

# Information Technology used and it's Impact on the Participation of Administrative Staff in Decision-Making in Palestinian Universities

Ihab Zaqout<sup>1</sup>, Samy S. Abu-Naser<sup>2</sup>, Suliman A. El Talla<sup>3</sup>, Mazen J. Al Shobaki<sup>4</sup>

Department of Information Technology,  
Faculty of Engineering and Information Technology,  
Al-Azhar University, Gaza, Palestine

<sup>1</sup>i.zaqout@alazhar.edu.ps<sup>2</sup>abunaser@Al-Azhar.edu.ps, <sup>3</sup>Eltallasuliman@gmail.com, <sup>4</sup>mazen.alshobaki@gmail.com

**Abstract:** *The objective of the study is to identify the information technology used and its impact on the participation of administrative staff in decision making in Palestinian universities. A comparative study between the Islamic University and Al-Aqsa University. The study community consists of administrative staff in the Palestinian universities under study: the Islamic University and Al-Aqsa University. In order to achieve the objectives of the study, the researchers used the descriptive analytical method in which they try to describe the phenomenon of the study, analyzing its data; the researchers used the stratified random sample method in the study. The study was conducted on a sample of (191) administrative staff from Al-Aqsa University and Islamic University. The response rate was 86.43%.*

*The study reached a number of results, the most important of which is that there is a high degree of the level of information technology used in the Palestinian universities in Gaza Strip from the point of view of the administrative staff, where the percentage (74.72%). There was an average level of participation of decision-makers from the point of view of administrative staff, with a percentage of (64.99%). There is a direct correlation between the information technology used and the participation of decision makers, a statistically significant impact of the technology used on the length of participation of decision makers, the absence of differences between the sample according to the gender variable in the information technology used and the participation of decision makers, the absence of differences in the perception of information technology Employees used and participation of decision-making Employees depending on the age variable. There are differences of statistical significance in the perception of information technology used and the participation of decision-making staff according to the variable of scientific qualification and the existence of differences in the perception of information technology Employees used according to the variable years of service, and there were no differences in participation of decision-making staff depending on the years of service.*

*The study reached a number of recommendations, the most important of which is that the interest of the departments of the Palestinian universities in the Gaza Strip in general, and Al-Aqsa and Islamic universities in particular, should be increased, and to give universities the opportunity to participate in decision-making.*

**Keywords:** Information Technology, Decision Making, Administrative Staff, Palestinian Universities, Palestine.

## 1. INTRODUCTION

Perhaps the technological revolution that has been described as the greatest manifestation has made technology and information systems two elements of success in a globalizing world and the rapid exchange of information. As a result of the depth of this development and its speed in the information technology world entered the age of the information society, Information and informatics The raw material of any human activity, we find most of the developed world racing among themselves to develop strategies and plans for the development of information technology and this is accompanied by the emergence and spread of computers, which became an imperative need The institutions have a strong advantage in processing and storing a large amount of information in a systematic, fast and accurate manner in addition to the development of communication devices and satellites, so the researcher was able to determine the source of the information to reach and re-form to invest in his research, and the importance of information and technology has the greatest impact in the emergence of the word Informatics and other terms such as

information science and information technology, which examine all functions and information technologies and their contributions to research, management, economics and science in general (Al Shobaki et al., 2017), (El Talla et al., 2018), (Abu-Naser et al., 2018) and (Abu Amuna et al., 2018).

The impact of this development has been reflected in the life of organizations of all kinds. The development of active organizations requires that they use the various requirements and mechanisms for the conduct of their business, especially the administrative process and information technology (Al-Ani and Jawad, 2008). These decisions, as a result of scientific progress and technological development in information based on the areas of life, led to an increase in the need for this information so that it became the vital artery that feeds the information management process, which is constantly changing and growing rapidly (Burhan, 1984). Information is the main resource in the conduct of the organizations' work, as well as decision-making. This process is based on the organization of an internal survey in light of the alternatives available to it. Most of the behaviors

of public organizations of all kinds are the result of decision making (Al-Ani and Jawad, 2008). Information technology, especially after using computer networks, can help organizations of all kinds by reducing costs, and this technology has opened the horizons for organizations to search for diverse sources (internal and external) (El Talla et al., 2017), (Abu-Naser et al., 2016) and (Abu Amuna et al., 2017).

There is a growing interest in the study of the subject of information technology used by university staff to increase the sense of the importance and prestige of the Employees in determining the future of their universities, as well as the impact they have on the development of the reality and objectives of these universities and universities is a good example of organizations that need to improve the performance of their employees so that they can function. The aim of this study is to evaluate the impact of information technology on the participation of administrative staff in decision-making in Palestinian universities - a comparative study between the Islamic University and Al-Aqsa University.

## 2. PROBLEM STATEMENT

This research seeks to identify the information technology used and its impact on the participation of administrative staff in decision making in Palestinian universities - a comparative study between the Islamic University and Al-Aqsa University.

**The problem of the study was to answer the following questions:**

**Q1-:** what is the level of information technology used in Palestinian universities?

**Q2-:** What is the level of participation of decision-makers in Palestinian universities?

**Q3-:** Is there an impact of the technology used to participate in decision-making in Palestinian universities?

## 3. RESEARCH OBJECTIVES

This study aims to achieve the following objectives:

1. To shed light on the nature of information technology used in Palestinian universities.
2. Identify the level of participation of university staff in decision-making.
3. Analysis of the relationship between the nature of the information technology used and the participation of decision makers.
4. Identifying the impact of information technology on the participation of decision-making personnel in Palestinian universities
5. Identify the differences in the nature of information technology used and the participation of decision makers according to demographic characteristics (gender, age, scientific qualification).
6. Identify the differences in the nature of information technology used and participation of decision-making

staff according to functional characteristics (years of service - career level).

7. Identify differences in the nature of information technology used and participation of decision-making staff between the Islamic University and Al-Aqsa University.
8. Providing suggestions and recommendations that help the management of Palestinian universities and all departments working in the field of education to improve and upgrade the information technology used and participation of decision-making personnel.

## 4. RESEARCH IMPORTANCE

The importance of the study is shown by the benefit that will be given to:

1. That it may help decision-makers and human resources managers in Palestinian universities in the Gaza Strip to identify the dimensions of the relationship between the information technology used and participation of decision-makers.
2. In addition to this vital area of research, one of the important areas that dealt with the concept of participation of decision-makers, and their need for development at the present time as a result of the enormous developments in different fields, and the need of human resources organizations that help solve the problems they face Achieve its objectives.
3. It addressed an important subject of organizational behavior and its vital role in influencing many other variables within the organization that are relevant to individuals.
4. Because universities are affected by the quality and effectiveness of their human resources, and an important part of these resources is administrative staff, so more attention should be paid to them so that they can achieve their goals and objectives.

## 5. RESEARCH HYPOTHESIS

In order to provide an appropriate answer to the questions posed, and the study seeks to test the validity of the following assumptions:

**Ho 1:** There is an impact of the technology used on the participation of decision-makers in Palestinian universities.

**Ho 2:** There are differences in the nature of information technology used and the extent of participation of decision-makers in accordance with demographic and organizational variables.

**The second hypothesis is based on a set of sub-hypotheses:**

**Ho 2-1:** There are differences in the nature of the technology used. The participation of decision-makers according to demographic variables (gender, age, qualification).

**The first sub-hypothesis is based on a set of sub-hypotheses:**

1. There are differences in the nature of information technology used and the extent of participation of decision-makers in relation to the gender variable.
2. There are differences in the nature of information technology used and the extent of participation of decision-making personnel depending on the age variable.
3. There are differences in the nature of information technology used and the extent of participation of decision makers according to the variable of scientific qualification.

**Ho 2-2:** There are differences in the nature of the technology used. The participation of decision makers according to the organizational variables (years of service - career level).

**The second hypothesis is based on a set of sub-hypotheses:**

1. There are differences in the nature of information technology used and the extent of participation of decision-making staff due to variable years of service.
2. There are differences in the nature of information technology used and the extent of participation of decision-making staff due to the variable level of employment.

**Ho 2-3:** There are differences in the nature of information technology used and the extent of participation of decision-making staff between the Islamic University and Al-Aqsa University.

## 6. RESEARCH VARIABLES

- **Independent variables:** Information technology used.
- **The dependent variable:** participation of decision makers.
- **Demographic and organizational variables** (gender, age, academic qualification, years of service, job level, workplace, university).

## 7. RESEARCH LIMITS AND SCOPE

1. **Objective Limitations:** the aim of the study is to identify the information technology used and its impact on the participation of administrative staff in decision making in Palestinian universities. A comparative study between the Islamic University and Al-Aqsa University.
2. **Human Limit:** This study is limited to the responses of administrative staff.
3. **Institutional Limit:** The study was conducted on the two universities (Islamic, Al-Aqsa)
4. **Time Limits:** This study was implemented at the beginning of 2018 and therefore represents the reality at this time.

## 8. LITERATURE REVIEW

Study of (Ahmed et al., 2018) aimed to examine the Information Technology used and its effect on the nature of the work of the administrators at Al-Azhar University in Gaza. The researchers used the analytical descriptive method through a questionnaire randomly distributed among the

employees of Al-Azhar University in Gaza. The study was conducted on a sample of 77 employees the response rate was 92.20%. The study reached a number of results, the most important of which is that there is a high degree of Information Technology Used at Al-Azhar University- Gaza from the point of view of the administrative staff, where the percentage (74.14%). And that there is a high level of the prevailing the Nature of Administrators Work from the point of view of administrative staff, where the percentage (72.14%), there is a direct correlation between the Information Technology Used and the Nature of Administrators Work, there is a statistically significant effect of the Information Technology Used on the Nature of Administrators Work at the university, the absence of differences between the sample according to the variable (gender and variable age) in their perception of the Information Technology Used and the Nature of Administrators Work, there are differences of statistical Sig. in the perception depending on the variable of scientific qualification in Field of the Nature of Administrators Work, while there were no differences in Field: technology used, the differences in the Nature of Administrators Work according to the scientific qualification were in favor of those who obtained the diploma degree compared to postgraduate studies, the absence of differences in the perception of employees of the Information Technology Used and the Nature of Administrators Work according to the variable years of service, and the variable level of employment (manager, head of department, administrative officer), and the change of the workplace.

Study of (FarajAllah et al., 2018) aimed to know the relationship between the nature of the work and the type of communication among the Employees in the Palestinian universities. A comparative study between Al-Azhar University and Al-Aqsa University. The researchers used the analytical descriptive method through a questionnaire that is randomly distributed among the employees of Al-Azhar and Al-Aqsa universities in Gaza Strip. The study was conducted on a sample of (176) administrative employees from the surveyed universities. The response rate was (85.79%). The study reached a number of results, the most important of which is that there is a high degree of satisfaction with the nature of work prevailing in the Palestinian universities in Gaza Strip from the point of view of the administrative staff, where the percentage was (68.15%). There is a Mean level of communication from the point of view of administrative staff, with a percentage of (67.50%). There is a direct correlation between the nature of the work and the prevailing pattern of communication. There is an absence of differences between the sample according to the gender variable in their perception of the nature of work and the prevailing pattern of communication. There is an absence of differences in the perception of Employees nature of work and the pattern of communication prevailing depending on the variables (age, years of service, job level, and university). There are statistically significant differences between Al-Azhar

University and Al-Aqsa University in favor of Al-Azhar University.

Study of (Madi et al., 2018) aimed to identify The Organizational Structure and its impact on the pattern of leadership in the Palestinian university in Gaza Strip. The researchers used the analytical descriptive method through a questionnaire randomly distributed among Palestinian university Employees in Gaza Strip. The study was conducted on a sample of (320) administrative staff from the three universities. The required sample calculated according to the law (274) Employees, and the response rate was (81.87%). The study found that there is a high degree of satisfaction with the nature of The Organizational Structure in the Palestinian universities in Gaza Strip from the point of view of the administrative staff, which reached (68.05%). The results showed that there was a Mean level of participation of decision-makers, with a percentage of (64.91%). There is a direct correlation between the nature of The Organizational Structure and the participation of decision makers. There is a significant impact of The Organizational Structure on the participation of decision makers. There is absence of differences between the sample according to the gender variable in their perception of the nature of The Organizational Structure and the extent of participation of decision-makers. There is absence of differences in the perception of Employees to the nature of The Organizational Structure and the participation of decision-making Employees depending on the age variable. There are statistically Sig. differences according to the variable of scientific qualification in The Organizational Structure, while there were no differences in the extent of participation of decision-making personnel. And the absence of differences in the perception of the Employees of the nature of The Organizational Structure and the participation of decision-making staff according to the variable years of service, the variable level of employment (manager, head of department, administrative officer), the variable of the workplace, and there are differences in the perception of the Employees of the nature of The Organizational Structure and the participation of decision-making personnel depending on the university in which they work in all areas. And that there are significant differences between the Islamic University and Al-Azhar University in The Organizational Structure, the extent of the participation of decision-making personnel, in favor of the Islamic University. And that there are statistically significant differences between Al-Azhar University and Al-Aqsa University in the extent of the participation of decision makers in favor of Al-Azhar University.

Study of (Almasri et al., 2018) aimed to study The Organizational Structure and its role in applying the Information Technology Used the Palestinian universities as a comparative study between Al-Azhar and Islamic universities. The researchers used the analytical descriptive method through a questionnaire that randomly distributed among Palestinian university Employees in Gaza Strip. A

sample of (182) administrative staff from the two universities, the response rate was (81.35%). The study reached a number of results, the most important of which is that there is a high level of the Information Technology Used from the perspective of administrative staff, there is a direct correlation between The Organizational Structure and the Information Technology Used, the role and impact of The Organizational Structure in the nature of the Information Technology Used, the absence of differences between the sample according to the variable (gender and age), there are statistically significant differences in the perception of The Organizational Structure and the Information Technology Used according to the variable of scientific qualification in The Organizational Structure, while there were no differences in Field of the Information Technology Used, the differences in The Organizational Structure according to the scientific qualification were in favor of those who obtained the diploma degree compared to other practical qualifications, the absence of differences in the perception of employees The Organizational Structure and the Information Technology Used depending on the variable years of service, the differences in The Organizational Structure and technology perception depending on the job level variable (Director, Head of Section, and Administrative Officer) for the benefit of the Administrative Officer, the absence of differences in the perception of employees The Organizational Structure and the Information Technology Used depending on the workplace variable, the differences in the perception of employees The Organizational Structure and the Information Technology Used by the University working for the Islamic University.

Study of (Abu Sultan et al., 2018) aimed to identify the type of leadership and its role in determining the type of administrative communication at the Islamic University. The researchers used the method of Stratified random sampling in the study. The study was conducted on a sample of 144 administrative staff from the Islamic University of Gaza. The response rate was 77.08%. The study found that there is a high degree of satisfaction with The Style of Leadership in the Islamic University - Gaza from the point of view of the administrative staff, where the percentage reached (73.52%). There is a high degree of satisfaction with the pattern of communication prevailing in the Islamic University - Gaza from the point of view of administrative staff, where the percentage (76.52%). There is a direct correlation between The Style of Leadership and communication pattern, the role of The Style of Leadership in determining the type of administrative communication at the Islamic University-Gaza. There are no differences in the perception of Employees in the pattern of communication while there are differences in The Style of Leadership according to the age variable in favor of the lower age groups. There are no statistically significant differences in the perception of the leadership pattern according to the variable (gender, qualification) and the absence of differences in the perception of the employees of The Style of Leadership and



style of communication depending on the variable years of service, and the absence of differences in the perception of the employees of The Style of Leadership and style of communication depending on the level of career variable (manager, head of department, administrative officer).

Study of (El Talla et al., 2017) aimed to investigate the relationship between the organizational variables and job performance at Gaza strip Universities, the organizational variables included: communication style, nature of work, the technology used. And it aimed to identify the extent of differences statistically significant in employees trends toward the reality of organizational variables attributed to some characteristics of the study population. The data has been collecting using a questionnaire consisting of (50) paragraphs. The questionnaire was distributed randomly to (320) employees of the administrative staff in Gaza strip universities; (262) employees responded, and the results showed the availability of a high degree of organizational variables in Gaza Universities, the order of variables were as follows: the technology used, the nature of work, and finally communication style, and it showed a high level of job performance, in addition the results showed a significant correlation between organizational variables and job performance, and there was existence of differences in the perception of the organizational variables depending on the university, for the benefit of the Islamic university, and differences between AlAzhar University and Alaqsa University for the benefit of Al-Azhar University, as results showed no differences between the sample depending on the variables: the functional level and the workplace. Keywords: organizational variables, communication style, work nature, used technology, job performance.

Study of (El Talla, 2015) aimed to investigate the reality of the burnout among Gaza electricity distribution company Employees, which included burnout dimensions: Emotional exhaustion, Depersonalization, and Personal accomplishment. And aimed to the organizational causes of burnout, and it aimed to identify the extent of differences statistically significant trends in working toward the reality of burnout attributed to some demographic and organizational characteristics of the study population. The data has been collecting using a Maslach Burnout Inventory (MBI) consisting of (22) items. And the questionnaire of organizational causes of burnout consisting of (31) items. The questionnaires were distributed randomly to (69) worker, the results showed that the availability of a medium degree of burnout in the company, and that there is high availability of Emotional exhaustion scope, average degree for Depersonalization scope and low degree of Personal accomplishment scope. Also the results showed the existence of organizational causes for burnout among Employees with the exception of the area of social relations, which was moderately and was the order of the causes are as follows (the weakness of physical stimulation, the limited powers of the work, work stress, conflict of values, poor social relationships). The results showed no differences between

the samples due to the variables of gender, age, and years of service in their perception of burnout. The researcher recommended the company to work on treatment the causes of burnout, and increase the attention to Employees.

Study of (El Talla, 2014) aimed to investigate the reality of the organizational climate for administrator's staff at Al-Azhar University - Gaza, which included some elements of the organizational climate such as: organizational structure, leadership style and the extent of participation of Employees in decision-making. It aimed to identify the extent of differences statistically significant trends in working toward the reality of organizational climate attributed to some demographic and organizational characteristics of the study population. The data has been collecting using a questionnaire. The questionnaire was distributed at random-layer sample to (77) male and female employees of the administrative staff in the university; The results showed that the availability of a medium degree of organizational climate at the Al-Azhar University with percentage (66.64 %), and that there is availability of the average for all scopes of organizational climate, with the exception of leadership style which its degree was high.

Study of (Al-Louzi and Zahrani, 2012) aimed at identifying the factors affecting the performance of employees in the Emirate of Baha and determining the most influential in the performance of the job, as well as determining the impact of the difference of these factors according to the demographic factors of the Employees (age, type of employment), Using the comprehensive survey method. The study found a significant correlation between the independent variables combined (work environment, job communication, incentives, training, management leadership) and job performance, as well as the existence of a positive relation between a factor on one hand and job performance. The results also showed significant differences the results did not show significant differences in the effect of organizational factors on job performance due to social status and age.

A study (Jassim and Hammoud, 2011) aimed at discovering the relationship between the elements of the organizational climate and the management of the university performance through the development of a number of main hypotheses, which states that there is a relationship of significant effect for all elements of the organizational climate in the management of university performance. A sample of (50) faculty members at the University of Muthanna. The study found that there is a relationship between the organizational climate and the management of the university performance, where it was found that there is a relationship of the effect of the elements of the organizational climate in the management of the university performance except the variable participation in decision-making. While the change in leadership style has the highest level of agreement.

Study of (Al-Jassimi, 2011), which aims at trying to know the current organizational climate in the Faculty of

Management and Economics, which is one of the most important elements of the success of any organization. The following dimensions of climate (leadership, working conditions, organizational structure, Evaluation of performance, and teamwork), and study the impact of attitudes of faculty members on these areas according to sex, and the qualification of the study, and the study was conducted on (40) individuals. The study found that there is a good organizational climate, and that there are significant differences in the organizational climate according to gender and scientific qualification. It also showed a strong impact on the organizational structure.

A study of (Bahr and Abu Swirih, 2010) aimed of the study was to identify the extent of statistical differences in the attitudes of Employees towards the effect of the elements of the organizational climate on the functional performance due to the demographic characteristics of the members of the study society. The study was conducted using a questionnaire consisting of (80) items, which were distributed randomly to (215) employees and administrative staff of the university, and it was possible to collect 180 valid questionnaires for analysis. The study found that there is a positive organizational climate in the Islamic University and a strong positive relationship between the availability of a good organizational environment and the level of job performance of the Islamic University employees. There is a very good level of job performance for the employees of the Islamic University and there are no statistically significant differences in opinions of individuals the sample on the degree of influence of the elements of the organizational climate on the performance of the administrative staff is due to gender, age, scientific qualification and place of work.

Study of (Al-Saffar, 2009) The study aimed to identify the impact of the main organizational climate dimensions such as organizational structure, administrative policies, information technology, professional progress, incentives for work on performance and competitive advantage. The study was conducted on a sample of (134) employees in five banks of Jordanian commercial banks. The results showed that there is an impact of the organizational climate on the performance of employees in Jordanian commercial banks, and their ranking is descending (IT, organizational structure, administrative policies, professional progress and incentives for work).

Study of (Al-Batoush, 2007) The aim of this course is to understand the impact of the organizational climate on the performance of employees in the Jordan Free Zones Corporation, the relation of the organizational climate, and the performance of the employees with some personal characteristics and career characteristics. The study found a number of results, the most important of which were: The incentives were the first place in terms of the dimensions of the other organizational climate in the Jordan Free Zones Corporation, while the organizational structure was the lowest level, and the managers of the Free Zones Authority did not delegate the powers at the required level. Decisions

made at the Jordan Free Zones Corporation are not always made by qualified persons who are related to the subject matter of the decision. The degree of consistency of the organizational structure with the nature of the work and functions of the Jordan Free Zones Corporation is unsatisfactory, (Organizational structure, communication, human resource development) and the performance of employees in the Free Zones Corporation. There is no statistically significant effect between the organizational climate (work systems and procedures, decision making, incentives) and the performance of employees in the Free Zones Corporation, and showed the existence of differences of statistical significance in the organizational climate attributed to the job title, and for the benefit of managers and heads of departments. While there are no differences due to personal and functional characteristics (age, academic qualification, specialization, number of years of service).

Study of (Al-Shanti, 2006) Which aimed to identify the extent of the impact of the organizational climate dimensions prevailing in the ministries of the Palestinian National Authority on the performance of human resources, and the assessment of the organizational climate in these ministries as well as to identify the level of performance of human resources. The results of the study were the most important: the attitudes of the sample towards the prevailing organizational climate positive trends, the positive impact of the organizational climate prevailing in the Palestinian ministries on the performance of human resources and that this climate leads to improved performance. It also showed that there is a defect in the organizational structure of the ministries and the methods and methods of decision-making and the disproportionate nature, functions and duties of the jobs occupied by the employees with the scientific qualifications and disciplines obtained.

Study of (Al-Sakran, 2004) the aim of this study was to identify the attitudes of the security sector towards the prevailing organizational climate in this sector and the relation to their performance. One of the most important findings of this study was the high positive attitudes of SS officers towards work systems and procedures. The presence of positive trends high among the officers of the security forces towards administrative communication as one of the axes of the organizational climate affecting the improvement of the performance of the job. 3 - The existence of positive trends high among private security officers towards the axis of "employee perception of his role" as one of the axes of performance.

## **9. RELATED WORK**

### **First- Information Technology Used:**

Information technology used to refer to the amount to which modern technological approaches are used in management which give to the computerization and innovation of administrative work from period to period and the accumulation of services that assist work and creativeness (Al-Thunibat, 1999). Contemporary

technological developments are one of the greatest beneficial factors for organizational environment for the individuals and the organization. Yet, occasionally it rises various alarms, such as growing unemployment and dropping the morale of employees, but this method to technology is reflected as a disease (Hamoud, 2002). The obtainability of suitable technology has a optimistic impact on the quantity and quality of facilities and production, in addition to the lessening of time required and thus dropping the effort given away (Jad Al-rab, 2005). Technology is the introduction of change and development of the organization, which helps simplify the work procedures and often rid of the routine parts, and the muscle effort that may need, and provide more opportunity for Employees to exploit their potential and potential, but on the other hand, the increased reliance on equipment and equipment May make the organizational climate take a negative trend characterized by stagnation and inhumanity, and the human being like the machine moves in calculated steps and limited movements (Al-Nouri, 1994). However, if technology is used in a healthy way, it contributes to improved productivity (Hamoud, 2002):

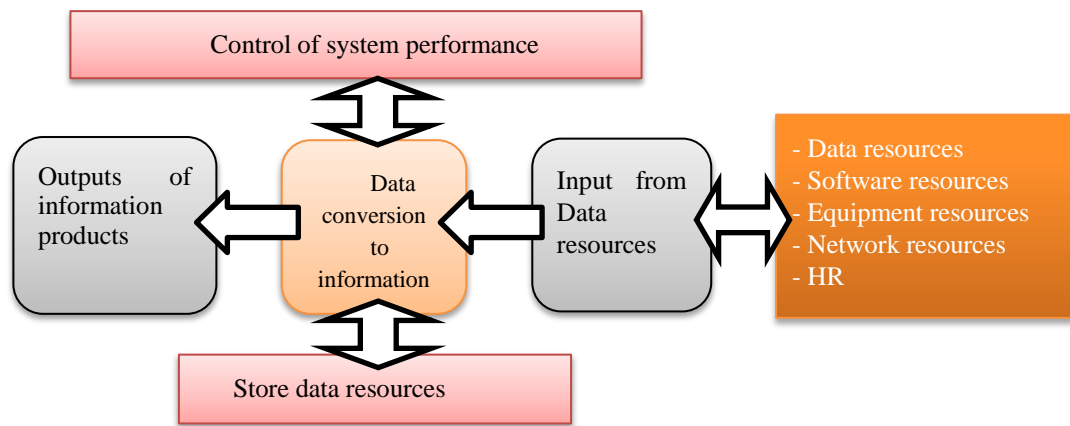
- Technology contributes to the distribution of tasks and duties and to work properly among individuals and groups.
- Technology contributes to the creation and identification of communication networks in such a way as to achieve

organizational cohesion with maximum efficiency and effectiveness.

- Technology sets organizational levels and relationships according to the real needs of the workflow networks.
- Technology contributes to the efficiency of the performance of individuals in the Organization in terms of speed, reduction of waste and loss of human, material and financial efforts.
- Technology contributes to improving the physical conditions of work in terms of light, heat and sound, in order to achieve the highest possible efficiency in performance.

**Information technology portal to achieve good administrative development:**

Information technology is an automated system consisting of a set of components that are used to receive data resources, transform them into information products, and Figure 1: A conceptual model of the components of the information system showing its most important resources and activities. Information systems deal with all activities related to information, the administrative body for the purpose of raising its efficiency and effectiveness by providing information and supporting the decisions of officials (Al-Abd & Al-Kurdi, 2000).



**Figure 1:** Components of the Information System (Burhan, 1994).

Information technology plays an important role in the integration of external variables with the needs, capabilities and capabilities of administrative bodies. There are many trends in the administrative bodies that highlight the need for an information system, the most important of which is the tendency to increase specialization and division of labor, the emergence of new methods of decision-making, the trend towards decentralized management, temporary employment to benefit from specific skills and tasks, Towards the service economy (Haidar, 2002).

**The importance of information technology for administrative devices:**

Information systems use all types of technology to operate, process, store and transmit information in electronic form, which is known as information technology, which includes computers, communication devices, networks, fax machines and other equipment. An information system triggers and presents data to users, possibly an individual or group of individuals who operate the information system outputs themselves as a result of the availability of computers. The outputs of many systems may be routinely used to monitor the performance of the administrative system itself or to simplify the operation of user orders (Al Shobaki et al., 2017), (El Talla et al., 2017), (Abu-Naser et al., 2017) and (Abu Amuna et al., 2017).

For example, in the United States, 50% of the capital invested in administrative bodies is related to information, and there are about 63 computers per 100 Employees, while some sources estimate that one out of every three employees uses a computer. The percentage of managers who use computers in their work is about 88%. US companies spent \$ 500 million on information technology in 1996, while the total amount spent in the world was about \$ 1 trillion (Haidar, 2002). Thus, it is clear that advanced technology will achieve the regulatory environment capable of killing the spirit of monotony and routine in performance, and the self-innovations of the individual and groups at work, and achieve the organizational climate suitable for outstanding achievement (El Talla et al., 2018), (Abu-Naser et al., 2018) and (Abu Amuna et al., 2018).

### **Second-The extent of participation of decision makers:**

The degree of participation of decision making gives the employees chance to express their feelings, thoughts and ideas, that can lead to improve working methods, reduce conflict and raise the morale of individuals and groups, as the decision is the essence of the administrative process and its basic means of achieving the goals of the organization (Hamoud, 2002). Participation in decision-making is the opposite of the individual method. Participatory method is considered by improving the organizational environment, that leads to the sense of prominence of individuals, it similarly makes them further understand the surroundings of the decision, and upsurge their knowledge of the factors touching decision-making. Thus implementing the aims of the resolution (Al-Kutbi, 2005). The human element is the most important element in any system. Without this element, no system can achieve its desired objectives. Machines, devices, and all modern means of technology are idle elements without the human element (Al-Jaafari, 1983). Although Arab countries have a human balance of about 273 million, more than half of them are of working age (15-60 years), they do not actively contribute to the development and use of information systems and computers in administrative systems (Shio, 1983).

Attention to the policy of decision making is a vital aspect in the formation of the organizational climate for its importance in the development of organizations and ensure continuity of success, and develop the motivation of individuals to practice creative behaviors to enhance the Organization's ability to compete and keep abreast of developments. Hence the opportunity to participate in decision-making raises the interest of employees and motivates them to improve Performance and productivity increase (Al-Adli, 1997). The interest in decision-making policy is a vital aspect of organizational structure, because it is important for the development of organizations and for ensuring the continuity of their success, and to develop the motivation of individuals to practice innovative behaviors to enhance the organization's ability to keep abreast of developments. Organizational structure that limits the employee's initiatives and their contribution to dealing with administrative

problems and reduces the spirit of competition (Al-Sakran, 2004). To increase the participation of decision makers, they must be involved in the design of business improvement strategies through Jad Al-rab (2012):

- Improve recruitment, training and performance strategies.
- Use the problem-solving method to enhance individual and community performance improvement skills.
- Identify important processes that need to be redesigned.
- Use new ways to think, innovate and improve quality.

### **Third- Palestinian Universities in Gaza Strip**

The march of the Palestinian universities in the Gaza Strip began with the opening of the Islamic University, which emerged in 1978 from the Azhar Religious Institute, then Al-Azhar University, which in turn originated from the same institute in 1991 and then Al-Aqsa University, which emerged in 2001 from the State College of Education. The focus of this study will be both the Islamic University model of public universities, Al-Aqsa University and a model of public universities.

Administrative staff in Palestinian universities is an essential component of the organizational structure of Palestinian universities. Without these Employees, universities cannot perform their great mission of serving the community through their teaching services, research and continuing education. This work is not completed without administrative staff. In the fields of student affairs, admission and registration, finance, public relations, personnel affairs, maintenance, procurement, warehousing, services, security and other administrative functions. In order for these employees to perform the work required of them, the availability of a good regulatory environment that helps them to that performance. The number of administrative staff at the Islamic University (428) employees, while the number at Al-Aqsa University (298) employees.

## **10. ANALYTICAL APPROACH**

### **First- Methodology of the study:**

This study deals with the study of tools, phenomena and practices existing and available for study and measurement as they are, without the intervention of researchers in their course, and researchers can interact with them and describe them and analyze them scientifically and objectively the study will rely on two basic types of data:

1. **Initial Data:** The study was carried out in the field by distributing questionnaires to study the vocabulary of the study and to collect and compile the necessary information in the subject of the study, and then unloading and analyzing it using the statistical program and using the appropriate statistical SPSS tests in order to arrive at indications of value and indicators that support the subject of the study.
2. **Secondary data:** Through the review of books and periodicals, special publications and scientific and professional journals related to the subject of the study,



and any references contribute to enrich the study in a scientific way, and the researchers through the use of secondary sources in the study to identify the foundations and methods of scientific studies in writing studies, Recent developments have occurred in the field of study.

**Second- Study Population:**

The study population consists of administrative staff in the Palestinian universities under study: the Islamic University, Al-Aqsa University, and through the census of the study

society, it was found that it consists of (726) administrative staff.

**Third- The study sample:**

- A. A sample of the sample was used by the researchers to verify the validity and stability of these tools. The sample size was 32 administrative staff.
- B. The random stratified sample method was used in the study. The sample was composed of (٢٢١) Employees. The response rate was (%٨٦.٤٣). The sample distribution and response rate were as follows:

**Table 1:** Number of sample members in each university and the number of respondents

Item	Islamic University	Al-Aqsa University	Total
The size of society	428	298	953
The ratio	%٥٩	%41	100%
Distributed sample	144	71	221
Number of respondents	111	80	191
Response rate	77.08%	80.80%	86.43%

**Table 2:** The distribution of respondents according to variables: university, level of employment, gender, age, academic qualification, and years of service

University Name	Islamic University	Al-Aqsa University			Total
	١١١	٨٠			
Career Level	Director	Head Of The Department	Administrative Employee		١٩١
	١٥	٢٩	١٤٧		
Gender	Male	Female		١٩١	
	١٣٧	٥٤			
Age	20-30 years	31-40 years	41-50 years	Greater than 50 years	١٩١
	٨٨	٦٠	31	١٢	
Qualification	Diploma	BA	Postgraduate		١٩١
	٥٢	١١٠	٢٩		
Years of service	Less than 5 years	5-7 years	8-10 years	More than 10 years	١٩١
	٦٢	٥٠	٢٣	٥٦	

**Fourthly- Study tool:**

Since the nature of the hypotheses and the variables involved are the ones that control the selection of the appropriate tool, accordingly, the researchers have prepared a measure for that study commensurate with its objectives and hypotheses, the scale of information technology used and its impact on the participation of decision-making staff in universities. The process of designing and preparing the study scale has gone through several stages and steps:

- 1. See the literature and previous studies related to the subject of the present study.

- 2. Collect and define scale paragraphs.
- 3. Formulation of the standard expressions according to the study sample.
- 4. Set the meter instructions.
- 5. How to correct the meter.
- 6. Conduct a study of stability and honesty of the scale.
- 7. (10) paragraphs were approved for each area

**How to correct the meter:**

The five-dimensional Likert scale was used to measure respondents' responses to the questionnaire sections according to Table (3):

**Table 3:** Scale of the five-dimensional Likert scale

Response	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Degree	١	٢	٣	٤	٥

Each question has five answers (strongly disagree - disagree - neutral – agree - strongly agree), asking the respondent to read each question or answer with an ✓ sign in proportion to his or her vision of reality, (Strongly Agree) Five points, (agree) four points, (neutral) three points, (disagree) two points, and (strongly disagree) one point, so that the relative weight in the last case is 20% and is proportional to this response.

**Believe the meter:**

The researchers calculated the validity of the meter in the following ways:

1. **Authentic honesty:** The researchers verified the validity of the tool ostensibly by presenting it to a select group of PhD holders in business administration (8). The apparent honesty indicates the general appearance of the test in terms of its relevance to the subjects, the

affiliation of the phrase to the field, Drafting and instructions.

**2. Internal consistency:**

The internal consistency coefficient is a correlation coefficient between each unit of scale and the whole scale, so this method is usually used to determine the validity of the test on the one hand and the validity of its units on the other. The researchers calculated the validity of the internal consistency of the scale by finding the correlation coefficients (32) by finding correlation coefficients for each paragraph in the field to which they belong, as well as correlation coefficients between each field and the scale as a whole, as in the following tables:

**Table 4:** *Honesty coefficients for each paragraph with the total score of the field of information technology used*

No.	Item	Honesty level	Level of Sig.
1.	The information technology used at the University contributes to improved decision-making	0.757	0.01
2.	The university is constantly developing the information technology used by the university	0.734	0.01
3.	The information technology used at the university leads to the speed of completion of work and improving the quality of services.	0.574	0.01
4.	The technology used by the university is easy to use	0.451	0.01
5.	The information technology used by the university is consistent with the business requirements	0.807	0.01
6.	The information technology used by the university contributes to the effort	0.818	0.01
7.	There is good knowledge of technological developments appropriate to the objectives of deanships, departments and the university as a whole	0.782	0.01
8.	The information technology used is proportional to the workload	0.857	0.01
9.	The university accomplishes most of its work using technology	0.585	0.01
10.	The university adapts and responds to technological changes permanently	0.796	0.01

**Table 5:** *Honesty coefficients for each paragraph with the total score for the scope of participation of decision-making personnel*

No.	Item	Honesty level	Level of Sig.
1.	Employees participate in setting goals for departments and departments.	0.771	0.01
2.	Decision-makers resort to consultations before making decisions to determine their results and effects	0.811	0.01
3.	Employees have the power and authority to make decisions about their work and take responsibility	0.533	0.01
4.	Management philosophy allows employees to solve their own problems	0.610	0.01
5.	Management is keen to involve subordinates in decision-making	0.713	0.01
6.	The problems facing the departments and divisions are solved collectively	0.470	0.01
7.	Different alternatives are evaluated and available before decisions are made	0.738	0.01
8.	The level of cooperation between colleagues is appropriate	0.367	0.05
9.	Employees are involved in developing performance standards related to their functions	0.714	0.01
10.	Employees participate in the process of evaluating their performance	0.694	0.01

**Stability of the scale:**

The concept of stability means the ability of the test to give the same grades or values to the same individual or individuals. If the measurement process is repeated and to ensure the stability of the scale, the researchers used the following methods:

1. **Method of split-half:** by calculating the correlation coefficient between the individual questions and marital questions, and obtained the stability coefficients shown in the following table.

**Table 6:** the coefficient of stability of the scale of technology used and the impact on the participation of administrative staff in decision-making in universities

No.	Field	No. of Items	Correlation Coefficient Before Adjustment	Correlation Coefficient After Adjustment	Level of Sig.
1.	Information Technology used	١٠	٠.٥٨٨	٠.٧٤١	Significant at (0.01)
2.	The extent of employee participation of in decision making	١٠	٠.٦٤٨	٠.٧٨٧	Significant at (0.01)

From the above table, we can see that the stability coefficients in all midterm segments were high, indicating that the questionnaire has a high degree of stability. The researchers then conducted a correlation matrix showing the dimensions of the scale as shown in the following table:

2. **Alpha Cronbach's coefficient of persistence:** The researchers used the Alpha -cronbach coefficient to calculate the stability coefficient for all the terms of the

scale, where the general correlation coefficient (0.862) is a high stability coefficient indicating the strength and validity of the scale. The researchers noted that the results of Pearson correlation coefficients are consistent with the results of alpha- , And then the researchers performed the coefficients of Alpha Cronbach between the terms of each field separately and is shown in the following table:

**Table 7:** shows the coefficients of the Alpha Cronbach for each dimension of the scale

No.	FIELD	COEFFICIENT OF ALPHA- CRONBACH STABILITY
1.	Information Technology used	٠.٨٩٧
2.	The extent of employee participation of in decision making	٠.٨٥٣

The above table shows that all Cronbach coefficients are above (0.853). This indicates that the questionnaire has a high degree of stability.

**Fifth: Statistical Methods:**

The computer was used in the statistical processing, especially the statistical packages program (SPSS), where all the data obtained by the researchers and then the results were extracted through the scientific equations necessary for this and the most important used in this study:

1. Averages, frequencies, standard deviations and percentages.
2. Spearman Brown’s correlation coefficient for the equal half - division, and the Cronbach alpha factor to determine the stability of the resolution.

3. Pearson correlation coefficient to measure the relationship between variables.
4. T test to find the differences between the averages.
5. Analysis of mono-variance to see differences between more than two groups.
6. Scheffe post-test to measure the direction of differences.

**Answer the study questions:**

**Answer the study question which states:**

**Q1-:** what is the level of information technology used in Palestinian universities?

To answer the study questions and to use the pentagram in the study instrument, the study adopted the criterion mentioned by Abdul Fattah (2008) to judge the trend when using the pentagram. The following table illustrates this:

**Table 8:** Scale of measurements used in this study

The Level Method	Very Low	Low	Medium	High	Very High
SMA	Less than (١.٨٠)	From (1.80): (٢.٥٩)	From (2.60): (٣.٣٩)	From (3.40):(٤.١٩)	Greater than(٤.٢٠)
Relative Weight	Less than 36.00%	From 36.00: 51.90%	From 52.00: 67.90%	From 68.00: 83.90%	Greater than 84.00%

This indicates that the averages of less than 1.80 indicate a very low degree in the elements of the field. The averages of (1.80: 2.59) indicate a low degree of availability of field elements, (2.60: 3.39) indicate that there is a medium degree in the elements of the field, and the averages ranging from (3.40:4.19) indicate that there is a large degree in the

elements of the field. More than (4.20) on the scale used in the study shown in the previous table.

To answer this question, the researchers resorted to repetitions, averages, standard deviation, percentages and order. The results were as shown in the following table:

**Table 9:** Frequency, Mean, Standard Deviation, Percentages and Ranking of Respondents' Responses to Information Technology Used

No.	Item	Total Scores	Mean (5)	Standard Deviation	Percentage	Rank
1.	The information technology used at the University	707	3.74	0.941	74.8%	5

No.	Item	Total Scores	Mean (5)	Standard Deviation	Percentage	Rank
	contributes to improved decision-making					
2.	The university is constantly developing the information technology used by the university	727	3.85	0.913	77.00%	2
3.	The information technology used at the university leads to the speed of completion of work and improving the quality of services.	720	3.81	0.982	76.20%	3
4.	The technology used by the university is easy to use	726	3.86	0.909	77.20%	1
5.	The information technology used by the university is consistent with the business requirements	701	3.71	0.942	74.20%	6
6.	The information technology used by the university contributes to the effort	718	3.80	0.969	76.00%	4
7.	There is good knowledge of technological developments appropriate to the objectives of deanships, departments and the university as a whole	682	3.63	0.931	72.60%	10
8.	The information technology used is proportional to the workload	690	3.65	0.954	73.00%	9
9.	The university accomplishes most of its work using technology	702	3.71	0.947	74.20%	7
10.	The university adapts and responds to technological changes permanently	696	3.68	1.039	73.60%	8
<b>All items of the dimension</b>		713.47	3.7354	.76296	74.72%	

The above table shows the results achieved in the field of information technology used by presenting the arithmetical averages of the fields of the field. The averages were between 3.63 and 3.86.

From the previous table, we see that all the paragraphs were high between 68% and 83.90%. The paragraph (the technology used by the university is easy to use) has the highest percentage (77.20%) followed by the paragraph (the university is keen to develop information technology (77.00%), followed by the paragraph (Information Technology used by the university to speed up the completion of work and improve the quality of services) in third place and percentage (76.20%). The paragraph (there is a good knowledge of technological developments Appropriate to the objectives of deanships, departments and the university as a whole) ranked (72.60%), and the total score for the field was 74.72% (high score).

This result can be explained by the fact that Palestinian universities constantly keep abreast of technological developments and are trying to develop them. In all these universities, there are IT units that supervise the programming of universities and provide electronic services to students and senior management in universities. On-site classroom registration through university websites, students can also request student services from checklists, certificates

**Table 10:** Frequency, Mean, Standard Deviation, Percentages and Ranking of Responses of Sample Members in the Scope of Participation of Decision-Making Employees

No.	Item	Total Scores	Mean (5)	Standard Deviation	Percentage	Rank
1.	Employees participate in setting goals for departments and departments.	608	3.18	1.048	63.60%	7
2.	Decision-makers resort to consultations before making	610	3.21	0.975	64.20%	5

of enrollment, and knowledge of their marks also through websites, and also provides information technology the information used is used to communicate data between the various departments in the university through the internal network located in each university. The information technology used also provides the information needed for senior management through existing databases.

This result is consistent with the study of Bahr and Abu Swirih (2010), which showed that the university is keen to keep abreast of the technological developments and continuously develops the information technology used in the university, and that the information technology used at the university led to the speed of completion of work and improve the quality of services. Al-Shanti, 2006, and Al-Saffar (2009). These studies have shown a positive trend towards information technology and continuous development of the technology used by the institutions in which the studies were conducted. Those institutions and their need for technology to improve performance and speed in business delivery.

**Answer the second study question which states:**

**Q2-:** What is the level of participation of decision-makers in Palestinian universities?



No.	Item	Total Scores	Mean (5)	Standard Deviation	Percentage	Rank
	decisions to determine their results and effects					
3.	Employees have the power and authority to make decisions about their work and take responsibility	605	3.17	0.970	63.40%	8
4.	Management philosophy allows employees to solve their own problems	604	3.21	0.996	64.20%	6
5.	Management is keen to involve subordinates in decision-making	578	3.03	1.013	60.60%	9
6.	The problems facing the departments and divisions are solved collectively	630	3.30	1.071	66.00%	4
7.	Different alternatives are evaluated and available before decisions are made	637	3.39	0.904	67.80%	2
8.	The level of cooperation between colleagues is appropriate	725	3.80	0.751	76.00%	1
9.	Employees are involved in developing performance standards related to their functions	642	3.36	0.946	67.20%	3
10.	Employees participate in the process of evaluating their performance	533	2.82	1.072	56.40%	10
<b>The overall degree of participation in decision-making</b>		620.69	3.2497	.68862	64.99%	

The above table shows the results achieved in the field of participation of decision-makers by presenting the arithmetical averages of the fields. It is noted that the averages ranged between (2.82 and 3.80).

We note from the previous table that all the paragraphs range from a medium to a high percentage. One paragraph in this field has a high percentage between 68% and 83.90%. Nine paragraphs have a medium score between 52.00% 67.90%), the paragraph (level of cooperation among suitable colleagues) obtained the highest percentage (74.80%) followed by the paragraph (different alternatives available before decisions are made) ranked second with percentage (76.00%), then paragraph (Employees in the development of performance standards will interact with their functions) in the third place with a percentage (67.20%). The section "The Employees participate in the evaluation of their performance" Recent ranking by a percentage (56.40%), and got the total score of the field on a percentage (64.99%), a medium degree.

As a result, there are some positive aspects in the participation of decision-makers such as cooperation between colleagues and the participation of Employees in the development of their work standards. However, there is a shortage in this area, especially in the participation of Employees in evaluating their performance. The staff assessment process is still used and does not inform employees of the results of their evaluation or discussion, which requires university administrations to address these

problems, to identify shortcomings in the participation of the employees in the decision-making process and to try to address this deficiency.

This finding is consistent with the study of Bahr and Abu Swirih (2010), which showed a relative weight of 65.46%. This indicates that there is an average level of cooperation among colleagues, and that the employees participate to a certain extent in setting the objectives of the work units and decision- This finding was also agreed with Al-Sakran (2004), which showed positive approval for the participation of decision makers. The researchers attributed the reason for this result to the scientific level and service of the sample. This result was opposed with Al-Shanti (2006) ), Which showed a negative trend among respondents in the PNA ministries on the extent of participation The findings differ from the findings of the study (Jassim and Hammoud, 2011) and the study (Al-Batoush, 2007) Where there was a weakness in the participation of Employees in the decision-making process.

### 11. HYPOTHESIS TESTING

**Ho 1:** There is an impact of the technology used on the participation of decision-makers in Palestinian universities. To determine the validity of this hypothesis, the researchers used the linear regression test as shown in the following table:

**Table 11: Model Summary**

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.546a	.298	.295	.57839

a. Predictors: (Constant), Information Technology used

**Table 12: Analysis of variance by ANOVA test**

ANOVAa	
--------	--

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26.871	1	26.871	80.322	.000b
	Residual	63.227	189	.335		
	<b>Total</b>	90.098	190			
a. Dependent Variable: the extent of employee participation of in decision making						
b. Predictors: (Constant), Information Technology used						

**Table 13: Transaction table**

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.408	.210		6.718	.000
	Information Technology used	.493	.055	.546	8.962	.000
a. Dependent Variable: The extent of employee participation of in decision making						

From the results described in the previous tables, the following can be inferred:

- Correlation coefficient = 0.546, and the adjusted limiting factor = 0.298, which means that 29.8% of the change in the participation of decision-making staff was interpreted through the linear relationship with the nature of IT used and the remaining percentage may be due to other factors
- The value of the calculated F test was 80,322, and the probability value is 0.000, which means rejecting the null hypothesis and accepting the existence of a statistically significant impact on the technology used in the participation of decision-making staff in Palestinian universities.

**Ho 2:** There are differences in the nature of information technology used and the extent of participation of decision-

**Table 14: Mean and standard deviations and the value of "T" for the functional scale fields according to the gender variable**

Field	Gender	The Number	Mean	Standard Deviation	"T" value	Level of Sig.
Information Technology used	Male	137	3.7630	0.78247	.828	.410
	Female	54	3.6654	0.71327		
The extent of employee participation of in decision making	Male	137	3.2596	0.66792	.302	.763
	Female	54	3.2245	.74452		

It is clear from the previous table that there are no statistically significant differences due to the gender variable between males and females in all fields. The calculated value of T is less than the tabular value of T,

2. There are differences in the nature of information technology used and the extent of participation of

**Table 15: Source of variance, sum of squares, degrees of freedom, mean squares, P value, and significance level**

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Information Technology used	Between Groups	.077	3	.026	.043	.988
	Within Groups	110.524	187	.591		
	<b>Total</b>	110.601	190			
The extent of employee participation of in decision making	Between Groups	2.559	3	.853	1.822	.145
	Within Groups	87.539	187	.468		

makers in accordance with demographic and organizational variables.

**The second hypothesis is based on a set of sub-hypotheses:**

**Ho 2-1:** There are differences in the nature of the technology used. The participation of decision-makers according to demographic variables (gender, age, qualification).

**The first sub-hypothesis is based on a set of sub-hypotheses:**

1. There are differences in the nature of information technology used and the extent of participation of decision-makers in relation to the gender variable.

To determine the validity of this hypothesis, the researchers used the T-test as shown in the following table:

decision-making personnel depending on the age variable.

To determine the validity of this hypothesis, one way anova was used as shown in the following table:

	<b>Total</b>	90.098	190			
--	--------------	--------	-----	--	--	--

It is clear from the previous table that there are no statistically significant differences in these fields and the overall score is due to the age variable of the respondents. The value of the calculated P is less than the value of the table.

3. There are differences in the nature of information technology used and the extent of participation of

**Table 16:** Source of variance, sum of squares, degrees of freedom, mean squares, P value and significance level due to the variable of practical qualification

		Sum of Squares	df	Mean Square	F	Sig.
Information Technology used	Between Groups	1.880	2	.940	1.626	.200
	Within Groups	108.721	188	.578		
	<b>Total</b>	110.601	190			
The extent of employee participation of in decision making	Between Groups	.263	2	.132	.275	.760
	Within Groups	89.835	188	.478		
	<b>Total</b>	90.098	190			

It is clear from the previous table that there are no statistically significant differences in the fields and information technology used and the extent of participation of decision-making staff according to their scientific qualifications. The value of the calculated F is less than the value of the table. Scientific scholars look forward to a good leadership style and to their participation in decision making. They all feel the importance of the information technology used at the university and its impact on performance.

This finding is consistent with Al-Louzi and Zahrani (2012), Al-Jassimi (2011), Al-Muqasher (2001) and Al-Muqasher (2001) between different educational qualifications in their knowledge of existing information technology. The results

**Table 17:** Source of variance, sum of squares, degrees of freedom, mean squares, P value, and significance level due to variable years of service

		Sum of Squares	df	Mean Square	F	Sig.
Information Technology used	Between Groups	6.865	3	2.288	4.125	.007
	Within Groups	103.736	187	.555		
	<b>Total</b>	110.601	190			
The extent of employee participation of in decision making	Between Groups	3.376	3	1.125	2.426	.067
	Within Groups	86.722	187	.464		
	<b>Total</b>	90.098	190			

It is clear from the previous table that there are differences in information technology used and that there are no differences in the participation of decision makers, that the value of the calculated "F" is less than the "F"

**Table 18:** Results of the Scheffe Test to identify the direction and significance of differences in the field of information technology used due to variable years of service

Years of service	Less than 5 years	5-7 years	8-10 years	More than 10 years
Less than 5 years	-			
5-7 years	.291771	-		
8-10 years	.240082-	*.037303-	-	
More than 10 years	.280200	.11016-	*.020837	-

\* Sig. at 0.05

decision makers according to the variable of scientific qualification.

To determine the validity of this hypothesis, one way anova was used as shown in the following table:

differed with Bahr and Abu Swirih (2010), Al-Batoush (2007)

**Ho 2-2:** There are differences in the nature of the technology used. The participation of decision makers according to the organizational variables (years of service - career level).

**The second hypothesis is based on a set of sub-hypotheses:**

1. There are differences in the nature of information technology used and the extent of participation of decision-making staff due to variable years of service.

To determine the validity of this hypothesis, one way anova was used as shown in the following table:

To find out the direction of the differences in the field of information technology used, the Scheffe Test was used in the following table:

It is clear from the previous table that there are statistically significant differences at the level of (0.05) due to the variable years of service in the field of information technology used between the years of service (8-10 years) and the years of service (more than 10 years) Years of service (5-7 years) and service owners (8-10 years). The researchers explain this result that the owners of the years of service (5-7), are in the stage of career development and are often satisfied with the nature of their work, (8-10 years), who seek to improve the nature of their work, and we note

**Table 19:** Source of variance, sum of squares, degrees of freedom, mean squares, P value and level of significance due to the variable of the functional level

		Sum of Squares	df	Mean Square	F	Sig.
Information Technology used	Between Groups	1.499	2	.750	1.292	.277
	Within Groups	109.102	188	.580		
	<b>Total</b>	110.601	190			
The extent of employee participation of in decision making	Between Groups	.337	2	.169	.353	.703
	Within Groups	89.761	188	.477		
	<b>Total</b>	90.098	190			

It is clear from the previous table that the calculated P value is less than the P value of the table, ie, there are no statistically significant differences in all fields and in the total score of the scale according to the functional level variable.

**Ho 2-3:** There are differences in the nature of information technology used and the extent of participation of decision-

**Table 20:** Mean and standard deviations and the value of "T" for the fields of the functional scale according to the gender variable

Field	The University	The Number	Mean	Standard Deviation	"T" value	Level of Sig.
Information Technology used	Islamic University	111	4.0751	0.53357	٨,٠٠١	٠,٠٠٠
	Al-Aqsa University	80	3.2642	0.78525		
The extent of employee participation of in decision making	Islamic University	111	3.4863	0.53810	٥,٨٠٢	٠,٠٠٠
	Al-Aqsa University	80	2.9214	.74130		

It is clear from the previous table that there are no statistically significant differences due to the gender variable between males and females in all fields. The calculated value of T is less than the tabular value of T.

The above table shows that the value of the calculated F is greater than the F value of the table. Consequently, there are statistically significant differences in all fields according to the university variable and the participation of administrative staff in decision making.

The University of Al-Aqsa is the most recent of these universities. It is a state-run university, run by the government, and the unified cadre does not apply fully to the university. Its employees, and it is influenced by the political division in the Palestinian arena, and its subordination to two ministries of higher education, one in Gaza and the other in Ramallah, and thus the division of employees in their loyalty to any of the two governments.

from the table that there are no significant differences among other categories of years' service.

2. There are differences in the nature of information technology used and the extent of participation of decision-making staff due to the variable level of employment.

To determine the validity of this hypothesis, one way anova was used as shown in the following table:

making staff between the Islamic University and Al-Aqsa University.

**To determine the validity of this hypothesis, the researchers used the T-test as shown in the following table:**

## 12. RESULTS

The following results were achieved:

- The results showed that there is a high degree of information technology level used by the Palestinian universities in the Gaza Strip from the point of view of the administrative staff. The percentage reached (74.72%).
- The results showed that there was an average level of participation of decision-makers from the point of view of administrative staff, with a percentage of (64.99%).
- The results showed that there is a positive correlation between the information technology used and the participation of decision makers.
- The results showed a statistically significant effect of the technology used on the participation of decision makers.
- The results indicated that there were no differences between the sample according to the gender variable in



the information technology used and the participation of decision-making personnel

- The results indicate that there are no differences in the perception of the information technology Employees employed and the participation of decision makers according to the age variable.
- The results showed that there are statistically significant differences in the perception of information technology used and participation of decision-making Employees according to the variable of scientific qualification
- The results showed that there were differences in the perception of the IT Employees used according to the variable years of service. There were no differences in the participation of decision-making staff according to the years of service
- The results indicate that there are no differences in the perception of the employees of the information technology used and the participation of the administrative staff in the decision making according to the variable of the functional level (manager, head of department, administrative officer).
- The results indicate that there are differences in the perception of information technology Employees used and participation of decision-making Employees according to the university in which they work in the interest of the Islamic University.

### 13. RECOMMENDATIONS

- Attention should be given to the departments of the Palestinian universities in the Gaza Strip in general, and Al-Aqsa and Islamic universities in particular the information technology used
- Provide universities with the opportunity to participate in decision-making.
- University administrations continue to pay attention to and continuously improve the performance of their employees.
- To enhance the periodic evaluation of job performance and to inform employees and express their opinion.
- Solve employee problems and give them the opportunity to contribute to solving their own problems.
- Use the staff rotation method periodically.
- Strengthening the democratic leadership style and empowering university staff.

### REFERENCES

1. Al Shobaki, M. J., & Naser, S. S. A. (2016). Performance development and its relationship to demographic variables among users of computerized management information systems in Gaza electricity Distribution Company. *International Journal of Humanities and Social Science Research*, 2(10), 21-30 .
2. Al-Hila, A. A., Alhelou, E., Al Shobaki, M., & Abu Naser, S. S. (2017). The Impact of Applying the Dimensions of IT Governance in Improving e-training-Case Study of the Ministry of Telecommunications and Information Technology in Gaza Governorates. *International Journal of Engineering and Information Systems (IJEAIS)*, 1(7), 194-219.
3. Abu Naser, S. S., & Al Shobaki, M. J. (2016). The Impact of Management Requirements and Operations of Computerized Management Information Systems to Improve Performance (Practical Study on the employees of the company of Gaza Electricity Distribution). Paper presented at the First Scientific Conference for Community Development 5-6 November, 2016.
4. Abdul Fattah, Ezz (2008). Introduction to descriptive and indicative statistics using SPSS, Algorithm Scientific Library, Egypt.
5. Abu Sultan, Y. S., Al Shobaki, M. J., Abu-Naser, S. S., & El Talla, S. A. (2018). Effect of the Dominant Pattern of Leadership on the Nature of the Work of Administrative Staff at Al-Aqsa University. *International Journal of Academic Information Systems Research (IJAISR)*, 2(7), 8-29 .
6. Ahmed, Adel A., Abu-Naser, Samy S., El Talla, Suliman A. and Al Shobaki, Mazen J. (2018). The Impact of Information Technology Used on the Nature of Administrators Work at Al-Azhar University in Gaza. *International Journal of Academic Information Systems Research (IJAISR)*, 2 (6), 1-20
7. Amuna, Y. M. A., Al Shobaki, M. J., & Naser, S. S. A. (2017). The Role of Knowledge-Based Computerized Management Information Systems in the Administrative Decision-Making Process. *International Journal of Information Technology and Electrical Engineering*, 6(2), 1-9 .
8. Badwan, J. J., Al Shobaki, M. J., Naser, S. S. A., & Amuna, Y. M. A. (2017). Adopting technology for customer relationship management in higher educational institutions. *International Journal of Engineering and Information Systems (IJEAIS)*, 1(1), 20-28 .
9. El Talla, S. A., Al Shobaki, M. J., Abu Naser, S. S., & Abu Amuna, Y. M. (2018). Organizational Structure and its Relation to the Prevailing Pattern of Communication in Palestinian Universities. *International Journal of Engineering and Information Systems (IJEAIS)*, 2 (5), 22-43.
10. FarajAllah, A. M., El Talla, S. A., Abu Naser, S. S., & Al Shobaki, M. J. (2018). Participation of Administrative Staff in Decision-Making and Their Relation to the Nature of Work in Universities. *International Journal of Academic Multidisciplinary Research (IJAMR)*, 2(7), 13-34 .
11. Almasri, Abdelbaset, El Talla, Suliman A., Abu-Naser, Samy S., and Al Shobaki, Mazen J. (2018). The Organizational Structure and its Role in Applying the

- Information Technology Used In the Palestinian Universities- Comparative Study between Al-Azhar and the Islamic Universities. *International Journal of Academic and Applied Research (IJAAR)*, 2 (6), 1-22
12. Abdulla, A., Aziz, A., Al Shobaki, M., & Abu Naser, S. S. (2017). The Reality of Integrating the Dimensions of Computerized Health Information Systems in Dar Al-Shifa Medical Complex. *International Journal of Engineering and Information Systems (IJEAIS)*, 1(9), 80-104.
  13. Naser, S. S. A., Shobaki, M. J. A., & Amuna, Y. M. A. (2016). Measuring knowledge management maturity at HEI to enhance performance-an empirical study at Al-Azhar University in Palestine. *International Journal of Commerce and Management Research*, 2(5), 55-62 .
  14. Salama, A. A. M., Abu Amuna, Y. M., Al Shobaki, M. J., & Abu-Naser, S. S. (2018). The Role of Administrative Procedures and Regulations in Enhancing the Performance of The Educational Institutions-The Islamic University in Gaza is A Model. *International Journal of Academic Multidisciplinary Research (IJAMR)*, 2(2), 14-27 .
  15. Abu Naser, S. S., & Al Shobaki, M. J. (2017). The Impact of Senior Management Support in the Success of the e-DMS. *International Journal of Engineering and Information Systems (IJEAIS)*, 1(4).
  16. Al Shobaki, M. J., Naser, S. S. A., & Ammar, T. M. (2017). The Degree of Administrative Transparency in the Palestinian Higher Educational Institutions. *International Journal of Engineering and Information Systems (IJEAIS)*, 1(2), 15-32 .
  17. Al Hila, A. A., Al Shobaki, M. J., & Abu-Naser, S. S. (2018). The Effectiveness of a Website to Improve the Effectiveness of Time Management for Employees in the Beauty Dental Clinic. *International Journal of Academic Information Systems Research (IJASIR)*, 2(5), 23-52 .
  18. El Talla, S. A., Al Shobaki, M. J., Abu-Naser, S. S., & Abu Amuna, Y. M. (2018). Organizational Structure and its Relation to the Prevailing Pattern of Communication in Palestinian Universities. *International Journal of Engineering and Information Systems (IJEAIS)*, 2(5), 22-43 .
  19. Abu Sultan, Yousef S., Al Shobaki, Mazen J., Abu-Naser, Samy S., and El Talla, Suliman A. (2018). The Style of Leadership and Its Role in Determining the Pattern of Administrative Communication in Universities- Islamic University of Gaza as a Model. *International Journal of Academic Management Science Research (IJAMSR)*, 2 (6), 26-42
  20. Abu Naser, S. S., Al Shobaki, M., & Ammar, T. M. (2017). Impact of Communication and Information on the Internal Control Environment in Palestinian Universities. *International Journal of Hybrid Information Technology*, 10(11), 41-60.
  21. Al Hila, A., Al Shobaki, M., Naser, S. A., & Amuna, Y. A. (2017). The Reality of the Effectiveness of Time Management from the Perspective of the Employees of the Beauty Clinic of Dentistry. *International Journal of Engineering and Information Systems (IJEAIS)*, 1(6), 137-156 .
  22. Al Shobaki, M. J., & Abu-Naser, S. S. (2017). The Requirements of Computerized Management Information Systems and Their Role in Improving the Quality of Administrative Decisions in the Palestinian Ministry of Education and Higher Education. *International Journal of Information Technology and Electrical Engineering*, 6(6), 7-35 .
  23. Al-Kutbi, Mohsen Ali (2005). *Human Resource Management Human Functional Entrance*, Al-Ashry Press, Cairo, Egypt.
  24. Al Shobaki, M. J., & Naser, S. S. A. (2016). The Dimensions Of Organizational Excellence In The Palestinian Higher Education Institutions From The Perspective Of The Students. *GLOBAL JOURNAL OF MULTIDISCIPLINARY STUDIES*, 5(11), 66-100 .
  25. Al-Hila, A. A., Alshaer, I. M. A., Al Shobaki, M., & Abu Naser, S. S. (2017). The Impact of the Governance of Private Universities in Building Partnership with NGOs Operating in Gaza Strip. *International Journal of Engineering and Information Systems (IJEAIS)*, 1(9), 11-30.
  26. Madi, S. A., El Talla, S. A., Abu-Naser, S. S., & Al Shobaki, M. J. (2018). The Organizational Structure and its Impact on the Pattern of Leadership in Palestinian Universities. *International Journal of Academic Management Science Research (IJAMSR)*, 2(6), 1-25 .
  27. Al Shobaki, M. J., Abu Amuna, Y. M., & Abu Naser, S. S. (2017). Organizational Excellence in Palestinian Universities of Gaza Strip. *International Journal of Information Technology and Electrical Engineering*, 6(4), 20-30.
  28. Al-Jaafari, Abdulrahman Ahmed (1983). "Administrative Analysis, the Beginning of the Development of the Arab City", 7th Conference of the Arab Cities Organization: Methods of Administration and Management in the Service of Contemporary Arab Cities, Algeria.
  29. Al Shobaki, M., Abu Naser, S. S., Abu Amuna, Y., & El Talla, S. A. (2017). Importance Degree of eHRM and its Impact on Various Administrative Levels in Palestinian Universities. *International Journal of Engineering and Information Systems (IJEAIS)*, 1(7), 181-196 .
  30. Al-Abd, Jalal Ibrahim & Al-Kurdi, Manal Muhammad (2000). "Introduction to Management Information Systems: The Theory of Tooling Applications", University Press Press, Alexandria.
  31. Al Shobaki, M. J., Abu-Naser, S. S., Abu Amuna, Y. M., & El Talla, S. A. (2018). Support Extent Provided by Universities Senior Management in Assisting the
-

- Transition to e-Management. *International Journal of Academic Management Science Research (IJAMSR)*, 2(5), 1-26 .
32. Al-Adli, Sameh Hussein (1997). *Methodology of decision making in the administrative organization*, Dar Sina Publishing House, Cairo.
33. Al-Ani, Mezher, Jawad, Shawqi, (2008), "Administrative Process and Information Technology." Ithraa Publishing and Distribution, First Edition, p. 281, Amman, Jordan.
34. Al Shobaki, M. J., Naser, S. S. A., & Bedair, R. A. (2011). *The Relationship between Decision-Support Systems and Re-Engineering in the Palestinian Universities in Gaza Strip*. [www.alazhar.edu.ps/Library/aattachedFile.asp?id\\_no=0044082](http://www.alazhar.edu.ps/Library/aattachedFile.asp?id_no=0044082) .
35. Al-Batoush, Mousa Hussein (2007). *The Impact of the Organizational Climate on the Performance of Employees in Jordan Free Zones Corporation*, Unpublished Master Thesis, Al-Bayt University, Jordan.
36. AlFerjany, A. A. M., Salama, A. A., Amuna, Y. M. A., Al Shobaki, M. J., & Abu-Naser, S. S. (2018). *The Relationship between Correcting Deviations in Measuring Performance and Achieving the Objectives of Control-The Islamic University as a Model*. *International Journal of Engineering and Information Systems (IJEAIS)*, 2(1), 74-89.
37. Al-Hila, A. A., Alshaer, I. M. A., Al Shobaki, M., & Abu Naser, S. S. (2017). *The Impact of the Governance of Private Universities in Building Partnership with NGOs Operating in Gaza Strip*. *International Journal of Engineering and Information Systems (IJEAIS)*, 1(9), 11-30 .
38. Al-Jassimi, Bassem Abbas (2011). *The variation of the trends of the faculty members on the reality of the organizational climate in the Faculty of Management and Economics, University of Qadisiyah, Iraqi Journal of Administrative Sciences*, 2011, Volume 7, Issue 30, pp. 167-179. University of Karbala.
39. Al Shobaki, M. J., Abu-Naser, S. S., Abu Amuna, Y. M., & El Talla, S. A. (2018). *The Level of Organizational Climate Prevailing In Palestinian Universities from the Perspective of Administrative Staff*. *International Journal of Academic Management Science Research (IJAMSR)*, 2(5), 33-58 .
40. Al-Louzi, Moussa, and Zahrani Omar Attieh (2012). *Factors Affecting the Functional Performance of Employees in the Emirate of Baha and its Provinces in Saudi Arabia, Analytical Study, Journal of Studies: Administrative Sciences*, Vol 39, No.1.
41. Al-Nouri, Basima Rafik (1994). *Organizational Climate in the Context of Technological Acquisition: An Applied Study on Industrial Establishments in Jeddah*, Unpublished Master Thesis, King Abdulaziz University, Jeddah.
42. Al-Saffar, Ahmed Abd (2009). *The Impact of the Organizational Climate on Performance and Competitive Advantage: A Field Study in Jordanian Commercial Banks*, *Journal of Administration and Economics*, Issue no.
43. Al Shobaki, M. J., Naser, S. S. A., Amuna, Y. M. A., & Al Hila, A. A. (2017). *Learning Organizations and Their Role in Achieving Organizational Excellence in the Palestinian Universities*. *International Journal of Digital Publication Technology*, 1(2), 40-85 .
44. Al-Sakran, Nasser (2004). "The Organizational Climate and its Relation to Job Performance: A Survey Study on the Special Security Forces Sector Officers in Riyadh City" Master Thesis, Naif Arab University for Security Sciences, Riyadh, Saudi Arabia.
45. Alshaer, I. M. A., Al-Hila, A. A., Al Shobaki, M., & Abu Naser, S. S. (2017). *Governance of Public Universities and Their Role in Promoting Partnership with Non-Governmental Institutions*. *International Journal of Engineering and Information Systems (IJEAIS)*, 1(9), 214-238.
46. Al Shobaki, M. J., Naser, S. S. A., Amuna, Y. M. A., & El Talla, S. A. (2017). *Impact of Electronic Human Resources Management on the Development of Electronic Educational Services in the Universities*. *International Journal of Engineering and Information Systems*, 1(1), 1-19 .
47. Al-Shanti, Mahmoud Abdel Rahman (2006). *The Impact of the Organizational Climate on Human Resources Performance, Field Study on the Ministries of the Palestinian National Authority, Gaza Strip*, Master Thesis, Islamic University, Gaza Palestine.
48. Al-Thunibat, Mohamed Mahmoud (1999). *The Organizational Climate and its Impact on the Performance of Employees in the Financial and Administrative Control Bodies in Jordan*, *Journal of Administrative Sciences Studies*, Volume 1, Volume 26.
49. Al Shobaki, M. J., Abu-Naser, S. S., El Talla, S. A., & Abu Amuna, Y. M. (2018). *Performance Reality of Administrative Staff in Palestinian Universities*. *International Journal of Academic Information Systems Research (IJAISR)*, 2(4), 1-17 .
50. Madi, S. A., El Talla, S. A., Abu-Naser, S. S., & Al Shobaki, M. J. (2018). *The dominant pattern of leadership and Its Relation to the Extent of Participation of Administrative Staff in Decision-Making in Palestinian Universities*. *International Journal of Academic Management Science Research (IJAMSR)*, 2(7), 20-43 .
51. Bahr, Yousef and Abu Swirih, Ayman (2010). *The Impact of Organizational Climate on the Performance of Administrative Personnel in the Islamic University of Gaza, Palestine*.
52. Burhan, Mohamed Nour (1994). "Management of Government Information Systems Elements of

- Strategies and Policies", (translated), Report of the United Nations Technical Cooperation for Development, Arab Organization for Administrative Development, Amman.
53. Burhan, Mohammed, (1984), "The use of electronic computers in management." Documentation and Manuscript Center for Publishing, without edition, p. 5, Damascus, Syria
54. El Talla, S. A., Al Shobaki, M. J., Naser, S. S. A., & Amuna, Y. M. A. (2017). The effectiveness of a training program in increasing crowd funding awareness. *International Journal of Advanced Educational Research*, 2(1), 31-37 .
55. FarajAllah, Ahmed M. A., El Talla, Suliman A., Abu-Naser, Samy S., and Al Shobaki, Mazen J. (2018). The Nature of Work and Its Relation to the Type of Communication among Employees in Palestinian Universities - A Comparative Study between Al-Azhar and Al-Aqsa Universities. *International Journal of Academic Multidisciplinary Research (IJAMR)*, 2 (6), 10-29
56. Haidar, Fahmi (2002). "Information Systems Approach to Achieve Competitive Advantage", University House, Alexandria, Egypt.
57. Hamoud, Khudair Kazem (2002). "Organizational Behavior", Dar Al Safa Publishing and Distribution, Amman, Jordan.
58. Hila, A. A. A., Shobaki, M. J. A., & Naser, S. S. A. (2017). The Effect of Academic Freedoms in Enhancing the Social Responsibility of Palestinian University Staff in the Gaza Governorates. *International Journal of Engineering and Information Systems (IJEAIS)*, 1(5), 22-35 .
59. Jad Al-rab, Syed Mohamed (2005). *Fundamentals of Business Administration*, First Edition, Academy Library, Cairo.
60. Jad Al-rab, Syed Mohamed (2010) *International Business Management: Fundamentals - Strategies - Applications*, First Edition, Al-Ashri Press, Cairo.
61. Jassim, Majid Jouda and Hammoud, Salam Jassim (2011). The Impact of Elements of the Organizational Climate in the Management of University Performance, A Survey Study of the Views of a Sample of Faculty Members at Al-Muthanna University, *Iraqi Journal of Administrative Sciences*, 2012, Volume 8, Issue 31, pp. 269-289. University of Karbala.
62. Madi, Sahar A., El Talla, Suliman A., Abu-Naser, Samy S., and Al Shobaki, Mazen J. (2018). The Organizational Structure and its Impact on the Pattern of Leadership in Palestinian Universities. *International Journal of Academic Management Science Research (IJAMSR)*, 2 (6), 1-25
63. Naser, S. S. A., & Al Shobaki, M. J. (2016). Computerized Management Information Systems Resources and their Relationship to the Development of Performance in the Electricity Distribution Company in Gaza. *EUROPEAN ACADEMIC RESEARCH*, 6(8), 6969-7002 .
64. El Talla, S. A., Al Shobaki, M. J., Abu-Naser, S. S., & Amuna, Y. M. A. (2018). The Nature of the Organizational Structure in the Palestinian Governmental Universities-Al-Aqsa University as A Model. *International Journal of Academic Multidisciplinary Research (IJAMR)*, 2(5), 15-31 .
65. Shio, Martin J., (1983). "An Approach to Design of National Information Systems for Developing Countries", *Information Systems in the Public Administration*, North-Holland Pub. Co., Amsterdam.
66. Sultan, Y. S. A., Al Shobaki, M. J., Abu-Naser, S. S., & El Talla, S. A. (2018). The Style of Leadership and Its Role in Determining the Pattern of Administrative Communication in Universities-Islamic University of Gaza as a Model. *International Journal of Academic Management Science Research (IJAMSR)*, 2(6), 26-42.
67. Al Shobaki, M. M., Naser, S. S. A., Amuna, Y. M. A., & El Talla, S. A. (2017). The Efficiency of Information Technology and its Role of e-HRM in the Palestinian Universities. *International Journal of Engineering and Information Systems*, 1(5), 36-55.
-