

Information Security Policies and their Relationship with the Effectiveness of the Management Information Systems of Major Palestinian Universities in the Gaza Strip

Ann S. Abdelwahed

Department of Business Administration
Faculty of Administrative and Economic Sciences
Al-Quds Open University, Gaza, Palestine
Corresponding Author: ann.s.eit@gmail.com

Ahmed Y. Mahmoud

Department of Information Technology
Faculty of Engineering and Information Technology
Al Azhar University, Gaza, Palestine
ahmed@alazhar.edu.ps

Ramiz A. Bdair

Department of Business Administration
Faculty of Economic and Management Sciences
Al Azhar University, Gaza, Palestine
dr.ramez@yahoo.com

Abstract

This paper aims to recognise Information Security Policies (ISP) and their relationship with the effectiveness of the Management Information Systems (MIS) of the major Palestinian universities in the Gaza Strip. The researchers used the descriptive analytical approach. They used a questionnaire as a research tool. They used a stratified random sample to explore viewpoints of the research sample which comprised 169 employees of The Islamic University – Gaza, Al Azhar University - Gaza, and Al-Quds Open University - Gaza Strip branches. The population comprised IT center employees and administrative departments' employees who use MIS in their daily work. 152 questionnaires were collected, with a response rate of 89.94%. The study found that the research sample had shown a high degree of agreement on the ISP dimensions (Risk Assessment of Information Security, Senior Management Support, Reviewing and Updating of ISP, Enforcement of ISP, Training and Awareness of ISP). Those dimensions together gained a rate of 74%. The study also found that the research sample had shown a high degree of agreement on the field of the "Effectiveness of MIS", with a rate of 81%. In addition, it demonstrated a statistically significance relationship level ($\alpha \leq 0.05$) between ISP and the effectiveness of the MIS of the major Palestinian universities in the Gaza Strip. It recommends that the universities should support the Information Security Policies from the process of risk assessment and creation of ISP to the process of continuous reviewing and updating of ISP. Furthermore, the universities should measure the effectiveness of their MIS periodically, to enhance this effectiveness and improve it regularly.

Keywords: Information Security Policy (ISP), Management Information Systems (MIS), Information Security, Effectiveness.

Introduction

Technology and management are invaluable tools for the advancement of any modern society. Perceptions of technology and management are largely determined by the seriousness and closeness of their relationship. There is a substantial need of technology and management

to each other. As technology progress accelerates continuously, it positively reflects upon management and in turn management facilitates technological advancement. Both guarantee each other's privileges and successes; together, they evolve in positive constructive development. This proposition manifests that information technology acceleration positively reflects upon daily managerial operations. Accordingly, the systems designers and developers maintain various Management Information Systems. Thaalab (2011) mentions that these systems utilise modern techniques and provide the necessary quantitative and accurate information, in the appropriate time, to contribute to supporting various decision-making processes. The more effective the Management Information Systems, the more they facilitate information exchange, and the more they guarantee information availability in the required characteristics (Al-Taeii, 2004).

The massive boost in information exchange has alerted concerned institutions to reconsider their information security, safety, integrity and non-repudiation (Dawood, 2004). Implementation of information security requires a set of security policies, procedures, conscious staff, effort, time, and financial and technical resources, to design a reliable security system (Al-Sarhan & Al-Mashhadni, 2001). It is conspicuous that the management of the organisation's information systems become more sophisticated with increased numbers of employees, applications, and systems. To determine secure use of hardware and software, and to facilitate and encourage secure employees' behavior, organizations utilize ISP (Al-Awadi & Renaud, 2008). Those policies generate a secured system, if they were accurately planned, implemented, distributed, monitored, refined and supported by senior management (Al-Danaf, 2013). It is significant for the institutions to consider the necessity of setting up criteria of Information Security standards; they should communicate, cooperate and coordinate to implement information security at all institutional levels.

Palestinian Universities in the Gaza Strip utilise Information and Communication Technology to invest in information systems. They design and develop information systems for their daily managerial operations. Furthermore, the academic staff, managerial staff, students and stakeholders utilise these information systems to perform several operations to access the proper information via Internet or some local networks. The universities should set up unambiguous policies to enhance the employees' awareness of the procedures and rules that help them protect their information.

Universities in poor countries encounter severe political and economic challenges. They are virtually unable to progress in areas like technology and management, even if they want to do so. Given this, the luxury of advancement in technology and management, to compete with the Western world is simply not possible. In such universities of the poor societies, administrations are most likely required to care for their conventional education, with implicit attempts to improve their academic performance and management, through harsh political and economic times.

We anticipate this research to be an additional reference for researchers and students, and to enrich the libraries and the research centers, as it concerns an important issue, particularly in the Arab region. In addition, we intend this research to assist the decision makers in the universities to promote their realisation of ISP significance and its relationship to the effectiveness of MIS. Likewise, we intend this study to help the decision makers to refer to

the research results, to grant more support for ISP to enhance the Effectiveness of MIS.

Research Problem and objectives

MIS effectiveness is significant due to its crucial role in the success of the institutions. The more effective MIS, the more it is capable of implementing the managerial operations with accuracy and regularity. The available previous studies indicated that IT centers and units at Palestinian universities in the Gaza Strip suffer insufficient MIS effectiveness. Al-Masri (2007) concluded that the universities in the Gaza Strip lack enough strategic plans for their IT centers and units, despite the fact that MIS plans are included in these strategic plans. Furthermore, Al-Dirawi (2014) concluded that the universities considerably need to illustrate their MIS mission. In addition, the study concluded that MIS strategic plans in those universities are insufficient, and the employees are unclear about the objectives. Although effectiveness is the degree of the objectives achievement, the objectives are still unclear. Also, Abd Elrahman (2001) pointed out that MIS accurate planning largely influences these systems. One of the methods to enhance MIS effectiveness is to implement ISPs in the institutions. ISP is one of the ISO27002 components, as it clarifies the direction of, and the support for information security. Implying the ISP in MIS strategic plan guarantees the information quality and confidentiality (Doherty & Fulford, 2006). Periodical Risk Assessment, ISP creation, Implementation, Revision and Development, reflect strongly and positively upon MIS (Al-Danaf, 2013). Consequently, this research paper studies the relationship between ISP and the effectiveness of MIS at Palestinian Universities in the Gaza Strip.

This research will therefore address the following main question: *What is the relationship between Information Security Policies and the Effectiveness of Management Information Systems at Palestinian Universities in the Gaza Strip?*

The research aims to investigate the relationship between ISP with its five dimensions (Senior Management Support, Information Security Risk Assessment, Training and Awareness of ISP, Enforcement of ISP, Reviewing and Updating of ISP) and the Effectiveness of MIS at Palestinian Universities in the Gaza Strip. It also aims to assess the state of ISP at Palestinian Universities in the Gaza Strip and to assess the state of the Effectiveness of MIS at Palestinian Universities in the Gaza Strip. It also aims to recommend some guidelines to support ISP and enhance the Effectiveness of MIS at Palestinian universities in the Gaza Strip.

Related Work

Information Security Policy

The literature offers many definitions of the concept of ISP. Dulany (2002) defined ISP as a set of security rules governing an Information System that provide an established level of protection. These policies must address the management, protection, and resources associated with the information and the Information Systems. Sidhu (2012) defined ISP as a set of rules, regulations, laws and practices that manage how assets in the system including sensitive information are managed, protected, shared and distributed accurately without any type of loss. According to Arnason & Willett (2008) it is a document that describes the organisation's

Information Security Management System in a simple and clear vocabulary. The objective of ISP is to illustrate the employees' Information Security responsibilities and duties, also to state procedures that should be followed to avoid the security risks (Al-Najjar, 2010). While Hare (2001) stated that, the main objective of ISP is to maintain the integrity, confidentiality, and availability of information resources. Al-Saheb (2013) concluded that availability of ISP in the institution contributes in ensuring security.

There are different views about determining the phases of the ISP lifecycle. Howard (2002) indicated that the ISP life cycle functions are: Policy Creation, Review, Approval, Communication, Implementation, Awareness, Exceptions, Compliance Monitoring, Enforcement, Updating and Retirement, and he indicated that it is possible to execute more than one function at one time. Eloff & Ramdeyal (2004) pointed out that the ISP model is represented in the following phases: Risk Assessment of Information Security, ISP Creation, ISP Implementation, ISP Updating, in addition to the need to Senior Management support. The phases of the ISP life cycle are classified into Risk Assessment of Information Security, ISP Creation, Training and Awareness, Implementation, Monitoring, Enforcement, Reviewing and Retirement (Knapp, et al., 2009). Kanpp & Ferrante (2012) outlined the dimensions of ISP in three major phases, ISP Awareness, Enforcement and Reviewing and Updating. In addition, it concluded that ISP Awareness is the most influential factor concerning the effectiveness of information security program and it is more important than either ISP Enforcement or ISP reviewing and updating consequently.

Al-Saheb (2013) pointed out that it is essential for the institution to have a documented ISP that is formulated depending on the potential risks in the institution; these policies should be reviewed at least annually and more often where necessary. Maynard, et al. (2002) asserted that insufficiency in ISP documentation is one of the problems that is encountered in the ISP development process, and they concluded that the lack of correlation between ISP and risk assessment process is one of the difficulties encountered in the ISP development process. Karyda, et al. (2005), Kazemi, et al. (2012), Sookdawoor (2005), Knapp, et al. (2009), Maynard, et al. (2002) stated that the senior management support is one of the most important factors affecting the success of ISP. While Mlangeni & Biermann (2006) found that the senior management needed more knowledge about ISP. Altom (2013), Al-Danaf (2013) concluded that there is a lack of employee awareness and experience in ISP. Qureshi (2011) concluded that lack of awareness and training results in poor ISP efficiency. Al-Gathbar & Al-Sbaih (2012) found that there is attention to ISP creation and ISP reviewing and updating, but there is a weakness in risk assessment processes and in ISP training and awareness programs. Al-Awadi & Renaud (2008), Maynard, et al. (2002) stated that ISP enforcement is considered one of the important factors that influence the success of information security implementation.

Effectiveness of Management Information Systems

MIS is a computer based information system used for planning, controlling, decision-making, and problem solving (oz, 2009). Abd Rabbou (2013) indicated that MIS is a group of integrated elements that collect, process, store and distribute the information to support the decision making process. According to Sayedpoor & Hoveyda (2015) MIS is an integrated system consists of people and machines. They fulfill the required information in order to

support the operations, management and decision making in their organization. MIS is composed of a number of related components, which are Inputs, Processes, Outputs, Storage and Control (Munirat, 2014). Whilst Al-Hameed & Nino (2007) pointed out the MIS resources are hardware, software, people and databases.

MIS plays a major role in managing information and in helping the managers to collect, integrate and assign the information needed, and to ensure the effective and efficient decision making process (Mishra, et al., 2015). To ensure the effectiveness of decision making process, the organizations should ensure the effectiveness of MIS. Al-Rashdi (2013) concluded that the effectiveness of MIS is an irreplaceable necessity for institutions as it helps in following up with the workflow process.

MIS effectiveness is the degree to which a goal is achieved. Thus, a system is more or less effective depending on how much of a particular goal it achieves, and the degree to which it achieves better outcomes than other systems (oz, 2009). Al-Taeii (2004) defined MIS effectiveness as the MIS ability to generate outputs in the required characteristics to facilitate the decision making process to achieve client satisfaction. Hien, et al. (2014) pointed out that the effectiveness of the system is more concerned with the influence of those systems on the environment. They also stated that the effective information system must support its organization to achieve all its objectives.

Though MIS efficiency is relatively easy to define and measure, it is much more difficult to adequately operationalize MIS effectiveness. Moreover, the lack of a relevant theory and the discord on a definition of MIS effectiveness exacerbate confusion and vagueness (Trivellas & Santouridis, 2013).

There are different dimensions to measure the effectiveness of MIS. These dimensions are User Satisfaction (Alkshali & Al-Qutob, 2007), (Abd Elrazzaq, 2011), (Abo Omar, 2009), (Al Ahmed, 2002), Amount of use (Alkshali & Al-Qutob, 2007), (Abd Elrazzaq, 2011), (Al Ahmed, 2002), System Suitability for Managerial Levels (Alkshali & Al-Qutob, 2007), (Abd Elrazzaq, 2011), (Abo Omar, 2009), (Al Ahmed, 2002), (Abdoyan, 2010), Information Security (Barzegar, et al., 2013), (Alkshali & Al-Qutob, 2007), (Abd Elrazzaq, 2011), (Abo Omar, 2009), (Al Ahmed, 2002), (Abdoyan, 2010), Flexibility (Alkshali & Al-Qutob, 2007), (Abd Elrazzaq, 2011), (Abo Omar, 2009), (Al Ahmed, 2002), (Abdoyan, 2010), Speed of Access to Information (Abo Omar, 2009), Speed of Decision Making (Abo Omar, 2009). Barzegar, et al. (2013) used related information, information accuracy, information correctness, information security, information speed, information economy and elements of MIS as indicators of MIS effectiveness.

On the other hand, Trivellas & Santouridis (2013) studied the impact of MIS effectiveness on task productivity, whereas Al-Rashdi (2013), Alkshali & Al-Qutob (2007) studied the relationship between MIS effectiveness and risks management. Abo Omar (2009), Abd Elrazzaq (2011) conducted some research to study the impact of the effectiveness of MIS on crisis management. Abdoyan (2010), Al-Shaqran & Ashour (2010) concluded that the effectiveness of MIS influences the institutions performance. Al Ahmed (2002) studied the organizational structure impact on the effectiveness of information systems.

Relationship between ISP and the Effectiveness of MIS

This research examines the relationship between ISP and the effectiveness of MIS of the major Palestinian universities in the Gaza Strip. As Selamat, et al. (2006) pointed out that there is an interdependence between Information Systems strategic planning and ISP. Furthermore, Doherty & Fulford (2006) assisted that implying the ISP in MIS strategic plans guarantees information quality and confidentiality. In addition, Al-Maashar & Al-Khasba (2006) concluded that there is a great impact of technical and organizational factors on the MIS, and policies are considered one of these factors. Meanwhile, this research covers the major ISP dimensions as the literature review shows there is insufficient research concerning ISP mainly in the Arab region. In addition, the literature review obviously uncovers the relationship between ISP and the effectiveness of MIS.

Methodology

Research Hypothesis

Hypothesis: There is a statistical relationship at significance level ($\alpha \leq 0.05$) between Information Security Policies and the Effectiveness of MIS at Palestinian Universities in the Gaza Strip.

H1: There is a statistical relationship at significance level ($\alpha \leq 0.05$) between the Senior Management Support and the Effectiveness of MIS at Palestinian Universities in the Gaza Strip.

H2: There is a statistical relationship at significance level ($\alpha \leq 0.05$) between the Information Security Risk Assessment of Information Security and the Effectiveness of MIS at Palestinian Universities in the Gaza Strip.

H3: There is a statistical relationship at significance level ($\alpha \leq 0.05$) between the Training and Awareness of ISP and the Effectiveness of MIS at Palestinian Universities in the Gaza Strip.

H4: There is a statistical relationship at significance level ($\alpha \leq 0.05$) between the Enforcement of ISP and the Effectiveness of MIS at Palestinian Universities in the Gaza Strip.

H5: There is a statistical relationship at significance level ($\alpha \leq 0.05$) between the Reviewing and Updating of ISP and the Effectiveness of MIS at Palestinian Universities in the Gaza Strip.

Sample Selection and Description

The researchers used the “Descriptive Analytical” approach, as it is convenient and widely used in analysing such a research.

The research population is composed of IT Centers’ and Units’ employees, and administrative departments’ employees who use MIS in their daily work. Those employees are from three major universities in the Gaza Strip: Islamic University, Al Azhar University, and Al-Quds Open University.

These universities are the largest and the oldest universities in the Gaza Strip. According to the most recent statistics by the Ministry of Higher Education in Palestine, those universities populate the largest bulk of students in the Gaza Strip. There are IT Centers/Units in the

organizational structure of those universities and they use MIS in their daily administrative activities.

The sample of the study is a Stratified Random Sample. Research sample equals 169. The researchers distributed 169 questionnaires based upon each university's proportion of the sample. Researchers collected 152 questionnaire sheets with a response rate 89.94%. As mentioned by Sekaran (2000) the minimum acceptable response rate is 30%. Thus, the response rate here is sufficient. Table (1) displays the research population and research sample.

Table 1
Research Population and Research Sample

No.	University	Population	Population Proportion	Sample Size	Sample Size Proportion	Collected Questionnaires	Response Rate
1.	Islamic University	167	55.3%	93	55.0%	78	83.87%
2.	Al-Azhar University	75	24.8%	42	24.9%	42	100%
3.	Al-Quds Open University	60	19.9%	34	20.1%	32	94.12%
Total		302	100%	169	100%	152	89.94%

Instrument Development

The research instrument is a questionnaire; we designed it especially to collect the research data. It is convenient for this research; it saves time and effort, and it enables the researchers to collect data from a large number of individuals.

The questionnaire is composed of two parts. Part one includes the personal traits for the research sample (University, Gender, Position, Years of Work Experience in the Field, Educational Qualification, Major Specialization). Whilst part two includes the research variables. The questionnaire consists of 49 paragraphs, of which 13 measure the dependent variable (Effectiveness of MIS), whereas the other 36 paragraphs measure the dependent variable (ISP) with its five dimensions.

Table 2
Questionnaire items regarding to fields and dimensions

Field	Dimension	No. of Items
ISP	Senior Management Support	8
	Risk Assessment of Information Security	8
	Training and Awareness of ISP	8
	Enforcement of ISP	7
	Reviewing and Updating of ISP	5
Total of ISP Items		36
Effectiveness of MIS	Effectiveness of MIS	13
Total of Questionnaire Items		49

Research Measures

The *dependent variable* is (Effectiveness of MIS), and the *independent variable* is (ISP).

The independent variable consists of Senior Management Support, Risk Assessment of Information Security, Training and Awareness of ISP, Enforcement of ISP, Reviewing and Updating of ISP. Demographic data is represented by: University, Gender, Position, Years of Work Experience in the Field, Educational Qualification, Major Specialization. The researchers adopt Likert Scale Model (Five Points Scale) to rate the questionnaire's responses as it appears in Table (3).

Table 3

Questionnaire Answering Model

Item	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Scale	1	2	3	4	5

Validity and Reliability of the Questionnaire

Parametric statistics can be used with Likert data, regardless of sample size, and regardless of whether the data has a normal or non-normal distribution (Norman, 2010). In addition, Rabeea (2007) mentioned that in the samples size which exceed 30 individuals, the researcher can abandon the normal distribution condition. Accordingly, the researchers used the parametric tests to perform statistical data analysis such as Pearson Correlation Coefficient, Cronbach's Alpha, and One Sample T-Test.

A composite of statistical tools were used to analyze the data and to interpret it for more valid and meaningful data. The data analysis was made by utilizing the Statistical Package for Social Sciences (SPSS V.22). The researchers carried out a pilot study on 30 individuals to check the validity and reliability of the instrument.

Validity of the instrument

A questionnaire's validity refers to the degree to which it measures what it is supposed to be measuring (El Telbani, 2013). There are a number of different aspects and assessment approaches concerning validity. There are two methods to measure validity. Validity of Referees and Statistical Validity. Statistical Validity includes Internal Validity and Structural Validity.

Face Validity

A first draft copy of the questionnaire was set up according to the literature review and the statement problem. This was presented to a group of professors to check its validity regarding its content, its clarity of paragraphs and questions and its suitability for the research topic. After detailed feedback from the referees, a final version was prepared.

Structural Validity of the instrument

Structural validity is a statistical test that is used to test the validity of the questionnaire structure by measuring correlation coefficient between each field and dimension of the questionnaire, and the whole questionnaire.

Table 4

Correlation coefficient of each field and dimension and the whole of questionnaire

Field	Dimension	Correlation Coefficient	P – Value (Sig.)
ISP	Senior Management Support	0.809*	0.000
	Risk Assessment of Information Security	0.824*	0.000
	Training and Awareness of ISP.	0.796*	0.000
	Enforcement of ISP	0.850*	0.000
	Reviewing and Updating of ISP	0.842*	0.000
All dimensions of ISP		0.985*	0.000
Effectiveness of MIS	Effectiveness of MIS	0.856*

*Correlation is statistically significant at the 0.05 level

Table (4) displays the correlation coefficient for each field and dimension of the questionnaire, and the whole questionnaire. The p-values (Sig.) are less than 0.05, thus, the correlation coefficients of all the fields and dimensions are significant at $\alpha = 0.05$; it is argued that the fields and dimensions are a valid measure of what the research set out to achieve.

Internal Consistency of the instrument

Internal validity of the questionnaire is a statistical test that is used to test the validity of the questionnaire by measuring the correlation coefficients between each item and the whole dimension or field that it belongs to. The following tables display the results of the internal validity test.

Table 5

Correlation coefficient of each item of "Senior Management Support" and the total of this dimension

No.	Item	Correlation Coefficient	P-Value (Sig.)
1.	University Senior Management is aware of ISP significance.	0.705*	0.000
2.	University Senior Management supports implementing ISP.	0.788*	0.000
3.	University Senior Management supports establishing Information Security department.	0.773*	0.000
4.	University Senior Management is concerned about recruiting Information Security specialists.	0.786*	0.000
5.	University Senior Management writes and approves ISP.	0.836*	0.000
6.	University Senior Management circulates ISP among staff.	0.795*	0.000
7.	University Senior Management appropriates ISP vis-a-vis other policies.	0.809*	0.000
8.	University Senior Management allocates the required budget for ISP preparation and implementation.	0.778*	0.000

*Correlation is statistically significant at the 0.05 level

Table 6

Correlation coefficient of each item of "Risk Assessment of Information Security" and the total of this dimension

No.	Item	Correlation Coefficient	P-Value (Sig.)
1.	The university periodically determines the risks which endanger its information.	0.762*	0.000
2.	The university determines precautionary measures to limit the level of anticipated risks.	0.768*	0.000
3.	The university takes adequate procedures to prevent unauthorized access to information.	0.798*	0.000
4.	The university takes adequate procedures to prevent intentional adding of false information by staff	0.743*	0.000
5.	The university updates methods to protect its information as the technological environment develops.	0.742*	0.000
6.	I am aware of the procedures to be followed to avoid Information Security risks to the university.	0.697*	0.000
7.	ISP is suitable for the anticipated information risks to the university.	0.816*	0.000
8.	ISP helps in reducing anticipated information risks to the minimum at the university.	0.675*	0.000

*Correlation is statistically significant at the 0.05 level

Table 7

Correlation coefficient of each item of "Training and Awareness of ISP" and the total of this dimension

No.	Item	Correlation Coefficient	P-Value (Sig.)
1.	The university issues periodical awareness leaflets on ISP significance.	0.696*	0.000
2.	I am aware of the university ISP.	0.713*	0.000
3.	I consider the university ISP evident and understandable.	0.776*	0.000
4.	The university ISP training and awareness programs are continual.	0.888*	0.000
5.	The university conducts compulsory ISP awareness lectures and training courses.	0.883*	0.000
6.	The university allocates an ISP training and awareness budget.	0.877*	0.000
7.	The university training and awareness programs explain my disagreement with ISP at the university.	0.781*	0.000
8.	The university ISP special training program contents correspond with the environment and needs of the university.	0.752*	0.000

*Correlation is statistically significant at the 0.05 level

Table 8

Correlation coefficient of each item of "Enforcement of ISP" and the total of this dimension

No.	Item	Correlation Coefficient	P-Value (Sig.)
1.	The university obliges me to comply with ISP implications.	0.824*	0.000
2.	The university reconsiders ISP when information penetration takes place.	0.794*	0.000
3.	The university monitors my commitment to ISP implementation.	0.843*	0.000
4.	The university penalises me when I violate ISP.	0.820*	0.000
5.	The university considers my commitment to ISP among the most significant elements of my performance.	0.817*	0.000
6.	I accomplish ISP by executing managerial decisions.	0.811*	0.000
7.	I accomplish ISP by executing online instructions such as altering my account's password.	0.788*	0.000

*Correlation is statistically significant at the 0.05 level

Table 9

Correlation coefficient of each item of "Reviewing and Updating of ISP" and the total of this dimension

No.	Item	Correlation Coefficient	P-Value (Sig.)
1.	There is a well-known university authority responsible for reviewing and updating ISP.	0.827*	0.000
2.	The university periodically reviews and updates ISP.	0.866*	0.000
3.	The university updates ISP to correspond with world technological developments.	0.807*	0.000
4.	The university always demonstrates to me any updates that take place on ISP.	0.867*	0.000
5.	The university encompasses me in any ISP revision and updating.	0.713*	0.000

*Correlation is statistically significant at the 0.05 level

Tables (5 to 9) display the correlation coefficient between each item and the whole dimension or field that it belongs to. The p-values (Sig.) are less than 0.05, thus, the correlation coefficients of these dimensions and fields are significant at $\alpha = 0.05$; it can be said that the items of these dimensions are consistent and valid to measure what it was set for.

Table 10

Correlation coefficient of each item of "Effectiveness of MIS" and the total of this Field

No.	Item	Correlation Coefficient	P-Value (Sig.)
1.	There are enough methods to protect MIS at the university.	0.676*	0.000
2.	MIS at the university implies characteristics to protect the information and reduce errors.	0.785*	0.000
3.	MIS at the university can detect the personal behavior that threatens or leaks its information.	0.713*	0.000

No.	Item	Correlation Coefficient	P-Value (Sig.)
4.	MIS at the university grants accurate and secure information.	0.763*	0.000
5.	MIS at the university grants adequate information and it accomplishes the requirements of the work.	0.731*	0.000
6.	MIS at the university improves the outcomes of the work.	0.754*	0.000
7.	MIS at the university grants the required information in the appropriate date and time.	0.765*	0.000
8.	The university studies cases of MIS penetration or leakage, and benefits from those studies.	0.662*	0.000
9.	The university strictly penalises those who leak or uncover MIS to unauthorised people.	0.643*	0.000
10.	The university authorises entering MIS on the basis of the staff managerial level.	0.663*	0.000
11.	The university updates MIS and continually maintains it.	0.752*	0.000
12.	There is a special MIS department at the university.	0.708*	0.000
13.	There is MIS technical support center at the university.	0.703*	0.000

*Correlation is statistically significant at the 0.05 level

Table (10) displays the correlation coefficient for each item of the field "Effectiveness of MIS" and the total of the field. The p-values (Sig.) are less than 0.05, thus, the correlation coefficients of this field are significant at $\alpha = 0.05$; it can be said that the items of this field are consistent and valid to measure what it was intended.

Reliability of the Questionnaire

The reliability of an instrument is the degree of consistency that measures the attribute; it is supposed to be measuring. The less variation an instrument produces in repeated measurements of an attribute, the higher its reliability. Reliability is equivalent to stability, consistency, or dependability of a measuring tool. The test is repeated with the same sample of people on two occasions and then compares the scores obtained by computing a reliability coefficient (El Telbani, 2013).

Cronbach's Coefficient Alpha

This method is used to measure the reliability of the questionnaire. The Cronbach's Coefficient Alpha was calculated for each field and dimension of the questionnaire. The normal range of Cronbach's Coefficient Alpha value is between 0.0 and +1.0, and the higher values reflects a higher degree of internal consistency.

Table 11

Reliability of the Questionnaire using Cronbach's Alpha method

Field	Dimension	Cronbach's Alpha
ISP	Senior Management Support	0.910
	Risk Assessment of Information Security	0.888
	Training and Awareness of ISP.	0.918
	Enforcement of ISP	0.914

Field	Dimension	Cronbach's Alpha
	Reviewing and Updating of ISP	0.870
	All dimensions of ISP	0.962
Effectiveness of MIS	Effectiveness of MIS	0.920
	All items of the questionnaire	0.970

Table (11) displays that the value of Cronbach's Alpha of the fields and dimensions were in the range from 0.870 and 0.918. This range is considered high; the result ensures the reliability of each field and dimension of the questionnaire. Cronbach's Alpha equals 0.970 for the entire questionnaire, which indicates an excellent level of reliability.

Analytical approach

Statistical analysis for the First Field (ISP)

Senior Management Support

Table 12

Statistical analysis results for items of "Senior Management Support" dimension

No.	Item	Mean	Proportional Mean	Test Value	P-Value (Sig.)	Rank
1.	University Senior Management is aware of ISP significance.	4.20	84%	20.53	0.000	1
2.	University Senior Management supports implementing ISP.	4.07	81%	16.89	0.000	2
3.	University Senior Management supports establishing Information Security department.	3.95	79%	13.61	0.000	3
4.	University Senior Management is concerned about recruiting Information Security specialists.	3.81	76%	12.05	0.000	4
5.	University Senior Management writes and approves ISP.	3.64	73%	8.01	0.000	5
6.	University Senior Management circulates ISP among staff.	3.55	71%	7.10	0.000	8
7.	University Senior Management appropriates ISP vis-a-vis other policies.	3.59	72%	7.70	0.000	6
8.	University Senior Management allocates the required budget for ISP preparation and implementation.	3.57	71%	7.85	0.000	7
	All items of the dimension	3.80	76%	14.35	0.000	

Table (12) displays that item #1 "University Senior Management is aware of ISP significance" has been ranked as the first regarding to mean value that equals 4.20 (84%). Meanwhile item #6 "University Senior Management circulates ISP among staff" has been ranked as the last regarding to mean value that equals 3.59 (72%). The mean of the dimension "Senior Management Support" equals 3.80 (76%). Researchers conclude that the respondents

agreed to this item. It is appropriate to mention that the proportional means are rounded to the nearest integer.

The former results indicate that the universities support ISP, but they need to pay more attention to circulating the ISP among staff. This is consistent with the literature that stressed the significance of senior management support in ISP creation and implementation process and it is seen as one of the most significant factors that affects upon ISP success.

Risk Assessment of Information Security

Table 13

Statistical analysis results for items of "Risk Assessment of Information Security" dimension

No.	Item	Mean	Proportional Mean	Test Value	P-Value (Sig.)	Rank
1.	The university periodically determines the risks which endanger its information.	3.97	79%	14.18	0.000	4
2.	The university determines precautionary measures to limit the level of anticipated risks.	4.03	81%	15.25	0.000	3
3.	The university takes adequate procedures to prevent unauthorized access to information.	4.05	81%	15.82	0.000	2
4.	The university takes adequate procedures to prevent intentional adding of false information by staff	3.91	78%	14.00	0.000	5
5.	The university updates methods to protect its information as the technological environment develops.	4.09	82%	18.17	0.000	1
6.	I am aware of the procedures to be followed to avoid Information Security risks to the university.	3.66	73%	9.09	0.000	7
7.	ISP is suitable for the anticipated information risks to the university.	3.83	77%	13.27	0.000	6
8.	ISP helps in reducing anticipated information risks to the minimum at the university.	4.09	82%	19.40	0.000	1
All items of the dimension		3.95	79%	19.60	0.000	

Table (13) shows that item #5 "The university updates methods to protect its information as the technological environment develops" and item #8 "ISP helps in reducing anticipated information risks to the minimum at the university" have been ranked as the first one regarding to mean value which equals 4.09 (82%). Meanwhile item #6 "I am aware of the procedures to be followed to avoid Information Security risks to the university" has been ranked as the last one regarding to mean value that equals 3.66 (73%). The mean of the dimension "Risk Assessment of Information Security" equals 3.95 (79%). Researchers conclude that the respondents agreed to this item.

The former results show that the universities do focus on risk assessment of information security as a part of ISP implementation, but they need to pay more attention to specify the procedures to be followed by the employees to avoid the information security risks.

Table 14

Statistical analysis results for items of "Training and Awareness of ISP" dimension

No.	Item	Mean	Proportional Mean	Test Value	P-Value (Sig.)	Rank
1.	The university issues periodical awareness leaflets on ISP significance.	3.72	74%	8.45	0.000	1
2.	I am aware of the university ISP.	3.53	71%	6.94	0.000	3
3.	I consider the university ISP evident and understandable.	3.54	71%	7.73	0.000	2
4.	The university ISP training and awareness programs are continual.	3.33	67%	3.85	0.000	6
5.	The university conducts compulsory ISP awareness lectures and training courses.	3.16	63%	1.76	0.080	7
6.	The university allocates an ISP training and awareness budget.	3.15	63%	1.76	0.080	8
7.	The university training and awareness programs explain my disagreement with ISP at the university.	3.34	67%	4.32	0.000	5
8.	The university ISP special training program contents correspond with the environment and needs of the university.	3.40	68%	5.17	0.000	4
All items of the dimension		3.40	68%	6.12	0.000	

Table (14) displays that item #1 "The university issues periodical awareness leaflets on ISP significance" has been ranked as the first one regarding to mean value which equals 3.72 (74%). Meanwhile item #6 "The university allocates an ISP training and awareness budget" has been ranked as the last one regarding to mean value that equals 3.15 (63%). The mean of the dimension "Training and Awareness of ISP" equals 3.40 (68%). Researchers conclude that the respondents agreed to this item.

The former results show that the universities need to conduct more training and awareness programs of ISP, and allocate a budget for them as this dimension has been ranked with the lowest dimension rate.

Table 15

Statistical analysis results for items of "Enforcement of ISP" dimension

No.	Item	Mean	Proportional Mean	Test Value	P-Value (Sig.)	Rank
1.	The university obliges me to comply with ISP implications.	3.83	77%	11.03	0.000	3
2.	The university reconsiders ISP when information penetration takes place.	3.86	77%	10.55	0.000	2

No.	Item	Mean	Proportional Mean	Test Value	P-Value (Sig.)	Rank
3.	The university monitors my commitment to ISP implementation.	3.64	73%	7.66	0.000	6
4.	The university penalises me when I violate ISP.	3.69	74%	8.59	0.000	4
5.	The university considers my commitment to ISP among the most significant elements of my performance.	3.49	70%	5.50	0.000	7
6.	I accomplish ISP by executing managerial decisions.	3.68	74%	8.83	0.000	5
7.	I accomplish ISP by executing online instructions such as altering my account's password.	3.91	78%	12.25	0.000	1
All items of the dimension		3.73	75%	11.17	0.000	

Table (15) displays that item #7 "I accomplish ISP by executing online instructions such as altering my account's password" has been ranked as the first one regarding to mean value which equals 3.91 (78%). Meanwhile item #5 "The university considers my commitment to ISP among the most significant elements of my performance" has been ranked as the last one regarding to mean value that equals 3.49 (70%). The mean of the dimension "Enforcement of ISP" equals 3.73 (75%). Researchers conclude that the respondents agreed to this item.

The former results indicate that the Palestinian universities realize the significance of the enforcement as an important dimension of ISP.

Table 16

Statistical analysis results for items of "Reviewing and Updating of ISP" dimension

No.	Item	Mean	Proportional Mean	Test Value	P-Value (Sig.)	Rank
1.	There is a well-known university authority responsible for reviewing and updating ISP.	4.10	82%	16.5 2	0.000	1
2.	The university periodically reviews and updates ISP.	3.88	78%	12.5 2	0.000	3
3.	The university updates ISP to correspond with world technological developments.	3.94	79%	13.5 6	0.000	2
4.	The university always demonstrates to me any updates that take place on ISP.	3.54	71%	6.24	0.000	4
5.	The university encompasses me in any ISP revision and updating.	3.24	65%	2.90	0.004	5
All items of the dimension		3.74	75%	12.1 1	0.000	

Table (16) displays that item #1 "There is a well-known university authority responsible for reviewing and updating ISP" has been ranked as the first one regarding to mean value which equals 4.10 (82%). Meanwhile item #5 "The university encompasses me in any ISP

revision and updating” has been ranked as the last one regarding to mean value that equals 3.24 (65%). The mean of the dimension “Reviewing and Updating of ISP” equals 3.74 (75%). Researchers conclude that the respondents agreed to this item.

The former results has shown that Palestinian universities focus on Reviewing and Updating of ISP which indicates that the Palestinian universities correspond with the technical changes, and seek to ensure its quality and flexibility.

Table 17

Statistical analysis results for ISP Field

No.	Item	Mean	Proportional Mean	Test Value	P-Value (Sig.)	Rank
1.	Senior Management Support	3.80	76%	14.35	0.000	2
2.	Risk Assessment of Information Security	3.95	79%	19.60	0.000	1
3.	Training and Awareness of ISP	3.40	68%	6.12	0.000	5
4.	Enforcement of ISP	3.73	75%	11.17	0.000	4
5.	Reviewing and Updating of ISP	3.74	75%	12.11	0.000	3
All items of the dimension		3.72	74%	14.71	0.000	

Table (17) displays that the “Risk Assessment of Information Security” dimension has been ranked as the first one regarding to mean value which equals 3.95 (79%). Meanwhile “Training and Awareness of ISP” dimension has been ranked as the last one regarding to mean value that equals 3.40 (68%). The mean of ISP field equals 3.72 (74%). Researchers conclude that the respondents agreed to this item.

The former results has shown that the Palestinian universities focus on ISP creation and implementation.

Statistical analysis for the second field (Effectiveness of MIS)

Table 18

Statistical analysis results for items of “Effectiveness of MIS” field

No.	Item	Mean	Proportional Mean	Test Value	P-Value (Sig.)	Rank
1.	There are enough methods to protect MIS at the university.	4.00	80%	15.30	0.000	7
2.	MIS at the university implies characteristics to protect the information and reduce errors.	3.95	79%	14.70	0.000	9
3.	MIS at the university can detect the personal behavior that threatens or leaks its information.	3.90	78%	14.27	0.000	10
4.	MIS at the university grants accurate and secure information.	4.00	80%	17.15	0.000	7
5.	MIS at the university grants adequate information and it accomplishes the requirements of the work.	3.95	79%	16.72	0.000	9

No.	Item	Mean	Proportional Mean	Test Value	P-Value (Sig.)	Rank
6.	MIS at the university improves the outcomes of the work.	3.98	80%	15.57	0.000	8
7.	MIS at the university grants the required information in the appropriate date and time.	4.01	80%	16.18	0.000	6
8.	The university studies cases of MIS penetration or leakage, and benefits from those studies.	4.01	80%	16.94	0.000	6
9.	The university strictly penalises those who leak or uncover MIS to unauthorised people.	4.03	81%	14.97	0.000	5
10.	The university authorises entering MIS on the basis of the staff managerial level.	4.20	84%	20.53	0.000	1
11.	The university updates MIS and continually maintains it.	4.06	81%	16.17	0.000	4
12.	There is a special MIS department at the university.	4.07	81%	13.98	0.000	3
13.	There is MIS technical support center at the university.	4.17	83%	16.50	0.000	2
All items of the dimension		4.03	81%	22.33	0.000	

Table (18) displays that item #10 “The university authorises entering MIS on the basis of the staff managerial level” has been ranked as the first one regarding to mean value which equals 4.20 (84%). Meanwhile item #3 “MIS at the university can detect the personal behavior that threatens or leaks its information” has been ranked as the last one regarding to mean value that equals 3.90 (78%). The mean of “Effectiveness of MIS” dimension equals 4.03 (81%). Researchers conclude that the respondents agreed to this item.

The former results has shown that the MIS at Palestinian universities are effective and achieve their goals.

Hypothesis Testing

Main Hypothesis: There is a statistical relationship at significance level ($\alpha \leq 0.05$) between ISP and the Effectiveness of MIS at Palestinian Universities in the Gaza Strip.

Table 19

Correlation Coefficient between Senior Management Support and the Effectiveness of MIS

Hypothesis	Correlation Coefficient	P-Value (Sig.)
There is a statistical relationship at significance level ($\alpha \leq 0.05$) between Senior Management Support and the Effectiveness of MIS at Palestinian Universities in the Gaza Strip.	0.578*	0.000

*Correlation is statistically significant at the 0.05 level

Table (19) displays that the correlation coefficient between Senior Management Support and the Effectiveness of MIS equals 0.578, and p-value (Sig.) equals 0.000. The p-value (Sig) is less than 0.05, thus, the correlation coefficient is statistically significant at $\alpha = 0.05$. In other words, there exists a significance relationship between Senior Management Support and the Effectiveness of MIS at Palestinian universities in the Gaza Strip.

Table 20

Correlation Coefficient between Risk Assessment of Information Security and the Effectiveness of MIS

Hypothesis	Correlation Coefficient	P-Value (Sig.)
There is a statistical relationship at significance level ($\alpha \leq 0.05$) between the Risk Assessment of Information Security and the Effectiveness of MIS at Palestinian Universities in the Gaza Strip.	0.670*	0.000

*Correlation is statistically significant at the 0.05 level

Table (20) displays that the correlation coefficient between Risk Assessment of Information Security and the Effectiveness of MIS equals 0.670, and p-value (Sig.) equals 0.000. The p-value (Sig) is less than 0.05, thus, the correlation coefficient is statistically significant at $\alpha = 0.05$. In other words, there exists a significant relationship between Risk Assessment of Information Security and the Effectiveness of MIS at Palestinian Universities in the Gaza Strip.

Table 21

Correlation Coefficient between Training and Awareness of ISP and the Effectiveness of MIS

Hypothesis	Correlation Coefficient	P-Value (Sig.)
There is a statistical relationship at significance level ($\alpha \leq 0.05$) between the Training and Awareness of ISP and the Effectiveness of MIS at Palestinian Universities in the Gaza Strip.	0.545*	0.000

*Correlation is statistically significant at the 0.05 level

Table (21) displays that the correlation coefficient between Training and Awareness of ISP and the Effectiveness of MIS equals 0.545, and p-value (Sig.) equals 0.000. The p-value (Sig) is less than 0.05, thus, the correlation coefficient is statistically significant at $\alpha = 0.05$. In other words, there exists a significance relationship between Training and Awareness of ISP and the Effectiveness of MIS at Palestinian Universities in the Gaza Strip.

Table 22

Correlation Coefficient between Enforcement of ISP and the Effectiveness of MIS

Hypothesis	Correlation Coefficient	P-Value (Sig.)
There is a statistical relationship at significance level ($\alpha \leq 0.05$) between the Enforcement of ISP and the Effectiveness of MIS at Palestinian Universities in the Gaza Strip.	0.709*	0.000

*Correlation is statistically significant at the 0.05 level

Table (22) displays that the correlation coefficient between Enforcement of ISP and the Effectiveness of MIS equals 0.709, and p-value (Sig.) equals 0.000. The p-value (Sig) is less than 0.05, thus, the correlation coefficient is statistically significant at $\alpha = 0.05$. In other words, there exists a significant relationship between Enforcement of ISP and the Effectiveness of MIS at Palestinian Universities in the Gaza Strip.

Table 23

Correlation Coefficient between Reviewing and Updating of ISP and the Effectiveness of MIS

Hypothesis	Correlation Coefficient	P-Value (Sig.)
There is a statistical relationship at significance level ($\alpha \leq 0.05$) between the Reviewing and Updating of ISP and the Effectiveness of MIS at Palestinian Universities in the Gaza Strip.	0.667*	0.000

*Correlation is statistically significant at the 0.05 level

Table (23) displays that the correlation coefficient between Reviewing and Updating of ISP and the Effectiveness of MIS equals 0.667, and p-value (Sig.) equals 0.000. The p-value (Sig) is less than 0.05, thus, the correlation coefficient is statistically significant at $\alpha = 0.05$. In other words, there exists a significance relationship between Reviewing and Updating of ISP and the Effectiveness of MIS at Palestinian Universities in the Gaza Strip.

Table 24

Correlation Coefficient between ISP and the Effectiveness of MIS

Hypothesis	Correlation Coefficient	P-Value (Sig.)
There is a statistical relationship at significance level ($\alpha \leq 0.05$) between ISP and the Effectiveness of MIS at Palestinian Universities in the Gaza Strip.	0.752*	0.000

*Correlation is statistically significant at the 0.05 level

Table (24) displays that the correlation coefficient between ISP and the Effectiveness of MIS equals 0.752, and p-value (Sig.) equals 0.000. The p-value (Sig) is less than 0.05, thus, the correlation coefficient is statistically significant at $\alpha = 0.05$. In other words, there exists a significance relationship between ISP and the Effectiveness of MIS at Palestinian Universities in the Gaza Strip.

Results

– There is a statistical relationship at significance level ($\alpha \leq 0.05$) between ISP, and the Effectiveness of the MIS at the Palestinian universities in the Gaza Strip. Therefore, the concern to ISP will contribute to increasing the effectiveness of MIS at Palestinian Universities in the Gaza Strip.

– There is a statistical relationship at significance level ($\alpha \leq 0.05$) between the Senior Management Support, and the Effectiveness of the MIS at the Palestinian universities in the Gaza Strip.

- There is a statistical relationship at significance level ($\alpha \leq 0.05$) between the Risk Assessment of Information Security, and the Effectiveness of the MIS at the Palestinian universities in the Gaza Strip.
- There is a statistical relationship at significance level ($\alpha \leq 0.05$) between the Training and Awareness of ISP, and the Effectiveness of the MIS at the Palestinian universities in the Gaza Strip.
- There is a statistical relationship at significance level ($\alpha \leq 0.05$) between the Enforcement of ISP, and the Effectiveness of the MIS at the Palestinian universities in the Gaza Strip.
- There is a statistical relationship at significance level ($\alpha \leq 0.05$) between the Reviewing and Updating of ISP, and the Effectiveness of the MIS at the Palestinian universities in the Gaza Strip.
- The research results have shown that Palestinian universities focus on ISP, as a research sample has demonstrated a high degree of agreement on the field of ISP with a rate of 74%.
- The research results have indicated that the Palestinian universities senior management is aware of ISP significance, but they do not pay adequate attention for ISP circulation among staff.
- The research results have indicated that the Palestinian universities focus on Risk Assessment of Information Security. This dimension has been ranked as the highest ISP dimension rate with a rate of 79%. This is because it is the main base for implementing ISP.
- The research results have indicated that the Palestinian universities update the methods they follow regarding any technological developments in order to protect their information.
- The research results have indicated that the Palestinian universities need to be more specific in describing the detailed procedures that the employees should follow to avoid security risks.
- The research results have indicated that the Palestinian universities need to conduct more Training and Awareness programs of ISP. As, this dimension has been ranked as the lowest ISP dimension rate with a rate of 68%.
- The research results have indicated that the Palestinian universities need to allocate a detailed and sufficient budget for ISP training and awareness programs.
- Enforcement of ISP got a rate of 75%; thus, it indicates that the Palestinian universities realise the significance of enforcement as a crucial dimension of ISP.
- The research results have indicated that the Palestinian universities should encompass the employees with any ISP revision and update; thus, this encompass helps the employees to be up to date with any changes in ISPs.
- The research results has shown that Senior Management at the Palestinian universities support ISP implementation. Accordingly, Senior Management Support got a rate of 76%.
- The research results have shown that Palestinian universities focus on Reviewing and Updating of ISP, as it achieved a rate of, 75%. This indicates that the Palestinian universities keep pace with technical changes and seek to ensure quality and flexibility.
- The research has demonstrated a high degree of agreement on the field of the “Effectiveness of MIS”, with a rate of (81%). This show that the MIS at Palestinian universities are effective and they achieve their goals.

Recommendations

In accordance with the results of this paper, the researchers suggest a number of recommendations as follows:

- Senior management should boost support to establish and apply ISP to increase the effectiveness of MIS.
- Universities should establish special departments for ISP and recruit ISP specialists.
- Universities should continually and periodically enhance measures for anticipating hazards and threats that they may encounter concerning university information and data, thus, facilitating taking measures when needed.
- Universities should pay attention to writing ISP according to the outcomes of ISP assessment, and prior to any anticipated information security problems.
- Universities should document ISP and circulate it to all the staff that use MIS, in addition to staff specially working in information technology centers and units.
- Universities should promote awareness and training courses on the significance of ISP and the factors of its success, both among staff who uses MIS and staff at information technology centers and units.
- Universities should impose written and approved ISP as a main reference when ISP encounter any obstacle. They should not stop at the online commands and regulations.
- Universities should impose ISP on staff at the information technology centers and units, as well as any staff who use ISP. Each violator should be penalised.
- Universities should appoint a responsible authority well-known to staff, to be in charge of ISP.
- Universities should review and update ISP periodically, and whenever a problem emerges.
- Universities should inform staff with any modifications that may occur to ISP.
- Universities should consider ISP implications as one of the factors in the evaluation of staff performance by the university.
- Universities should periodically measure MIS effectiveness so as to continue improving this effectiveness.
- Universities should establish technical support centers to be consulted whenever any technical failure occurs.
- Universities should increase their concern with modern technological developments regarding ISP and MIS, and take appropriate action corresponding with those developments.

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