

## The impact of accounting information systems on enhancing financial information security in Jordanian banks

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### ABSTRACT

The aim of the current study is to examine the impact of accounting information systems (AIS) on enhancing financial information security in Jordanian banks by the moderating role information technology (IT) governance. The sample of the study includes 149 administrative employees in banks operating in Jordan and a questionnaire is used as the tool of the study. The results indicate that there is an effect for accounting information systems on enhancing financial information at operating banks in Jordan on information systems' operating, inputs, and outputs. The results also indicated in effect the level for information technology governance on the relationship between accounting information systems in achieving information security at the banks operating in Jordan. Considering the result obtained, the study concluded with a group of recommendations the most important among which was to work on establishing departments to protect and secure accounting information, as well as securing qualified cadres to monitor the systems.

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## 1. Introduction

Accounting information systems (AIS) is the lifeblood of enterprises, contributing to the administration of business actions (Al-Okaily, 2022; Al-Okaily, 2021). The great importance occupied by accounting information systems, which work on providing appropriate information in the rationalizing decision-making process by management and stakeholders to direct them to make right decisions, and as an outcome of the development that occurred in information technology, the accounting system, in line with the industrial revolution, became computerized, by which all data is obtained and processed to obtain accurate and fast information, which in turn made a qualitative leap in information quality and its availability in a timely manner by linking the organization as a whole as a single unit, and this development was accompanied by some problems and risks related to the security and safety of information (Aws et al, 2021; Thaer, & Laith, 2018). Information security assists in providing with the necessary protection for information against risks and threats that may incur by information (Morgan, 2017), this is achieved by providing with a set of technical or preventive procedures and measures to preserve information through hardware and software, and protecting data resources such as hardware, software, and data from hacking or illegal interventions that accidentally occur, or due to wrong procedures used information resources management (Al-Okaily & Al-Okaily, 2022). The technological revolution in information and communication systems has contributed to the emergence of what is known as information technology governance, which is defined by the International Finance Corporation (IFC) as a system that takes place through managing the company's affairs and controlling the whole work of its divisions. It is also defined by the Organization for Economic Cooperation and Development (OECD) as a set of relations among the firm's management and stakeholders. Information technology governance has become one of the main concerns that organize daily business, especially considering the new environmental variables effects and implications which involves risks related to the in-information security and confidentiality during the electronic transaction's conclusion, and the confidentiality of

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information flowing over the Internet, where their content can be transferred and being read (Abutaber et al., 2021). This has necessitated organizations to keep pace with these developments on the one hand, and the existence of the intense competitive environment that the world is witnessing on the other, and the urgent need to know the extent of accounting information systems' effectiveness in the organization and its real role in achieving information security appears in particular if it is under the umbrella of the IT governance environment and the extent to which management utilize information offered in the field of setting objectives and real control, monitoring their implementation, taking appropriate related decisions, as accounting information systems are among the basic pillars on which the management relies in performing its functions to rely on managing its functions and duties. To identify the problem of the study, the following questions should be addressed:

**The main research question:** *What is the effect of accounting information systems on enhancing financial information security at public banks in Jordan?*

From this main question, the following sub questions were derived:

- 1- *What is the effect of operations' operating on achieving information security in Banks operating in Jordan?*
- 2- *What is the effect of data entry operations on achieving information security in Banks operating in Jordan?*
- 3- *What is the effect of output operations on achieving information security in Banks operating in Jordan?*

**The second main research question:** *Does the IT governance moderate the relationship between accounting information systems and enhancing information security in banks operating in Jordan?*

## 2. Theoretical Framework and Literature Review

### 2.1 Previous studies related to AIS

Ahmad (2021) aimed at evaluating the efficiency of electronic accounting information role in promoting financial information security and control at Baradbar Exchange Company to evaluate the efficiency of the accounting information system and its ability to provide with reliability. Results of the study indicated the existence of an integrated information security system, and an integrated information security control system. Hong et al. (2003) integrated security policy theory, risk management theory, control and auditing theory, management system theory and contingency theory to provide a theory of information security management (ISM). Abakr et al. (2020) aimed at defining e-commerce and its importance and introduced accounting information system in addition to identifying the opinions of a selected sample included specialized employees of commercial companies in the state of Khartoum about the impact of electronic commerce on accounting information systems. The results indicated that e-commerce impacts the accounting information system and that e-commerce transactions led to the development of accounting information systems' physical and human components.

### 2.2 Study Hypotheses

Economic units' success is related to the amount of accurate, correct, and clear information availability that is relied upon in deciding, which in turn is based on technological development which is a set of structures, hardware parts, software, and data that jointly work together to record and process data on a regular basis for the purpose of controlling informational procedures. To construct an electronic accounting system, it is necessary to be based on principles of specialized professional and accounting bodies such as the AICPA and CICA, which emphasized the availability of confidentiality, privacy and processing integrity (Bashatweh et al., 2022).

Good accounting information systems are characterized by accuracy and appropriateness, which necessitates the use of electronic computers and calculators operating data, due to the speed and accuracy they provide in the operation and circulation of such data. Accounting information system also has two main objectives, protecting from assets loss by ensuring the completeness and accuracy of data and correct operation, and provision of information (Kanakriyah, 2016).

Accounting information system goes through several stages, the most important among which: rational raw data collection via documents, invoices and hour cards, then tabulating the data, and verifying its validity and arrangement, then maintaining the data including calculations, comparison, summarization and storage, reports that management needs on project performance, and after processing process is complete, comes the output process and dividing into routine daily outputs concerned with documenting the activity and normal routine transactions of the economic unit and the outputs of feedback information and can be classified into information related to events' record describing the past, resulting in operational reports and information expressing specific trends and indicators (Shnaishel, 2022). The accounting information system is based on a set of principles and methods that enables data and information collection to achieve managerial objectives and decision-making (Al-Okaily et al, 2021; Ganyam & Ivungu, 2019). Through this system, economic operations are recorded in documents, whether internal or external, are converted into values, and then kept in records, and analytical statements in light of specific rules and principles, with the aim of obtaining information in the form of accounting reports at successive periods to be used

for various purposes in planning, control and decision-making (Dagiliene & Štutiene, 2019; Lutf et al., 2016), and the main objective of the accounting information system is to produce information and present it to users inside and outside the organization, and therefore to help them in performing their tasks (Shatnawi & Taber, 2020). Alhanahnah et al. (2016) define information security as the science of research in theories and strategies to protect information from threats or attacks, through a set of measures to protect confidentiality and combat abuse or use a system in criminal activities, and defined by Othman, (2018) as protecting and securing all resources used in information. According to Ahmad (2021), information security is strategies and laws related to protecting information security against likely threats and working on applying the necessary procedures and methods to make available protection and to respond to risks and to overcome them.

Aldegis (2018) indicated the most important objectives of accounting information systems' security is systems' protection which is the most important issue for organizations currently, and systems' protection relies on oversight systems to protect information systems from risks and corruption, and to ensure compliance with the laws within the organization through determining the most important accounting information security systems' purposes include reducing risks that hinder the organization's work, protecting information confidentiality, ensuring that policies and laws are followed, ensuring the integrity and reliability of data sources, providing backup copies.

Stewart (2022) states that information security elements consist of: information confidentiality, integrity of content, documentation. The elements of reliable systems identified by American control standards that are consistent with (COBIT) standards are existence, security, validity. Effectiveness is considered in electronic accounting information systems as a major factor in the continuity or failure of any organization, and for the system to be effective, information technology must be available, the strategy of accounting information systems, oversight of accounting information systems, and the integrity of the design of accounting information systems.

Alobaidi et al. (2013) indicated that to effectively evaluate internal regularity control, auditors must understand internal control's main concepts and risk control through risk-related data, data-related controls, risks associated with the database process, controls, and the database process. Risks to electronic accounting information systems are also classified into resource-related risks: internal risks, external risks, perpetrator-related risks: resulting from the human element, risks resulting from the non-human element. Electronic accounting information systems are considered less secure than manual information systems, due to a number of factors that make it difficult to make hard copies of them, the difficulty of detecting errors resulting from changes in the electronic accounting information system, and the difficulty of reviewing the procedures that are done through the computer because they are not visible and not apparent.

Turban et al. (2001) defined information technology (IT) as using computer technologies to organize and obtain data to access information that leads us to make the right decisions in a timely manner through software and applications and the World Wide Web (the Internet). The Information Technology Governance Institute (ITGI) defined information technology governance in 2003 as an integral part of project governance and an effective tool in the organization by creating flexibility to achieve a commensurate advantage for the organization. The importance of information technology governance is also highlighted by developing the information technology strategy and starting the operational review, developing management information technology systems, identifying best practices in the field of technological development, ensuring the effectiveness of information technology services to deliver the strategy to business departments (Ibrahim et al., 2019). It is worth noting that information technology governance contributes to achieving information security requirements and helps in limiting risks through separating ownership from management, performance control, thus achieving information security.

### **1<sup>st</sup> main hypothesis:**

**H<sub>01</sub>:** There is no significant statistical impact for accounting information systems on enhancing financial information at operating banks in Jordan.

From this main hypothesis, the following sub hypotheses are hypnotized:

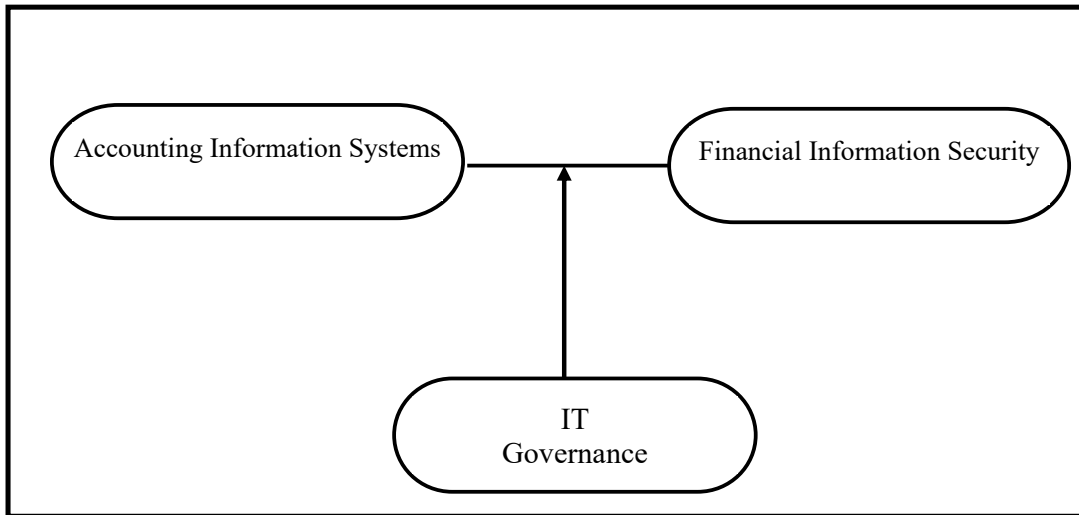
1<sup>st</sup> sub hypothesis (H1.1): There is no significant statistical impact level for accounting information systems' operating on achieving information security at the banks operating in Jordan.

2<sup>nd</sup> sub hypothesis (H1.2): There is no significant statistical impact level for accounting information systems' inputs on achieving information security at the banks operating in Jordan.

3<sup>rd</sup> sub hypothesis (H1.3): There is no significant statistical impact level for accounting information systems' outcomes on achieving information security at the banks operating in Jordan.

### **2<sup>nd</sup> main hypothesis:**

**H<sub>02</sub>:** There is no significant statistical impact level for information technology governance on the relationship between accounting information systems in achieving information security at the banks operating in Jordan.



**Fig. 1.** Theoretical Framework

### 3. Methodology

#### 3.1 Study Population and Sample

The population of the study was represented by all banks operating in Jordan from which a sample of (158) administrative employees in banks operating in Jordan was selected. The total number of distributed questionnaires (158) were distributed, and 9 ones were invalid for statistical analysis, hence, the valid questionnaires for statistical analysis were (149). The stability test Alpha Cronbach which states that the tool is of acceptable stability and reliability if Cronbach alpha stability coefficient test exceeds 0.06 was also utilized, Table 1 below indicates reliability statistics for the study variables.

**Table 1**  
Reliability statistics for the study variables

Cronbach's Alpha	N of Items
0.962	30

The Cronbach's Alpha test was utilized to measure the stability of the measurement tool, and it reached a value of 0.962%, which is an excellent percentage because it is higher than the accepted percentage of 60%. Table 2 below shows the results of the multiple correlation tests between the independent variables.

**Table 2**  
Results of the multiple correlation test between the independent variables

Axis' No	Items	VIF	Results
1	Input-related axis	4.15	No multi correlation
2	Operating-related axis	4.32	No multi correlation
3	Outcomes-related axis	3.41	No multi correlation
4	Information security-related axis	3.32	No multi correlation
5	Information technology governance-related axis	4.12	No multi correlation

Table 2 indicates that inflation factor value was less than 10 for all axes of the study, and this in turn indicates no high multi correlation between independent variables so the data is ready for analysis.

#### Testing the 1<sup>st</sup> research hypothesis

To test this hypothesis, multi linear regression was used as shown in Table 3 below:

**Table 3**  
Multi linear regression

Dependent variable	Independent variable (Information Systems)	B value	t value	Sig
Information security	Operating	0.207	4.081	0.000
	Inputs	0.052-	1.075-	0.283
	Outputs	0.207	4.081	0.000

R = 0.647 R<sup>2</sup> = 0.418 F-value = 72.226 (0.000)

## 4. Results

The 1<sup>st</sup> main hypothesis with its sub hypotheses as well as the 2<sup>nd</sup> main hypotheses of this study were rejected and the following sub hypotheses and sup hypotheses were accepted:

**\*The 1<sup>st</sup> main hypothesis (H<sub>01</sub>):** *There is a significant statistical impact less than ( $\alpha \leq 0.05$ ) level for accounting information systems on enhancing financial information at operating banks in Jordan.*

-1<sup>st</sup> sub hypothesis (H1.1): There is a significant statistical impact less than ( $\alpha \leq 0.05$ ) level for accounting information systems' operating on achieving information security at the banks operating in Jordan.

- 2<sup>nd</sup> sub hypothesis (H1.2): There is a significant statistical impact less than ( $\alpha \leq 0.05$ ) level for accounting information systems' inputs on achieving information security at the banks operating in Jordan.

- 3<sup>rd</sup> sub hypothesis (H1.3): There is a significant statistical impact less than ( $\alpha \leq 0.05$ ) level for accounting information systems' outcomes on achieving information security at the banks operating in Jordan.

### \*2<sup>nd</sup> main hypothesis:

**H<sub>02</sub>:** *There is a significant statistical impact less than ( $\alpha \leq 0.05$ ) level for information technology governance on the relationship between accounting information systems in achieving information security at the banks operating in Jordan.*

The first main hypothesis was tested at ( $\alpha \leq 0.05$ ) and the results were as follows: f tabular value was extracted to be compared to the value of calculated f variance test to ensure the regression's significance; it was indicated that f calculated value (72.226) was higher than its tabular value of (2.38) which indicates the significance of the model used in regression analysis. The test's level of significance was compared with the level of significance adopted in the study to indicate the existence of a statistical effect on the dependent variable, the table shows that f significance was 0.000 and this value is less than the adopted significance level of (0.05), so the first main hypothesis is rejected and the alternative hypothesis stating that there is a significant statistical effect at less than ( $\alpha \leq 0.05$ ) level for accounting information systems in enhancing financial information security at operating banks in Jordan is accepted.

From R value, which indicates the correlation among the independent variables and the dependent variable, it is inferred that there is a correlation between the dependent and independent variables, and R value was 0.647 which indicates a strong positive correlation between the independent variables as whole.  $R^2$  value reached (0.418) which represents the independent variables as whole interpretive ability for the (operating, inputs and outputs) the independent variables compared to the dependent variable (information security), it is concluded that independent variables interpretive ability is about (41.8) for information security.

The B value reached (1.513) and this is necessary to construct the variables' regression formula. According to the above stated results, the regression formula for the independent variables with the dependent one is as follows:

$$\text{Information security} = 1.513 \times \text{operating} + 0.207 \times \text{inputs} + 0.256 \times \text{outputs}.$$

It was also indicated that the variable of inputs has no significant statistical role on information security as its significance level was (0.283) which is above (0.05).

### Testing the research 1<sup>st</sup> sub hypothesis (H1.1)

To test this sub hypothesis, the simple linear regression was used and the hypothesis was tested at ( $\alpha \leq 0.05$ ) level of significance and results were as shown in Table 4 below:

**Table 4**  
**The results of the first sub hypothesis' simple linear regression**

Variables	Independent variable	Correlation R	R <sup>2</sup>	B Value	B stable value	Tabular t	Calculated t	Sig
Independent	Operating							
Dependent	Achieving information security	0.454	0.206	0.381	2.428	1.96	10.260	0.000

T tabular value was calculated to be compared to the contrast analysis of calculated t test to confirm regression significance and it was indicated that t calculated value was above its tabular value of (1.96) as it reached (10.260). This confirms the significance of the model used in the regression analysis. The significance level of the test was compared with the significance level adopted in the study to check for the existence of a statistical role for the independent variable on the dependent variable, and as indicated in Table 4 above, the significance level for t was (0.000), which is less than the significance level of (0.05) adopted in the study.

Significance of the test was compared to the significance level adopted in this study to determine the existence of a statistical role for the independent variable on the dependent variable, and as shown in table (4), the significance level for t reached (0.000), which is less than the significance level of (0.05) approved in the study thus, the 1<sup>st</sup> sub hypothesis stating that there is no significant statistical impact less than ( $\alpha \leq 0.05$ ) level for accounting information systems' operating on achieving information security at the banks operating in Jordan is rejected and the alternative sub hypothesis stating that there is a significant statistical effect at ( $\alpha \leq 0.05$ ) value for accounting information systems' operating on achieving information security at the banks operating in Jordan.

R value indicates the correlation between the independent variable and the dependent one, and, as shown in Table 4, it indicates the existence of a correlation between the independent variable and the dependent one, and it was indicated that the correlation value was (0.454) and this value indicates a positive medium correlation between the independent variable (operating) and the dependent variable (achieving information security) (Cohen, 1988).

Determination coefficient represented by  $R^2$  value reached (0.206) indicating an interpretive ability for the independent variable (operating) for the dependent variable (achieving information security), and it is inferred that the operating variable interprets 20.6% of achieving information security.

#### *Testing the research 2<sup>nd</sup> sub hypothesis (H1.2)*

To test this sub hypothesis at ( $\alpha \leq 0.05$ ) level, the simple linear regression was used, and the results were as indicated in Table 5 below:

**Table 5**

Results of the simple linear regression for the 2<sup>nd</sup> sub hypothesis

Variables	Dependent variable	Correlation R	R <sup>2</sup>	B Value	B stable value	Tabular t	Calculated t	Sig
Independent	Inputs	0.495	0.245	0.490	1.982	1.96	11.477	0.000
Dependent	Information security							

The t tabular value was extracted to be compared to the calculated t contrast test to check for regression significance and it was indicated that t calculated value was (11.477) which is above its tabular value of (1.96) which in turn indicates the significance of the model used in the regression analysis. Test's significance level was compared to the significance level adopted in this study to determine the existence of a statistical role for the independent variable over the dependent one. Table 5 above indicates the t level of significance was (0.000) and this value is less than the (0.05) value adopted in this study thus, the 2<sup>nd</sup> sub hypothesis stating that there is no significant statistical impact less than ( $\alpha \leq 0.05$ ) level for accounting information systems' inputs on achieving information security at the banks operating in Jordan is rejected and replaced by the alternative sub hypothesis stating that there is a significant statistical impact less than ( $\alpha \leq 0.05$ ) level for accounting information systems' inputs on achieving information security at the banks operating in Jordan.

R value indicates the correlation between the independent variable and the dependent one and table (5), it refers to a correlation between both variables, it is also indicated that the correlation value is (0.495) which indicates a positive medium correlation between the independent variable (input) and the dependent one (Achieving information security as the value is between (0.3) and (0.49) (Cohen, 1988). Determination factor reached (0.245) for  $R^2$  and this indicates an interpretive ability for the independent variable (input) for the dependent variable (achieving information security) so it is inferred that the input variable explains 24.5% of achieving information security.

#### *Testing the research 3<sup>rd</sup> sub hypothesis (H1.3)*

To test this hypothesis at ( $\alpha \leq 0.05$ ) level, the simple linear regression was used and the results were as shown in Table 6 below:

**Table 6**

Results of the simple linear regression for the 3<sup>rd</sup> sub hypothesis

Variables	Dependent variable	Correlation R	R <sup>2</sup>	B Value	B stable value	Tabular t	Calculated t	Sig
Independent	outputs							
Dependent	Achieving Information security	0.595	0.354	0.479	2.087	1.96	14.899	0.000

The tabular t value was calculated to be compared with the value of contrast analysis for calculated t to confirm regression significance and it was indicated that calculated t value was (14.899) and this value is higher than its tabular value of (1.96) which proves the significance of the model used in the regression analysis. Significance level of the test was compared to the study's significance level to identify the existence of a statistical role for the independent variable on the dependent variable. Table 6 indicates that significance level for t was (0.000) and this value is less than (0.05) adopted in this study to determine

the existence of an effect for the independent variable on the dependent one so this sup hypothesis which states that there is no significant statistical impact less than ( $\alpha \leq 0.05$ ) level for accounting information systems' outcomes on achieving information security at the banks operating in Jordan is rejected and the alternative sub hypothesis stating that there is a significant statistical impact less than ( $\alpha \leq 0.05$ ) level for accounting information systems' outcomes on achieving information security at the banks operating in Jordan is accepted.

The R value indicates the correlation between both the independent and dependent variables, and it indicates, as shown in table (6) to the correlation between the independent variable and the dependent one. It was indicated that the correlation value was (0.595) which indicates a strong positive correlation between the independent variable of information systems' outcomes and the dependent variable of achieving information security as the value was above (0.05). Determination factor reached (0.354) as represented by  $R^2$  value and this indicates the interpretive ability for the independent variable of information systems' outputs from the dependent variable of achieving information security, this means that the independent variable interprets about (35.4%) of achieving information security.

#### Testing the research 2<sup>nd</sup> main hypothesis (H02)

Table 7 indicates information technology governance effect on the relationship between accounting information systems in achieving information security.

**Table 7**

The results of the effect of information technology governance on the relationship between accounting information systems in achieving information security

	General Info	Model1	Model2
(Model Summary)	Correlation R	0.222a	0.301b
	Determination Coefficient R	0.049	0.091
	(R) <sup>2</sup> Change	0.049	0.041
	(F)Change	14.993	13.155
	(Sig F)Change	0.000	0.000
(ANOVA)	(Sum of Squares)	253.633	242.591
	( F )	14.993	14.388
	(Sig F)	0.000a	0.000b

Table 7 indicates the multiple hierarchical regression analysis results based on two models. The first model shows the extent to which there is a statistically significant effect of the accounting information systems dimensions (the independent variable), on the dependent variable of achieving information security, and it indicates that the value of the determination coefficient amounted to  $R^2$  (0.049) at freedom score of (df=1), and Fisher's value reached (F.=14.993), at a significant level of (0.000), which is less than ( $\alpha \leq 0.05$ ), and this confirms the significance of the regression in the first model and means that the dimensions of accounting information systems have explained a percentage of (4.9%) of the discrepancy in the achievement of information security. It is clear from the second model at the same table, and after introducing information technology governance (the modified variable) to the regression model, that the change in the coefficient of determination reached ( $R^2$  Change = 0.041), at a freedom score of (df = 1), and that the change in the Fisher's value reached (F.Change = 13.155), at a significant level of change in Fisher (Sig.F Change = 0.000), which is less than ( $\alpha \leq 0.05$ ), and this confirms the significant change in the regression, and means that the information technology governance variable was able to improve the impact of accounting information systems by dimensions in achieving information security by (4.1%). It is also shown in the second model that the coefficient of determination has reached (=0.091  $R^2$ ) at a freedom score of (df = 2), and that Fisher's value reached (F. = 14.388), at a significance level of (Sig. = 0.000), which is less than ( $\alpha \leq 0.05$ ).

## 5. Recommendations

Considering the results obtained by this study, the researcher recommends with the following recommendations:

1-Working on the security and integrity of accounting information has become a necessity, due to the importance of these systems and the importance of the information stored through these systems, and banks should work to establish departments in order to protect these systems and information, and to secure qualified cadres who can monitor the systems through entry operations, processing operations, data extraction and optimal analyzing operations.

2- Supporting all the protection measures used and working on developing them periodically, in order to ensure the provision of security and safety for accounting information and to control those operations through information technology governance.

3- Working on adopting training programs for human cadres, especially in the field of protecting accounting information systems, and working on introducing them to the risks and threats facing the use of this type of systems, and the methods of treatment and methods of optimal protection for that data.

4-Banks should work on creating secure electronic cloud copies, to ensure that this data is retrieved in the event of failures on the main data of the system, and work on developing it periodically and adding recent data to align with the main database of the bank.

5- Working on adopting electronic archiving systems with a separate system from the main system, to be a reference for checking data and maintaining the security and integrity of those transactions separately.

6- Establishing specific procedures for restoring backup copies of data when potential accidents occur, and for backup copies to be kept in safe locations outside the Information Systems Division, and to follow a specific mechanism for the duration of keeping such data according to its importance.

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