applications (such as the Tawakkalna, Tabaud, Boroog...etc.) to support Saudi government's efforts aimed at rationalizing decision-making, preserving the health and safety of citizens and residents on the territory of the KSA, and creating a healthy and safe environment for society.

I- About SDAIA

In 2019, SDAIA was established to lead ambitious and purposeful programs of work in the field of data and artificial intelligence AI in the KSA. The authority aspires to transform the economy of the KSA into a world-leading data-driven economy by 2030. SDAIA operates based on strategic plans consisting of a vision, mission and goals. Its vision is to position KSA as a global leader in the elite league of data-driven economies. As for its mission, it is to unlock the potential value of data as a national asset to realize Vision 2030's aspirations by setting the national data and AI strategy and supervising its execution through data governance, providing data-related capabilities and foresight capabilities, and enhancing them with continuous innovation in the field of AI. Its objectives stem from the authority's regulation of the data sector and the promotion of creativity and innovation through the Office of the National Center for Artificial Intelligence, the National Data Administration and the National Information Center (SDAIA, 2021). Its objectives stem from its commitment to regulate data sector and promote innovation through the Office of the National Center for Artificial Intelligence, the National Data Administration and the National Information Center (SDAIA, 2021).

II- The collection of SDAIA's information and data and its impact on rationalizing decision-making in the KSA

The information was collected through the official website of SDAIA, which is a scientific and more credible method, as the information is from the primary source.

III- SDAIA's routes in supporting and rationalizing decision-making in the KSA

The nature and composition of the political system directly affect the decision-making process. This is because this process is affected by the extent of restrictions imposed by politics on the freedom and direction of leadership decisions to be in harmony with the political system. The effectiveness of decision-making is also affected by the economic system, as decisions must be consistent with the economic trend adopted in the country (Kanaan, 2011). Accordingly, SDAIA included many routes, which are as follows (Cydia, 2021):

1. **Strategic route:** Its strategic path is in line with the public interest in that it achieves justice and provides an opportunity for all segments of society to achieve their goals. It is characterized by the objectivity of decision-making by applying scientific criteria and methods that ensure the selection of the best alternatives away from subjective and personal influences. SDAIA is one of the world's leading organizations. It has developed the National Strategy for Data and Artificial Intelligence, which called (NSDAI). The NSDAI strategy is based on 6 main dimensions set with the word (ASPIRE). This strategy can be achieved through its strategic goals, which are as follows (SDAIA, 2021):
 - **Ambition:** through consolidating the KSA's position as a global center, enabling the availability of best data and artificial intelligence technologies through global agreements and partnerships, the progress in the global index of AI, support for start-ups and business incubators, the establishment of an investment authority for global cooperation, harnessing AI for the development of developing countries, the progress in the IMD Smart Cities Index, deepening KSA's international presence, and holding the Global Artificial Intelligence Summit.
 - **Skills:** Building a steady local supply of skills by developing the Kingdom's workforce in the field of data and AI. The KSA has advanced in the global index of AI, being the 1st in the Arab world and 22nd globally. It also ranked ninth in the world in the operational

environment, and the second place globally in the governmental strategy criterion. In addition, SDAIA has conducted many competitions, such as the Homathon competition, which was held at the beginning of the Corona pandemic. This competition aimed at providing technical solutions to meet the challenges facing individuals, societies, and the economy and government performance. More than ten thousand participants from more than fifty nationalities around the world participated in it and it has produced more than a thousand innovative projects. In addition, the Artificial Intelligence Artathon, which is one of the initiatives of the World Artificial Intelligence Summit in Riyadh in 2020, is a global challenge competition characterized by the creation of artworks using artificial intelligence techniques. More than two thousand registered and more than 300 participants participated in this competition, and it has produced more than one hundred innovative projects and ten qualified artworks.

- **Policies and regulations:** Enacting the most welcoming policies and legalization for data and AI talents and businesses, these policies include: data classification policy, open data policy, data sharing policy, personal data protection policy and freedom of information policy.
- **Investment:** Attract effective stable funding for qualified data and AI investment opportunities.
- **Research and innovation:** Empowering top data and AI research institutions to spearhead innovation and impact creation. In addition, it highlighted the role of data and artificial intelligence technologies in managing health crises. It also contributed a number of knowledge publications, six publications, including "Global experiences in the use of data and artificial intelligence to confront the emerging corona virus", which included more than 190 initiatives and more than 19 countries and reviewed the positive and negative effects caused by the pandemic on the data and artificial intelligence system, including regulatory policies, and on research and the development for startups; in addition to "The dictionary of data and artificial intelligence" which helps in enriching Arabic content, spreading awareness, standardizing concepts and facilitating access to information needed by researchers, practitioners and media professionals, it included more than 300 terms with their definitions in both Arabic and English arranged alphabetically. Its research and innovation, "Innovation in Vision 2030" and "Comparing the Kingdom's performance with the performance of other countries and comparing the Kingdom with its best

performance", contributed to the KSA's position in the Global Competitiveness Index and the Global Innovation Index.

- **Ecosystem:** Stimulate data and AI adoption with the most cooperative ecosystem.
- 2. **The operational route:** Technological progress played an important role in the effectiveness of the decision through data collection, storage, preservation, analysis of data and its interconnection accurately, and finding appropriate solutions to problems and their impact on decision-making (Kanaan, 2011). The operational path included many initiatives in technological progress, as follows (SDAIA, 2021):
 - **National Information Bank:** It builds a reliable National Data Warehouse, provides data to government agencies, and develops a central index of national data. In addition, it contained more than 140 data sets and more than 8 billion joint operations.
 - **Governmental Cloud "Deem":** It included more than 130 data centers and more than 30 cloud services to provide technical assets to all governmental and semi-governmental entities with safety and flexibility. Its objectives include ease of integration with government agencies, rationalization of government spending and financial savings.
 - **Estishraf:** It included more than 47 billion riyals of savings and revenue opportunities and more than 50 forward-looking economic scenarios to provide decision-makers in the KSA with insights and predictions using data and AI. It aims to support the programs of Vision 2030 and to understand the impact of some economic policies, as well as to contribute to the development of national capabilities and keep pace with the requirements of the labor market.
 - **Bayan Store:** It included more than 2,600 fields to enable entities in the government and private sectors to benefit from the National Data Bank. Among its goals are to provide high quality data, reduce data falsification, reduce errors, and protect the privacy of individuals.
 - **Absher for individuals, Absher for business, and Absher for government:** It included more than 18 million documented customers and more than 175 electronic services, and it is a pioneering national platform in completing services and providing them to all segments of society. It aims to raise the level of quality of life and raise the level of information security.

- **National Single Sign-on:** It is a national platform to verify the identities of individuals. Its objectives included reducing operational costs for technical support centers, and facilitating user access to services and supporting the digital economy.
- **Efaa:** It is a platform that aims at enabling citizens, residents, visitors, and business owners to know and view all their violations issued by government entities against them and pay their fines. This platform aims to facilitate payment of violations, raise awareness and achieve behavioral discipline.
- **Furijat:** It is a service that enables philanthropic donors to help persons convicted in non-criminal financial cases in settling their debts. This service aims to assist individuals and entities in collecting their financial dues, provide a safe and quick way to release prisoners in financial cases. It is evident that administrative decisions are influenced by social traditions, customs and religious values, especially in Islamic countries, as this is an effective factor in persuading the masses of many decisions. It is clear and tangible through the decisions made that, this extended to government agencies and their leadership was influenced by it (Kanaan, 2011).
- **The Preparation for the Virtual G20 Leaders Summit:** More than 2 million cyber-attacks were blocked, which included 15 government and private entities linked to a joint operations center and 80 tested global touch points.
- **EYAB:** It included more than 16 thousand beneficiaries, and it is a service to facilitate check-in departure procedures for the pilgrims, registering their departure and completing all procedures related to the transportation and shipping of their luggage automatically before arriving at the airport.
- **Tmaluk:** It is an electronic platform that facilitates the procedures for residents' application for owning real estate in the KSA in order to attract foreign investments and create an attractive environment for foreign talent and save effort and time.
- **Premium Residency Center:** It contributes to increasing the country's non-oil resources and enabling government agencies to provide customized services. It also contributes to facilitating access to services and the full integration with all security systems.
- **Financial investigations Platform:** It is an electronic platform that helps improve the monitoring, follow-up and analysis of financial investigations, as the KSA has obtained membership in the Financial Action Task Force (FATF).

- **National Alerts Platform:** It includes more than 500 content templates, more than 85 beneficiaries, and more than 280,000 daily alerts. It aims to provide a direct and reliable communication service for alerts and notifications, in an easy and available way that saves costs and facilitates access to users.
3. **The legislative route:** The following five Data & AI policies have been developed:
- **Data classification policy:** It is to protect the confidentiality of national data and classify it into four levels.
 - **The open data policy:** It is to provide unprotected open data and information to all beneficiaries.
 - **Data Sharing Policy:** It is to enhance sharing and obtaining of data from its sources to achieve integration between government agencies.
 - **Freedom of Information Policy:** It is to regulate beneficiaries' accessing public information and/or obtaining it from government agencies.
 - **Personal Data Protection Policy:** It is to regulate the process of collecting and processing personal data and to preserve the digital national sovereignty.
4. **Innovation Route:** It included several projects, among which are:
- **King Salman AI Oasis Project:** It is the first national project concerned with AI applications, which included more than 15 AI applications.
 - **NEOM Challenge:** It included more than 100 innovative projects, five hundred thousand Saudi riyals were spent on it, and 39 universities participated in it.

IV- SDAIA's response to the Corona pandemic in support of decision-making

The decision-making process is affected by rapid and sudden changes in the regulations and laws issued by the State (Kanaan, 2011). SDAIA has demonstrated its success in decision-making by building the Operations Center to Support Security and Health, assisting leaders and decision-makers in taking appropriate measures, providing accurate and real-time analyzes, with anticipation of future damage and numbers of injured. Especially since this decision is one of the complex decisions as it involves multiple legal aspects and is not independent in itself, as it is closely linked to other administrative work and was implemented in stages (Kanaan, 2011). This decision is classified as an organizational decision, as it includes many general rules applicable to an unlimited number of individuals. Such decisions are also characterized by relative continuity, as they do not exhaust their

purpose by applying them to one case, but rather they remain applicable to new cases (Kanaan, 2011). The Corona pandemic crisis is considered one of the problems that the whole world has been exposed to, and it is classified as one of the strategic problems, as it is the responsibility of the top management to consider it and find solutions to it. It is also one of the problems that cannot be postponed, as it is an emerging problem that requires the decision-maker to decide on it as soon as possible. It is also a non-programmed, complex and unclear problem, as the decision maker does not have enough information to solve it. In addition, it is one of the qualitative problems on which decision-making depends heavily on the decision maker's experience due to the lack of quantitative information about the pandemic, as it is in its early stage. As is notable, its solution needs stages, as we will see in SDAIA's response to contain the pandemic by designing mobile applications as follows (SDAIA, 2021):

- **Tawakkalna Application:** The Saudi Ministry of Interior, in cooperation with SDAYA, launched the Tawakkalna application in May, 2021. This application aims to aid in the management of granting permits automatically during the curfew period for employees of government sectors, the private sectors, as well as individuals, in cooperation with the Ministry of Health and a number of government agencies, which helped reduce the spread of the Corona virus. The application has issued 27 million permits, and it has more than 9 million users and is connected to more than 15 government agencies. During the lifting of lockdown measures and the stage of 'cautious return', the application launched several new services, such as clarifying the health status of its users through colored codes with the highest level of security and privacy in order to achieve 'a safe return'. In addition, since confronting the pandemic requires efforts from society and the state, SDAIA launched another feature of Tawakkalna, "Tawakkalna For Individuals", as a contribution to reporting gatherings and individuals violating the precautionary measures related to the Corona epidemic. The decision to launch "Tawakkalna" is considered one of the decisions affecting individuals, as it is binding and obligatory regarding the rights of individuals, and being invoked against them (Kanaan, 2011).

V- Tawakkalna services during the phase of 'Cautiously We Return' and its impact on the effectiveness of decision-making in the KSA

Tawakkalna has provided many services based on the rational decisions of the government in the KSA to limit the spread of the Covid-19 virus, the most prominent of which are (Sdaya, 2021):

- ✓ ***Covid-19 vaccine***: It is a service that enables the user to book Covid-19 vaccine appointment after confirming their eligibility.
- ✓ ***Power of Attorney Preview***: It is a service that enables users to preview their power of attorney registered in the Ministry of Justice's system.
- ✓ ***Deeds Preview***: It is a service that enables users to preview their deeds registered in the Ministry of Justice's system.
- ✓ ***National Address***: It is a service that allows users to add, update, and print their Saudi Post registered national address.
- ✓ ***Health Passport***: It is a service confirming that the user has taken all doses of COVID-19 vaccine and is now "immune".
- ✓ ***Digital Portfolio***: It is a service that allows users to preview their official documents; National ID, Residence Permit and Driving License digitally.
- ✓ ***Previewing Civil Affairs & Passports Appointments***: This service allows users to preview their Civil Affairs and Passports appointments.
- ✓ ***Previewing Public Violations***: This service allows users to preview their violations that are related to: Public Security, Ministry of Human Resources and Social Development, Ministry of Municipal and Rural Affairs, Ministry of Housing, Ministry of Tourism, General Organization for Social Insurance that are under his ID number, as well as previewing the details for each violation.
- ✓ ***Sharing Health Condition Cards***: It is a service that allows guardians to share their dependents' Health Condition Card with other users.
- ✓ ***Preview Your Judicial Bodies Appointments***: This service allows users to preview their judicial authorities' appointments that are related to their ID number, as well as appointment details.
- ✓ ***Previewing Umrah Permit***: It is a service linked with Eatmarna app to view the Umrah permit on Tawakkalna, the permit will be automatically cancelled if the Umrah pilgrim's health condition changes, ensuring a safe Umrah to all.
- ✓ ***Children Educational Status***: It is a service that allows parents to view their children's educational status details on the Tawakkalna screens.

- ✓ **Caution Mode Service:** This service enables users to view the health status of those in crowded places. To activate "Caution Mode", Bluetooth must be turned on. The user gets notified when there is an infected or exposed person around.

VI- The importance of Tawakkalna's strategic role in supporting decision makers

The decision to launch “Tawakalna” is considered a strategic decision, as it is related to the administrative organization's entity, its future and environment. It is related to vital and serious problems and requires the use of opinions, proposals, experiences and the involvement of all parties concerned to ensure the proper implementation of decisions (Kanaan, 2011). The Tawakkalna application works based on the surrounding changes with a view to keep pace with the times and ensure the health of society and rationalize decision-making related to preserving the health of citizens and limiting the spread of the virus. The strategy of the Tawakkalna is based on shedding light on the health of the community and limiting the spread of the virus, and it goes in two directions. The first is the safety of citizens’ health by facilitating their service and maintaining their safety through the services it provides, such as **"Request movement permits electronically"** for requesting necessary supplies during the curfew period through the application, so that supply applications are processed automatically. The second is the provision of services related to the security of citizens and residents, as the application allows reporting gatherings violating the precautionary measures and exposed persons to the responsible authorities to help the citizen receive health services (SDAIA, 2021).

- **Tabaud Application:** "Tabaud" is a Mobile Application to notify those who are in contact with people infected with coronavirus. The KSA ranked the third globally to launch an application that uses the technologies of Apple and Google in relation to the response to the Corona pandemic. This application included 22 languages supported by the application and more than 30,000 reported their infection (SDAIA, 2021).
- **Boroog application:** It is a visual and secure communication platform to allow the holding of high-importance meetings remotely. More than 1500 virtual meetings were held through this platform, including meetings of the Council of Ministers, the Shura Council and the Group of Twenty Summit (Sdaya, 2021).

VII- SDAIA's response to the Corona pandemic and business continuity

The Precautionary Committee was formed, which is a special committee to manage and follow up the internal precautionary measures. Among its most important objectives (SDAIA, 2021):

- Preserving the safety of SDAIA's employees.
- Enhancing the culture and spirit of responsibility among all its employees.
- Achieving business continuity during the pandemic crisis.
- Building capabilities in data and AI. This included more than 70 training courses and 1500 training places.

Conclusion

Based on the above, it can be said that SDAIA played an important and key role, especially during the Corona pandemic, by using accounting information technology because of its clear positive effects on the effectiveness of decision-making. SDAIA seeks to translate the aspirations in its vision, mission, plans and programs into a tangible reality through targeting citizens and others who are impacted by the decision-making process, with view to serving decision-makers and guide them towards choosing the best alternatives to limit the spread of the virus, and to achieving the Saudi vision 2030 goals "An ambitious state, a vibrant society, and a thriving economy". Mary Follett emphasized that the role of followers in the decision-making process appears to be very important. The role and influence of the followers are more clear in the early stages of the decision-making process, i.e. the stage of defining the problem, collecting adequate information for providing it to the managers (officials/leaders), in addition to their important role in the implementation stage of the decision, as their cooperation and conviction in the solution has an effective impact on its implementation. This is evidenced by their interaction with the Tawakkalna application, which was launched by the Saudi MoI in cooperation with the SDAIA on March 24th 2021, that, by reporting gatherings and individuals violating the precautionary measures, committing to obtaining permits to move during the imposed curfew period, booking their appointments for Corona vaccines after confirming their eligibility, and activating the "Caution Mode" to know the health status of those around. All of these measures contributed to their implementation by subordinates (citizens), which resulted in limiting the spread of the Corona virus.

These implementations revealed the factors affecting the subordinates' (citizens) cooperation with managers (officials/leaders) and their participation in decision-making and implementation, the most important of which are:

1. Subordinates (citizens) do not feel safe about vaccines, so King Salman, his Crown Prince Mohammed bin Salman and some state officials began to receive the first doses of the Modern COVID-19 vaccine, to encourage citizens and reassure them that the vaccines are safe.
2. The social climate, as the more it comfortable it is, free from tensions and anxieties, the more it helps to cooperate in the implementation of the decision. This is made clear by the media's contribution to raising public morale by continuously broadcasting messages despite the spread of the virus.
3. The degree of familiarity among the individuals in a group; the extent of their capacities, experiences and skills; and the degree of their dependence on each other. These are all characteristics were clearly highlighted during the daily press conferences held by the Ministry of Health to emphasize that the Ministry is the reliable source of information on the pandemic. These conferences were a window through which the community was informed of the situation and to block any rumors, with an emphasis on coordination between different sectors.

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