

The mediating effect of information technology on the cost of internal control systems and enhancing confidence in quality relationship on accounting information quality

Abutaber Thaer^a, Mohammad Al Ameri^b, Mustafa Saeed Alathamneh^a, Haider Mohammed Bani Ata^a, Manaf Al-Okaily^a, Shahir El-Qawaqneh^a and Dmaithan Almajali^{c,d*}

^aJadara University, Jordan

^bUniversity Putra, Malaysia

^cApplied Science Private University, Jordan

^dMiddle East University, Jordan

CHRONICLE

Article history:

Received: February 23, 2023

Received in revised format: April 2, 2023

Accepted: May 23, 2023

Available online: May 23, 2023

Keywords:

Information Technology

Internal Control Costs

Accounting Information Quality

Jordanian Banks

ABSTRACT

This study aimed to investigate the mediating effect of information technology on the relationship between internal control system's costs and enhancing confidence in the quality of accounting information in banks working in Jordan. To achieve the objectives of the study, the researchers designed a 56-items questionnaire and 200 versions of this questionnaire were distributed on a random sample from the study population represented by all employees of the internal control departments in banks operating in Jordan, and 152 questionnaires were retrieved, and 4 questionnaires were excluded because they were not valid for analysis so, the valid questionnaires for analysis were 148 questionnaires. Effect was assessed using the Multiple Regression Analysis and after the appropriate statistical treatment, the study concluded with a group of results the most important among which that there was a mediating effect of information technology on the relationship between internal control system's costs and increasing confidence in accounting information in banks working in Jordan in terms of internal control environment costs, internal control activities' costs, internal risk assessment's costs, internal monitoring and follow-up costs, information and internal communication costs among banks working in Jordan that use internal control systems. In light of the results revealed, the researchers recommended the need for implementing internal control systems within certain cost limits in banks because of their significant role in increasing confidence in accounting information through the aforementioned variables.

© 2023 by the authors; licensee Growing Science, Canada.

1. Introduction

Through the technological revolution, the emergence of giant organizations and their geographical expansion, and the development of the information and communication technology system between organizations, there has been an urge need for systems that maintain data confidentiality, forbidding its theft, provide reliable and appropriate information in a timely manner, and creating control within the organization that increases efficiency and effectiveness in order to achieve strategic goals, all within acceptable cost limits. The internal control system at any organization represents the main component and cornerstone that is based on protecting the interests of shareholders whether internal or external by providing protection for the process of producing accurate and reliable information which results from the combination of all related parties of the organization. Accounting information represents a communication tool between the organization and the interested parties and also represents the main artery for its importance as it assists in the decision-making process, and the more reliable the information

* Corresponding author.

E-mail address: d_almajali@asu.edu.jo (D. Almajali)

ISSN 2561-8156 (Online) - ISSN 2561-8148 (Print)

© 2023 by the authors; licensee Growing Science, Canada.

doi: 10.5267/j.ijds.2023.5.015

is, the greater its importance in helping senior management and decision makers to make rational decisions. Accordingly, this study aims to demonstrate the impact of environmental costs and control activities, as well as the costs of auditing, follow-up, risk assessment, information and communication representing the dimensions of the internal control system in enhancing confidence in the quality of accounting information on banks (Alrabei, 2021; Almajali et al., 2022).

The need for an effective internal control system in Islamic banks is important for the continuity of organizations, and within this frame, the importance of this study is highlighted by its focus on the concept of the internal control system that exists in companies on the its construction costs, as the internal control systems help greatly in solving many problems faced by banks as well as providing high quality information, and it is expected that this study will benefit managers and departments' managers in banks and companies in general, in addition to presenting some suggestions that improve the application of these systems in a way that leads to the success and continuity of banks' work and enhances confidence in the information they produce.

2. Statement of the Problem

For the importance of accounting information quality in companies, and in financial sector in particular, working on making available the appropriate information within the process of rationalizing decision-making by management and stakeholders to be directed to make the right decisions, through which all data is obtained and processed to obtain accurate and fast information, which in turn made a qualitative leap in the information quality and its availability in a timely manner by linking the organization as a whole as a single unit that works to provide comprehensive information to assists then in making strategic decisions, especially through the rapid development of information technology, which was reflected in the financial technology used in the banking sector through the use of smart applications that facilitate work and communication with clients. Therefore, there must be internal controls that help regulate financial and operational processes alike, and this is what was stressed in Sarbanes-OxleysSox (Ge et al., 2017) in that this requires the auditor to supervise the effectiveness of the organization's internal control over financial reports. Therefore, accounting information resulting from effective internal control systems is more useful for making administrative decisions, and companies that determine and disclose ineffective internal controls and then address the problem witness an improvement in operational performance so, the internal effective control system requires high quality standards, which is reflected in the cost and the budget allocated for this purpose. Therefore, this study came to demonstrate and clarify the mediating effect of information technology on the relationship between the costs of the internal control system and the enhancement of confidence in the quality of accounting information in banks operating in Jordan. This study is considered an extension of several studies that have addressed this topic such as (Ge et al., 2017; Shroff, 2017, Feng et al., 2015; Coates & Srinivasan, 2014).

3. Theoretical Framework and Early Studies

Achieving what has been planned of goals requires the existence of a tight management system, and the latter requires the existence of a management control system within the institution relying mainly on analytical accounting, as the process of allocating and consuming resources is matched by the process of controlling those resources' allocation and consumption to ensure good performance of interests and the preservation and exploitation of resources in an economical manner, so costs and budgets are the domain where management control processes are applied.

3.1 Cost Control

Control aims at ensuring the extent of goals achievement according to what is planned based on predetermined standards, and to economically control resources' consumption which contributes in achieving profitability of the organization, internal control is also defined by the Institute of Internal Auditors in 1999 as an independent and objective consulting activity concerned with adding better value to the organization and assisting it achieve its goals by following a specific approach to evaluate the control and management processes in the organization and to improve the effectiveness of risk management (Aseidu & Defor, 2017). Control is based a specific system and procedures allowing to obtain technical and accounting information related to activity cost, and there is the preventive control that depends on procedures and standards related to cost and resource consumption, which is a basis for determining deviations and achieving feedback with data related to the occurrence and behavior of costs used for preparing reports and various budgets. There is the accompanying control of activity operations that aims to control all operations and work on their good conduct so that the institution can conserve resources in addition to respecting the following procedures and criteria. Finally, there is the post control, and it occurs after obtaining all data, conducting analyzes, identifying the differences and their causes, and taking the appropriate measures, this type of control aims at improving procedures and taking the necessary measures in future to prevent undesired deviations, it also encourages the efforts leading to good performance and here, deviations are usually addressed by applying the rule of management by exception (Daf & Hennad ,2021). Cost control is the main tool for controlling management within an organization and has accounting and economic dimensions, so it works on controlling cost elements, analyzing and interpreting them from various aspects. It utilizes technical and accounting procedures and criteria, planning tools and control related to cost control previously addressed in addition to informatics programs (automated information) regarded as an essential means of controlling costs in terms of recording, storing, processing, and obtaining information results with high characteristics that are reliable in decision-making and preparing budgets and various plans (Al-Hadi, 2016).

Among the most prominent accounting frameworks for cost control, there is the standard cost method, which allows conducting calculations in a timely manner based on standards related to the consumption of raw materials, the use of labor and other indirect burdens, and the prices based on these elements are evaluated, and it also allows the follow-up of the elements of costs achieved during a cycle activity and work to identify the differences and the real reasons for them, and then preparing the necessary reports on the situation, which is the main base for decision-making. There is also the modern method for costs based on ABC activities to accurately control burdens, which can be applied within the standard costing method framework to take advantage of as any other method (homogeneous, variable sections) (Petitjean, 1985).

Auditing was defined as the evaluation activity that occurs within the institution with the aim of reviewing the accounting and financial operations as a basis for providing preventive services to the management in an impartial manner (Jahmani et al., 2023; Alrabei et al., 2022) which aims to assist the organization's management to effectively perform its responsibilities by providing the management with observations, recommendations and reports that are objective. The internal audit profession has been developed so that the goals the internal audit seeks can be achieved through following up the work of the administration to ensure that the policies, plans and procedures set are implemented without deviation, and assessing the effectiveness and efficiency of the means used to control the financial and accounting aspects used in the institution and following up the financial statements of the institution to protect Enterprise assets from bankruptcy, theft, embezzlement (Mei, 2018). It also monitors the accounting and statistical data fixed in the institution's records to ensure that the accounting and statistical data can be adopted to improve the performance of the financial institution.

Internal audit is considered as the arbiter, as it occupies an internal function affiliated with the organization's management, where the internal auditor performs many functions such as preventive services, evaluation services, construction services, and remedial services (Alkanani, 2014).

The financial auditor interacts with the internal problems of the organization, being one of the employees in this organization, through audit work periodically throughout the year, including all operations carried out by the organization (DeSimon et al., 2019). The auditing process also goes through important stages such as planning and documentation for the audit process and implementing basic control tests for operations, completion of the internal audit process and issuance of the auditor's report (Roussey & Brivot, 2016).

3.2 Internal Control System Components (Al-Dhniebat, 2018)

1st: Control Environment, and includes:

- *Organizational Structure*: where authorities are determined through the organizational structure within the institution and is considered as a main nerve in the process of defining responsibilities, tasks and creating effective control.

- *Communication Means*: companies should use effective communication methods through which responsibilities and control are determined within the institution.

- *The philosophical and practical method adopted by the management*: control from the management's perspective has a significant impact on the internal control effectiveness through its application to employees through ethical behavior and reducing violations (Abutaber & Maswadeh, 2023; AL-Sous et al., 2023)

- *Audit committees*: The audit committee is formed by the Board of Directors from non-executive board members, provided that the majority are independent, the number of members is not less than three, and that one of the members is an expert in accounting aspects. Among the duties of the audit committee is to work on evaluating the control system and ensuring its efficiency, determining contracting conditions with the audit office, then working to monitor the independence of the chartered accountant and follow up on his objectivity and the scope of the audit process and its effectiveness in accordance with the approved standards. It also mediates between the executive directors and the board of directors on the one hand, and the chartered accountant on the other.

2nd: *Risks' Determination*: according to (Abutaber et al., 2021), is the possibility that the financial statements contain material errors, and this is called the risk of financial reports. AlKarima (2017) indicated that detecting errors is the responsibility of the company, and whatever the management's decision on the subject of risks is, it will have a clear impact on the auditor's work, as the auditor relies in his work on the internal control system and on the management's acceptance of the risks related to the financial statements and the extent of its fairness when preparing it, which must be prepared in accordance with international standards, and here the management has to put in place control procedures (Sahhar, 2015), with the aim of reducing the possibility of significant errors in financial reports, which will help the auditor to assess control risks at a low level, which reduces scope of examination and detailed testing procedures. All this calls for a joint interest between the management and the auditor regarding the issue of financial statement risks.

3rd: *Control's procedures and Activities*: are procedures and policies that assist employees comply with management instructions and are followed to meet the risks associated with achieving the objectives of the company efficiently. These control-related activities have several objectives and applications at several administrative levels, therefore, the control procedures and activities related to financial policies are the same as the procedures and activities through which the company's

performance is evaluated and its data processed. There must be a complete separation of responsibilities and a clear delineation of the authorities. Which prevents fraud and risks' occurrence (Abutabar et al., 2021). In the same vein (A'nbar & Khodair, 2018) revealed that by following up and updating the control procedures and activities, we conclude that the control procedures and activities must be designed, implemented, and updated periodically, and the management must be familiar with and have sufficient knowledge of the procedures and policies that the company utilizes to monitor the financial statements related activities, and that the development and control systems are the management's most important responsibilities.

4th: Supervision and Following up Related Control: The internal audit department at any company is the most important supervisory method through budget systems, as well as responsibility accounting systems and performance reporting systems that can be used as oversight methods, these are summarized in the following (Bashatweh et al., 2023): procedures used in preparing planning budgets, responsibility accounting system for human resources in departments and methods used to compare actual performance with planned performance. Then the administration addresses the deviations from the expected performance as well as the policies and procedures that the administration follows to reform the accounting system and control procedures in order to keep pace with environmental changes.

5th: Information and Communication

The financial information related information system –including accounting system- includes the accounting methods related to the institute's operations processing, and the quality of information generated by the system and the technology used affects the possibility of making the appropriate decisions by the management (Zaqout, 2016), and it should be taken into accounts that the manager is responsible and some aspects that are important and directly related to activities should be taken into account. It is necessary to point out that a cost system should be available to achieve internal control efficiency, to achieve this, the internal control system should be characterized by the followings: the clear determination for cost points, the proper classification of the cost elements without mixing these elements to measure and track aspects of production activity and the changes that occur to it, then following fair principles that suit the distribution of costs in order to ensure that the facility follows accurate scientific methods for cost determination.

3.3 Accounting Information Quality

The main objective of preparing financial reports is to offer and make available high quality reliable information following the institute's economic status to assist in decision making for owners and investors in investment decisions (Beest et al., 2009). Accounting information quality is also defined by the (IASB) as the accuracy in transferring information related to the institution represented by operational activities and expected cash flows from operations related to the institution, and measuring the benefit that accrues to investors from that information. Accounting information affects decision-making regarding future events, and therefore effective control elements must be available to achieve this goal (Ababneh & Alrabei, 2021), so that benefit and trust and return from the decision become as great as possible to reach confidence in accounting information, the information should be characterized by reliability as these information contained in accounting reports are used for evaluating performance and decision making and resolve problems (Abutabar, 2021), and from behavioral aspect, this assists in directing and enhancing the person receives reports , in addition, accounting information also are more appropriate in managerial activities connected to them so that management becomes more efficient and effective when there is an effective control system (Sharpi, 2015). This won't be achieved unless accounts submit beneficial. Accurate and full information for management. The Accounting Criteria Committee has confirmed the necessity of availability of the following criteria: appropriateness, honest representation, impartiality, error-free, completeness, accuracy, understanding and comprehension, timeliness, importance and adequacy. In addition, the control system effectively contributes to improving accounting information quality, and obtaining high quality information depends on following a group of the internal control system's criteria (Al-Ghoul, 2015). Al-Hadi (2016) indicates that the more internal control is effective, the less is the auditors' test scope. Internal control depends on internal auditing system in detecting errors and resolving them and then developing an internal control system that operates on increasing work efficiency and achieving the company's goals, it was also indicated that there are latent risks including that the internal control system cannot reduce and ignore, and in order to increase confidence in them, attention must be paid to all aspects surrounding them and to prepare them to include aspects of accounting information (Bin Qasim, 2017).

3.4 Information Technology

The importance of information technology governance is highlighted by developing information technology strategy and starting operational feedback, managing information technology systems, determining the best practices in the field of technological development, and ensuring information technology efficiency to communicate the strategy to business departments (Ibrahim et al., 2022; Al-Okaily et al., 2021a; Al-Okaily et al., 2021b). Information technology can be defined as utilizing computer technologies to regulate and collect data to obtain information that leads us to making correct and appropriate decisions at the appropriate time through software and applications. and the World Wide Web (Bin Qasim, 2017). In addition, the Information Technology Governance Institute (ITG) defined information technology governance in 2003 as an integral part of project governance and an effective tool in the enterprise by creating flexibility to achieve a proportional advantage for the enterprise (Bashatweh et al., 2023; Alrabei et al., 2020). Good information technology systems are characterized by accuracy and appropriateness and require using electronic computers in operating data for the speed and accuracy they offer in operating and circulating that data, and the main goal for any system can be achieved through daily support for the processes,

supporting decision making, and fulfillment of management obligations (Al-Dhiba, 2019). In addition, information technology systems have two main objectives: protecting assets from loss by ensuring the completeness and accuracy of data and its correct operation and providing information for decision-making (Othman, 2018).

4. Early Literature

Most studies called for increasing interest in the internal control system and its costs and working on developing and adapting the internal control system in line with the changes and ensuring its protection from penetration and addressing existing weaknesses or that may arise as a result of the changes in order to provide confidence in the accounting information in banks. Many researchers also dealt with the relationship between the internal control system and the quality of accounting information. Many researchers have addressed the relationship between internal control system and accounting information quality such as Abumusa's study (2021) which indicated that the quality of the company's managerial system has changed from a manual system to a computerized system that produces useful outputs for each information user. And this is evident by all the components needed to support the company's systems, and there is an element of internal control that it is better to implement organized internal controls and develop access controls that are restricted using user and password so that only certain units can implement internal access, which enhances the internal control system. Afiah et al. (2020) indicated that employee's efficiency and the internal control system had a significant impact on the quality of accounting information, while Abutabar (2021) concluded that the existence of an accounting information system is positively related to enhancing the role of human resources' management at Islamic banks in Jordan.

Asiedu and Deffor (2017) indicated that the full implementation for the law, the internal flow size and auditing department autonomy significantly affect the effectiveness of the internal audit function, which limits corruption. Sahhar's study (2015) on the other hand indicated that the internal auditor has a great role in increasing confidence in accounting information quality within the institution especially when applying the standards and principles governing the auditor's work. Ayyash (2014) concluded that there is an efficient supervisory structure, especially on corporate assets, which supports financial performance.

Mei's study (2018) described the situation of university internal auditing in the big data environment from the perspective of establishing the framework and application of technology for big data auditing and found implementation difficulties and corresponding countermeasures while Sharbi (2015) indicated that preparing a strong internal control system that affects confidence in the financial statements, allowing them to be prepared with reliability. AlKarima (2017) concluded that the internal control system contributes to presenting financial statements that are more understandable, appropriate, reliable, and comparable. In their study, A'nbar and Khodair (2018) and Jahmani et al. (2023) indicated that there is an impact for internal auditing functions on increasing the effectiveness of its performance in detecting the joints of managerial and financial corruption at institutions. Ben Qasim (2017) studies revealed the existence of a role for information technology and communication in the auditing process which positively affects accounting information quality. Abutabar et al. (2021) investigated the role of internal audit functions at the public sector and reserving public money and the results indicated that the internal auditor in government departments has a role in preserving public money and that internal auditors in government departments have the knowledge to preserve public money. DeSimone et al., (2019) concluded with a confirmation of their study's hypotheses at the global and regional level through the Board of Directors, various training programs, management training, and the maturity of risk management system significantly, while Roussy and Marion ,(2016) revealed results that are in agreement with auditors' opinions and suggests completely different perspectives, and Dangolani's study, (2011) indicated that information technology contributes to the banking system in three different ways as follows: Information technology clearly saves customers and employees time, reduces expenses, and information technology facilitates network transactions. Finally, Holden and El-Bannany (2004) indicated that when other factors used in the literature were included, it was found that investment in information technology used in the automatic exchange that the bank installs have a positive impact on the bank's profitability.

5. Methodology

5.1 Construct Measurements

Table 1 demonstrates the structure of the proposed research. Note that the measures have already been used by other studies, however, some new items were proposed to suit the context of the current study. Then, the instrument was sent to experts in the field of confidence in accounting information for content validity of each item. The measure of the dependent variable, the confidence in accounting information, were taken from Ababneh and Alrabei (2021), while The measure of the independent variables, the measures for costs of internal control system were adapted from Alrabei (2021), The people who took part in our survey were requested to express their level of agreement with each item based on a 5-point Likert-type scale ranging from 1 = strongly disagree to 5 = strongly agree as recommended by Sekaran and Bougie (2016). Table 1 summarizes the measurement items of all the three constructs of the study. The study has explored the existing internal control system costs and tested its alignments with level of confidence in the accounting information. The study further assumed that whenever the existing internal control system costs are low, the level of confidence in the accounting information is expected to be high and vice versa. To examine the assumption, we used the partial least square-structural equation model (PLS-SEM), preferred when the research objective is based on the theory development and explanation of variance or prediction of the constructs.

5.2 Variables and Measurement

Table 1
Measurement items of all the Constructs

First-order construct	Second-order construct	Code	Measurement Item
Internal Control Environment		ICE	ICE1 ICE2 ICE3 ICE4 ICE5
Internal Control Activities		ICA	ICA1 ICA2 ICA3 ICA4 ICA5 ICA6
Internal Risk Assessment		IRA	IRA1 IRA2 IRA3 IRA4 IRA5 IRA6 IRA7
Information & Communication		IC	IC1 IC2 IC3 IC4 IC5 IC6
Monitoring		MO	MO1 MO2 MO3 MO4 MO5 MO6 MO7
	Internal Control System	ICS	ICE ICA IRA IC MO
Information Technology		IT	IT1 IT2 IT3 IT4 IT5 IT6 IT7 IT8 IT9
Accounting Information Confidence		AIC	AIC1 AIC2 AIC3 AIC4 AIC5 AIC6 AIC7 AIC8 AIC9 AIC10 AIC11

This study selected Islamic Banks in Jordan as a study sample due to the argument that banks are more able to increase confidence in accounting information and more likely to have ability to reduce the costs of the internal control system. Indeed, Islamic Banks are a suitable sample for this study because they have possibilities to provide accounting information and a good internal control system.

5.3 Measurement model

The partial least square structural equation modeling (PLS-SEM) technique was used to analyze the measurement (Fornell & Larcker, 1981) and structural models (Hair et al., 2018) using SmartPLS software. The measurement model was built up to assess convergent validity. Factor loadings, composite reliability (CR) and average variance extracted (AVE) were used to assess convergent validity. The assumed values for loadings are set at more than 0.70 the AVE should be more than 0.5 and the CR should be more than 0.70. In this study, the ACI construct has been assumed as a second-order construct, to assess the

convergent validity for each construct, so the result indicated that each factor loading exceeded the assumed value. Because each factor loading on each construct was more than 0.70, thereby providing evidence of construct validity for all the constructs in this study. As well as the AVE was calculated to assess the discriminant validity for each construct, the discriminant validity of the construct using Fornell and Larcker (1981) approach. The result has been indicating adequate discriminant validity.

5.4 Hypotheses Development

Once the conceptual framework is finalized, the next step is hypothesis development.

The first hypothesis is developed to explore the relationship between costs of internal control system and confidence in accounting information:

H₁: *Costs of internal control systems (ICS) significantly influence confidence in accounting information (ACI).*

The second hypothesis is developed to examine the relationship between costs of internal control system and information technology:

H₂: *Costs of internal control system (ICS) significantly influence information technology (IT).*

The third hypothesis is created to test the linkage between information technology (IT) and confidence in accounting information (AIC):

H₃: *Information technology (IT) significantly influences confidence in accounting information (ACI).*

Information technology is a mediating variable in the model. Hence the fourth hypotheses are developed as the following:

H₄: *Information technology (IT) significantly mediates the relationship Costs of internal control system (ICS) and confidence in accounting information (CAI).*

4. Result

4.1 Structural Model

After obtaining an appropriate measurement model, we build a structural model to show the relationship between the latent constructs, along with the cause and effect of the constructs of the proposed study model. The model was assessed according to the values of path coefficients, standard errors, t-value and p-value.

PLS-SEM Design Considerations

Sample size

In this study, there are 148 valid responds to analysis, and Hoelter (1983) mentioned a sample size of 200 hence sample size smaller than 200 is generally considered to be small, so PLS-SEM has emerged to handle this kind of data set since it normally operates suitably with small sample sizes (Reinartz et al., 2009).

Indicator Reliability

Since reliability is a condition for validity, indicator reliability is first checked to ensure the associated indicators have much in common that is captured by the latent construct. Seven indicators (CAI6, CAI10, ICA4, IRA6, IRA7, IC1 and MO3) are found to have loadings less than 0.7. A loading relevance test is thus executed for these 3 indicators to realize whether they need to be kept in the model. Normally, problematic indicators ought to be removed only if their removal from the PLS model may increase the AVE and composite reliability of their constructs over the 0.5 thresholds. As the elimination of these 7 indicators yields an increase of AVE and composite reliability of their respective latent construct, they are deleted from the PLS model. The remaining indicators are kept since their outer loadings were all 0.7 or bigger. The results of the path model estimation is presented in Fig. 1.

Table 2

Evaluation of Cronbach's Alpha, AVE and CR

Construct	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
AIC	0.943	0.952	0.691
IC	0.901	0.927	0.717
ICA	0.959	0.97	0.867
ICE	0.94	0.953	0.803
ICS	0.867	0.904	0.656
IRA	0.921	0.941	0.761
IT	0.935	0.945	0.658
MO	0.937	0.952	0.8

Internal Consistency Reliability

The reliability was assessed through Cronbach's alpha and composite reliability (CR). Cronbach's alpha and composite reliability are used to evaluate the measurement model's internal consistency reliability. In this study, the Cronbach's alpha for the constructs AIC, ICS and IT are 0.943, 0.867, and 0.935, respectively, meaning suitable levels of internal consistency reliability. Previous studies recommend that a threshold level of 0.7 or bigger is needed to show a desirable internal consistency reliability in this study.

Convergent validity Convergent

Validity is associated with the model's capability of describing the indicator's variance. The AVE may give some evidence for convergent validity. Bagozzi and Yi (1988) recommend an AVE threshold level of 0.5 as an indicator of convergent validity. All the constructs are bigger than this level or within the same level. Since all these constructs reached discriminant validity and other reliability tests, they are considered in the model to reach content validity. The AVE for the latent construct AIC, ICS and IT are 0.691, 0.656, and 0.658, respectively, well more than the required minimum level of 0.50 (Bagozzi & Yi, 1988). Thus, the measures of the three constructs have high levels of convergent validity.

Multicollinearity

The desirable option in a study is to have high correlation between the exogenous variables and the endogenous variable, but with little collinearity among the exogenous variables (Hair et al., 2018), so high multicollinearity makes the standard error high. The examination for multicollinearity based on variance inflation factors (VIF) the results have resulted that there were not any problems of multicollinearity among the constructs.

Table 3
VIF Values

Construct	AIC	IC	ICA	ICE	ICS	IRA	IT	MO
AIC								
IC					1.296			
ICA					1.104			
ICE					1.045			
ICS	1.169						1	
IRA					1.304			
IT	1.169							
MO					1.056			

Discriminant Validity

The Fornell-Larcker criterion (1981) is a method to evaluate discriminant validity and it is implemented in PLS-SEM. Another method is cross-loading examination, where the indicator's loading to its latent construct ought to be bigger than that of others. To build the discriminant validity, the square root of AVE of each latent variable must be bigger than the latent variable correlations (LVC). Table 4 demonstrates that discriminant validity is reached for this research since the square root of AVE for AIC, ICS and IT are bigger than the corresponding LVC.

Table 4
Fornell-Larcker Criterion

Construct	AIC	IC	ICA	ICE	ICS	IRA	IT	MO
AIC	0.831							
IC	0.234	0.847						
ICA	0.195	0.035	0.931					
ICE	0.148	0.078	0.176	0.896				
ICS	0.372	0.836	0.214	0.129	0.81			
IRA	0.25	0.469	0.108	-0.012	0.77	0.872		
IT	0.507	0.202	0.297	0.177	0.38	0.079	0.811	
MO	0.187	-0.001	0.227	0.004	0.104	0.021	0.169	0.894

Measurement Model

Structural equation modeling Smart PLS 3.0 was implemented to verify the hypotheses and to assess the predictive power of the structural model, R^2 was calculated. R^2 shows the amount of variance explained by the exogenous variables (Hair et al., 2012). Using a bootstrapping method with a re-sampling of 500 (Hair et al., 2013), the path t-statistics were computed for the hypothesized relationships. Table 5 and Fig. 1 show the structural model analysis. The results showed that the relationships between AIC and ICS were significant ($B=0.216$, $t\text{-value}=2.151$) and the relationships between ICS and IT were significant ($B=0.374$, $t\text{-value}=3.621$) and that the explanatory power (R^2) of the relationship was 0.295. Thus, H_1 and H_2 were supported. The relationship between AIC and IT was significant ($B = 0.426$, $t\text{-value} = 3.211$), and the explanatory power (R^2) of the relationship is 0.144. Thus, H_3 was supported.

5. Result of Statistic Testing

5.1 Measurement Model

Partial least squares PLS was used test the relationship existing between the latent variables of the model using both the measurement model and structural model.

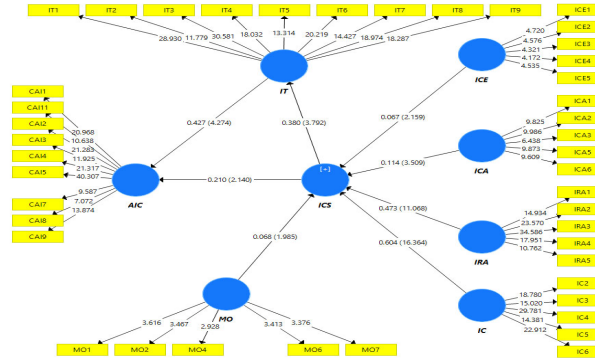


Fig. 1. PLS Path Model Estimation

Table 5

The effect of costs of internal control system on information technology and its implication on confidence in accounting information

Hypothesis	Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values	Decision
H_1	IC → ICS	0.604	0.601	0.036	16.641	0.000	Supported
	ICA → ICS	0.114	0.113	0.035	3.281	0.001	Supported
	ICE → ICS	0.067	0.067	0.029	2.327	0.020	Supported
H_2	ICS → AIC	0.210	0.216	0.098	2.151	0.032	Supported
	ICS → IT	0.380	0.374	0.105	3.621	0.000	Supported
H_3	IRA → ICS	0.473	0.475	0.041	11.650	0.000	Supported
	IT → AIC	0.427	0.444	0.096	4.448	0.000	Supported
	MO → ICS	0.068	0.062	0.033	2.091	0.037	Supported

Table 6

The results of R square and R square adjusted

	R Square	R Square Adjusted
AIC	0.295	0.285
IT	0.144	0.138

R square model of this study 0.144 meaning that the costs of internal control system (ICS) can explain the Information Technology (IT) as much as 14.4%. The R square model is 0.295 meaning that the costs of internal control system (ICS) and Information Technology (IT) can explain the variable of confidence in accounting information (AIC) as much as 29.5%.

5.2 Information Technology (IT) as a Mediator

To gain a better understanding of the role of IT in our model, its potential mediating effect on the linkage between ICS and AIC (see Fig. 2). This is accomplished by following the Preacher and Hayes (2008) procedure.

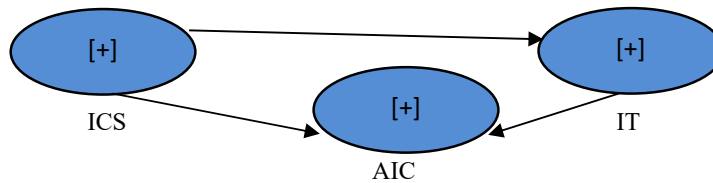


Fig. 2. Mediation Analysis

The Preacher and Hayes (2008) procedure involves the use of bootstrapping in a 2-step procedure:

1. Bootstrap the indirect effect: the relationship between ICS and AIC via IT must be significant.
2. Bootstrap confidence interval (lower and upper level)

Table 7

Mediation analysis in PLS-SEM

Hypothesis	Procedure	Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values		Decision
	Step 1	ICS → AIC	0.181	0.19	0.07	2.59	0.01		
H4									Supported
	Step 2	ICS→IT	IT→AIC	ICS→AIC	SE	t-value	95% LL	95% UL	
		0.437	0.415	0.392	0.068	5.804	0.259	0.525	

6. Conclusion

The objective of this study was driven by the revealing of the extent to which information technology influences confidence in accounting information and Costs of internal control systems. The finding of this study provides evidence that information technology mediates the relationship between Costs of internal control systems and confidence in accounting information. where the findings implies that Costs of internal control systems when it is the greater level have a positive influence on maximizing confidence in accounting information, particularly in the cases where they make effective information technology practice. The results also indicate that there is a significant relationship between the five variables (Internal Control Environment, Internal Control Activities, Internal Risk Assessment, Information & Communication and Monitoring) and Costs of internal control systems.

7. Discussions

Many researchers dealt with the relationship between the internal control system and the quality of accounting information. Some studies agree with our study such as Abumusa's study (2021), Afiah et al. (2020), Alrabei (2017) Asiedu and Deffor (2017) indicated that employee's efficiency and the internal control system had a significant impact on the quality of accounting information, while Abutabar (2021) concluded that the existence of an accounting information system was positively related to enhancing the role of human resources' management at Islamic banks in Jordan. Also, Sahhar's study (2015) agrees with our study since it indicated that internal auditors had a great role in increasing confidence in accounting information quality within the institution especially when applying the standards and principles governing the auditor's work. Mei's study (2018) described the situation of university internal auditing in the big data environment from the perspective of establishing the framework and application of technology for big data auditing. While Sharabi (2015) indicated that preparing a strong internal control system affects confidence in financial statements, allowing them to be prepared with reliability. And Ben Qasim (2017) and Abutabar et al. (2021) founded revealed the existence of a role for information technology and communication in the auditing process which positively affects accounting information quality.

Recommendations

1. The Internal Control Department performs audit work in accordance with professional standards and regulatory requirements, whether local or international, which is considered a necessary means to ensure the reliability of accounting information that investors and stakeholders need to make appropriate decisions.
2. Focusing on the internal control department through continuous and continuous research to find errors and deviations and find out their causes and remedy them, in addition to encouraging the workers in this department to inform the department upon the arrival of any information that may affect the audit process.
3. Encouraging banks working in Jordan to adopt information technology because of its effective role in reducing the risks of using information technology, through the adoption of approaches and frameworks to manage risks in the organization.

Limitations

The researchers inferred this could Provide comprehensive knowledge about the quality of accounting information and its connection to the quality of internal control and providing those interested with information related to this field, which was supported by the COBIT framework, which helps auditors and managers to understand information technology systems related to commercial banks in Jordan.

References

- Ababneh, D. S., & Alrabei, A. M. (2021). The Moderating Effect of Information Technology on the Relationship between Audit Quality and the Quality of Accounting Information. "Jordanian Auditors Perception". *Journal of Theoretical and Applied Information Technology*, 99(14), 3365-3378.
- Abu Musa, A. A., & Saleh, R. I. (2020). The impact of information security management on the success of the accounting information security program. *Journal of Contemporary Business Studies*, 6(10), 106-142.
- Abutaber, T. A., & Maswadeh, S. N. (2022). The Effect of Social Responsibility Disclosure on the Economic Value Added. In *From the Internet of Things to the Internet of Ideas: The Role of Artificial Intelligence: Proceedings of EAMMIS 2022* (pp. 617-628). Cham: Springer International Publishing.
- Abutaber, T., Bzur, A., Odeh, M., Alathamneh, M., Al-Okaily, M., & Afaneh, M. (2021). The effect of corporate governance indicators on enhancing the financial performance of industrial listed companies on the Amman Stock Exchange. *Accounting*, 7(2), 415-422.
- Afiah, N. N., Alfian, A., & Sofia, P. (2020). Effect of employee competence and internal control systems on accounting information quality of the local government in West Java region. *Utopia y Praxis Latinoamericana*, 25(1), 146-154.
- Al-Dhiba, Z. A.-H. (2019). The extent to which Jordanian companies are aware of the importance of specializing in accounting information systems. *Journal of the Islamic University for Economic and Administrative Studies*, 1(27), 222-269.
- Al-Ghoul, S. (2015). The role of the internal control system in improving the quality of accounting information: a study of a sample of institutions in the state of Ouargla, a published master's thesis, Kasdi Merbah University, Ouargla, Algeria.
- Al-Hadi, H. M. (2016). The role of the internal control system in improving audit quality: applied to Shikan Insurance and Reinsurance Company Ltd. in the period from 2015-2016, a published master's thesis, Al-Zaeem Al-Azhari University, Iraq.
- AlKarima, M. (2017). The role of the internal control system in improving the qualitative characteristics of the financial statements: a field study of a sample of institutions in the state of Ouargla, a published master's thesis, Kasdi Merbah University, Ouargla, Algeria.
- Almajali, D., Al-Okaily, M., Al-Daoud, K., Weshah, S., & Shaikh, A. A. (2022). Go Cashless! Mobile Payment Apps Acceptance in Developing Countries: The Jordanian Context Perspective. *Sustainability*, 14(20), 13524.
- Al-Okaily, A., Al-Okaily, M., & Teoh, A. P. (2021a). Evaluating ERP systems success: Evidence from Jordanian firms in the age of the digital business. *VINE Journal of Information and Knowledge Management Systems*, (ahead-of-print).
- Al-Okaily, A., Al-Okaily, M., Ai Ping, T., Al-Mawali, H., & Zaidan, H. (2021b). An empirical investigation of enterprise system user satisfaction antecedents in Jordanian commercial banks. *Cogent Business & Management*, 8(1), 1918847.
- Alrabei, A. (2021). The influence of accounting information systems in enhancing the efficiency of internal control at Jordanian commercial banks. *Journal of Management Information and Decision Sciences*, 24(1), 1-9.
- Alrabei, A. M., Al-Othman L. N., Al-Dalabih, F. A., Abu Taber, Thaer., Ali, B. J., & Amareen. S. M. (2022) The Impact of Mobile Payment on the Financial Inclusion Rates. *Information Sciences Letters*, 11(4), 1033-1044.
- Alrabei, A., Abu Haija, A., & Al Aryan, L. (2020). The Mediating Effect of Information Technology on the Relationship between Organizational Culture and Accounting Information System. *International Journal of Advanced Science and Technology*, 29(5s), 1085-1095.
- Alrabei, A. M. (2017) Perception of Jordanian Banks Employees on the Relationship between Accounting Information Quality and Documentary Credits. *International Journal of Applied Business and Economics Research*, 15(19).
- AL-Sous, N., Almajali, D., Al-Radaideh, A., Dahalin, Z., & Dwas, D. (2023). Integrated e-learning for knowledge management and its impact on innovation performance among Jordanian manufacturing sector companies. *International Journal of Data and Network Science*, 7(1), 495-504.
- Anbar, A., & Khudair, J. (2018) The effectiveness of the performance of internal auditing agencies in combating administrative and financial corruption: an analytical survey of the opinions of a sample of internal auditors working at Al-Qadisiyah University. *Dinars Magazine*, 13, 2018.
- Asiedu, K. F., & Deffor, E. W. (2017). Fighting corruption by means of effective internal audit function: Evidence from the Ghanaian public sector. *International Journal of Auditing*, 21(1), 82-99.
- Ayyash, A. W. A. (2014). The role of internal control in raising the efficiency of financial performance. *Al-Nasser University Journal*, 4, 156-183.
- Bagozzi, R., & Yi, Y. (1988) On the Evaluation of Structural Equation Models. *Journal of the Academy of Marketing Sciences*, 16, 74-94. <http://dx.doi.org/10.1007/BF02723327>
- Bashatweh, A.D., Abutaber, T.A., AlZu'bi, M.J., Al-Jaghibir, S.A., & AlZoubi, I.J. (2023). Does Environmental, Social, and Governance (ESG) Disclosure Add Firm Value? Evidence from Sharia-Compliant Banks in Jordan. *Lecture Notes in Networks and Systems this link is disabled*, 487, 585-595.
- Beest, F. V., Braam, G. J. M., & Boelens, S. (2009). Quality of Financial Reporting: measuring qualitative characteristics. <https://www.iasplus.com/en/standards/ias> <https://www.iasplus.com/en/resources/ifrsf/iasb-ifrs-ic/iasb>.
- Bin Qasim, J. (2017). The role of information technology in achieving governance. *The Iraqi Journal of Information Technology*, 7(4), 1-27.
- Coates, J. C., & Srinivasan, S. (2014). SOX after ten years: A multidisciplinary review. *Accounting Horizons*, 28(3), 627-671.
- Daf, A., & Hennad, S. (2021). *Le contrôle budgétaire au sein des entreprises publiques à caractère commercial Cas: NAFTAL Tizi-Ouzou* (Doctoral dissertation, Université Mouloud Mammeri).

- Dangolani, S. K. (2011). The Impact of information technology in banking system (A case study in Bank Keshavarzi IRAN). *Procedia-social and behavioral sciences*, 30, 13-16.
- DeSimone, S., Onza, G., & Sarens, G. (2019). Correlates of Internal Audit Function Maturity (No. 1905).
- Feng, M., Li, C., McVay, S. E., & Skaife, H. (2015). Does ineffective internal control over financial reporting affect a firm's operations? Evidence from firms' inventory management. *The Accounting Review*, 90(2), 529-557.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39-50. <https://doi.org/10.2307/3151312>
- Ge, W., Koester, A., & McVay, S. (2017). Benefits and costs of Sarbanes-Oxley Section 404 (b) exemption: Evidence from small firms' internal control disclosures. *Journal of Accounting and Economics*, 63(2-3), 358-384.
- Hair, J.F., Black, W.C., Babin, B.,J., Anderson, R.,E., & Latham, R.(2018). *Multivariate data analysis* .New Jersey: Pearson.
- Hoelter, D.R. (1983) The analysis of covariance structures: Goodness-of-fit indices, sociological. *Methods and Research*, 11, 325-344. <http://dx.doi.org/10.1177/0049124183011003003>
- Holden, K., & El-Bannany, M. (2004). Investment in information technology systems and other determinants of bank profitability in the UK. *Applied Financial Economics*, 14(5), 361-365
- Ibrahim, M. M., Abu Bakr A, Musharraf. M, & Othman. F. A. (2022). The impact of the target cost method in cost control, the mediating role of the resource consumption accounting system (Doctoral dissertation, Sudan University of Science and Technology).
- Jahmani, A., Jawabreh, O., Abokhoza, R., Alrabei, A.M. (2023). The Impact of Marketing Mix Elements on Tourist's Satisfaction towards Five Stars Hotel Services in Dubai during COVID-19. *Journal of Environmental Management and Tourism*, (Volume XIV, spring), 2(66), 335 - 346. DOI:10.14505/jemt.v14.2 (66).04.
- Mei, Z. (2018). Big-data Environment-based Innovations and Difficulties of Internal Audit Mode in Universities. *Journal of Longyan University*, 2, 25.
- Othman, M. M. (2018). The impact of the components of the accounting information system on protecting the e-commerce operations of banks operating in Sudan. *Journal of Economic, Administrative and Legal Sciences*, 2(11), 2522-3372.
- Petitjean, M. (1985). *Gestion Analytique et budgétaire*, Publisher: Litec, Paris, p 404.
- Reinartz, W., Haenlein, M., & Henseler, J. (2009). An empirical comparison of the efficacy of covariance-based and variance-based SEM. *International Journal of research in Marketing*, 26(4), 332-344 <https://doi.org/10.1016/j.ijresmar.2009.08.001>
- Roussy, M., & Brivot, M. (2016). Internal audit quality: a polysemous notion?. *Accounting, Auditing & Accountability Journal*, 29(5), 714-738.
- Sahhar, F. (2015). The role of internal auditing in improving the quality of accounting information: a case study in the two institutions of South Mills - and Naftal - Biskra, a published master's thesis, Mohamed Khudair University, Biskra, Algeria.
- Sekaran, U., & Bougie, R. (2016). *Research methods for business: skill building approach*. 7th edition, John.
- Sharpi, A. F. (2015). The role of the internal control system in enhancing the qualitative characteristics of the financial statements, a published master's thesis, Kasdi Merbah University, Ouargla.
- Shroff, N. (2017). *Corporate investment and changes in GAAP*. *Review of Accounting Studies*, 22, 1-63.
- Zaqout, M. (2016) Measuring the effectiveness of using information technology and its impact on improving the quality of the audit process, an unpublished master's thesis, the Islamic University, Gaza.



© 2023 by the authors; licensee Growing Science, Canada. This is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC-BY) license (<http://creativecommons.org/licenses/by/4.0/>).