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The moderating impact of cloud computing on the relationship between the reliability of accounting information systems and credit granting decisions in Jordanian banks

Thaer Ahmad Abutaber[a*]

[a]*Jadara University, Jordan*

A B S T R A C T

The study explored trust in the accounting information system and tested its compatibility with the credit granting decision level. The study also hypothesized that whenever the confidence in the current accounting information system is high, the level of the decision to grant credit is high, and vice versa. To test this assumption, the study used partial least squares structural equation modelling (PLS-SEM). This method is usually preferred when the goal of the research is to develop theory and explain variance or predict structures. The survey design approach was adopted in the commercial banks in Jordan, where 225 valid questionnaires were retrieved for statistical analysis. The results demonstrate a direct and significant effect on GCD in commercial banks. Moreover, the results of this paper show that cloud computing (CC) mediates the relationship between the independent variable (Accounting Information System Trust (AIS-Trust) with the dependent variable (Grant Credit Decision (GCD)).

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1. Introduction

The banking sector is considered one of the most important contemporary economic industries due to its active role and impact on local and global economic development and various developmental and investment fields (Abutaber et al., 2021). This makes it a pillar of the economy and a practitioner of supervising the granting of bank credit, whether internally or externally. It stems from the fact that a good credit policy based on objective criteria must be provided and adapted to the financial, regulatory, and technical capacities of the banking system, as well as the general economic, commercial, and legal environment in which it operates. This creates relationships between it and various economic sectors (Abutaber & Maswadeh, 2022). This is considered one of the most important preventive steps to mitigate credit risk and ensure the effectiveness of credit policy. Banking credit is one of the most attractive banking activities for commercial banks and other intermediary institutions. With the significant developments that have occurred in all economic aspects, banks have become interested in evaluating the reliability of accounting information systems as a fundamental source of information on which they rely to make their credit facility decisions. This is separate from the primary accounting data, as the data consist of isolated facts that do not help in decision-making because they are prepared in a way that does not allow them to be relied upon or decisions to be made based on them.

Undoubtedly, the lack of sufficient and appropriate information, as well as accurate information, on which credit granting decisions rely is one of the main reasons for the failure of many credit decisions (Alqudah et al., 2022). The effectiveness and success of credit decisions depend on the integrity and reliability of information. Additionally, cloud computing has emerged as a tool that helps in obtaining timely, highly accurate, and reliable accounting information through available computer resources and systems over the internet. It can provide a range of integrated computer services without being limited by local

* Corresponding author
E-mail address thaer@jadara.edu.jo (T. A. Abutaber)

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resources, aiming to help the user. This includes optimal utilization of storage space, backup and self-synchronization of data and information, as well as software processing and scheduling capabilities for tasks, email delivery, and remote printing. When connected to the network, users can control these resources through a simple programming interface (Fatafta, 2022). Every bank bears a certain degree of risk when granting credit, without any exceptions. Credit losses are a possible outcome of the lending process, and credit risk is associated with customers' default or inability to repay, as well as total or partial loss of the amount lent to customers. Therefore, sound credit granting decisions require the presence of a credit policy based on reliable information capable of securing the bank's assets from loss, thus protecting the bank's stakeholders, especially shareholders, investors, and all relevant parties (Lutfi et al., 2022).

According to Al-Masry (2021), combining the application and study of information, along with monitoring, designing, and implementing an information system based on cloud computing and advanced information technology, can provide banks with reliable financial information that helps them make prudent credit granting decisions, minimizing credit risks and protecting the assets and interests of stakeholders. The contribution of this study lies in the importance of the banking sector, which is considered one of the most significant contemporary economic sectors due to its active role and impact on local and global economic development and various developmental and investment areas, making it a cornerstone of the economy. Therefore, exercising control over bank credit granting, whether internally or externally, stems from the fact that a sound credit policy must be provided based on objective criteria, adapted to the financial, organizational, and technical capacities of the banking system it serves, as well as the general environment, economic, commercial, and legal environments in which it operates, and establishing relationships between them and different economic sectors is worth studying and analysing as one of the most preventive steps to mitigate credit risks and ensure the effectiveness of the credit policy in achieving desired goals. The importance of bank credit granting lies in increasing production, establishing new industrial, agricultural, and service projects, and increasing individuals' consumption by obtaining goods and services. According to Justiniano et al. (2019), if the granted credit is used in commercial, industrial, or agricultural projects, it benefits the wheel of economic development and the national income growth of the state.

This study aims to examine the impact of the reliability of accounting information systems (information security, information confidentiality, information privacy, operational integrity, and information readiness) on credit granting decisions. Additionally, it investigates the moderated effect of cloud computing on the relationship between the reliability of accounting information systems and credit granting decisions in Jordanian banks.

1.1 Cloud Computing

Our contemporary world is witnessing significant changes accompanied by major technological advancements that have implications on various aspects of life, work, and production sectors. Cloud computing represents a comprehensive framework of different components and elements capable of collecting, processing, and distributing information in a timely manner (Alrabei, 2021). Cloud computing is considered one of the most important tools used by various business organizations in their different operations, as it enables the provision of information in a timely manner and at lower costs (Jahmani et al., 2023; AL-Sous et al., 2023; Rajm et al., 2021).

According Allal and Boubaaya (2020), Cloud computing “is a system capable of collecting, processing, classifying, and storing data and information required by decision-makers to perform all administrative functions, including planning, organizing, directing, and controlling, in all areas of work within an organization. Public and private institutions have witnessed a qualitative shift in information systems, which include the use of computers, databases, communication networks, and other technological means that contribute to the existence of an information system primarily based on computer usage".

1.2 Reliability of Accounting Information

Accounting information systems are defined as a set of interconnected components that consist of four main components: inputs, outputs, processes, interactions, and system boundaries (Okwudili, 2017). They are systems that gather, store, and process data to produce information for decision-makers (Romney & Steinbart, 2018). They also perform various accounting tasks and activities using computers to obtain important and useful results for individuals interested in the outputs of these systems for making appropriate decisions (Naseer, 2018).

1.3 The Jordanian Banks

The number of operating banks in Jordan reached twenty-four by the end of 2022. These banks are distributed into sixteen Jordanian banks, including three Islamic banks and thirteen commercial banks, and eight branches of foreign banks, including a branch of an Islamic bank. All of these banks conduct their activities through 871 branches and 70 offices distributed within the kingdom, compared to 861 branches and 81 offices at the end of 2021. Preliminary data indicates that the ratio of population to total number of operating branches (banking density index) was approximately 12.4 thousand individuals per branch by the end of 2022. Licensed banks witnessed an improvement in their performance during 2022, as they achieved a growth of 3,396.0 million dinars (6.3%) in their total assets, reaching 57.0 billion dinars, compared to an increase of 2,724.2

million dinars (5.4%) during 2021. Deposits increased by 1.5 billion dinars (4.2% growth), reflecting the continuous improvement in the activities of the banks (Central Bank of Jordan Bulletin, 2022).

According to Smreen (2018), bank credit is defined as the trust given by a bank to an individual, whether natural or legal, to provide them with a specific amount of money for a specified period of time and under certain conditions, in return for an agreed-upon return and with guarantees that enable the bank to recover its loan in case the client defaults. Abutaber et al. (2021) argue that banks need to establish sound foundations and policies to reduce risks and secure them, as well as develop high-quality accounting standards and principles. Reliable accounting information systems play an effective role in making credit decisions. Credit managers require information about the client's repayment capacity, based on previous transactions, profitability of facilities, purpose of facilities, and the amount required, as well as guarantees. Banks seek to gather savings from both small and large savers in order to mobilize available cash surpluses and direct them towards various investment activities. Thus, banks play an active role in stimulating investment and revitalizing the economy in the countries where they operate (Melhem et al., 2021; Alshannag et al., 2020; Almajali et al.,2023).

1.4 Cloud Computing and the Reliability of Accounting Information

The economic and technological changes occurring in the world are exerting significant pressure on economic entities in general. With the significant advancements in information technology, it has become important and necessary to explore the latest technologies. This has led to an increased demand for information, which has become integrated in various fields and has become a business practice carried out by economic entities, differentiating one organization from another. To what extent can this information provide organizations with important insights for making managerial decisions and contribute to their overall performance? Accurate and vital information assists stakeholders in making appropriate decisions that align with their goals. Bashatweh et al., (2022), Masaeed and Mdallah (2020).

The reliability of accounting information is considered to be one of the most important sub-systems of an information system, playing a vital role within an organization. With technological advancements and the emergence of globalization, accounting systems have changed and evolved to require accurate and reliable information for designing information systems that help manage the vast amount of necessary data. Cloud computing has greatly contributed to this by automating data processing (Ababneh and Alrabei, 2021). Consequently, electronic accounting information systems have emerged, which have improved the quality of financial reports by providing timely and high-quality information. This assists users of this information in making better decisions (Abdul Latif et al., 2019).

2. Literature Review and Previous Studies

Accounting information systems are defined as systems that process, store, and gather accounting and financial data used by internal users within companies to provide tax authorities, creditors, and investors with accounting information (Oktavianita, et al., 2022). The importance of the reliability of accounting information systems lies in providing and preparing financial reports that reflect the actual banking operations, to assist management in efficiently performing its functions, ensuring sound credit decisions, and contributing to the preparation of accurate and reliable financial reports. It also involves presenting data in an effective and scientifically based manner, built on accuracy and operational efficiency of accounting data, making it ready for presentation (Al-Masry, 2021). A study by Satadamrul (2014) emphasized that the reliability of accounting information systems relies on accuracy and high-speed processing and execution of financial data, providing management with the necessary information to choose among a set of available alternatives, flexibility and scalability, and providing services and performing various types of administrative tasks, such as decision-making, planning, control, and coordination. This was also supported by a study by Copeland and Dascher (2018).

Credit operations, in particular, are characterized by a gap between reality and customer demand. Manual credit processes no longer adequately meet customer expectations. It is essential to have accurate and timely information about customers. If traditional methods were used to gather information, there could be missing, incorrect, or inconsistent data in the application process. Manual data entry and the time-consuming process of verifying its accuracy, as well as a low level of automation in the workflow steps, are examples of factors that often make the credit process laborious and prone to errors. Therefore, there is a need for advanced information systems that meet and expedite all these requirements. The existence of cloud computing has contributed to addressing these challenges (Fatafta, 2022).

Previous studies have examined the subject of the study. For instance, a study by Najla and Alkhami (2022) found that accounting information does not fully impact credit decisions, while non-accounting information plays a more significant role in influencing banking credit decisions. Another study by Al-Rifai (2017) highlighted the importance of accounting information in predicting bankruptcy, specifically noting that the cash flow statement aids in predicting bankruptcy with a high degree of accuracy. Ferdinand et al. (2021) indicated that the use of cloud computing-based accounting information systems enables small and medium-sized enterprises to become more competitive by leveraging the core advantages of AIS through cloud computing. Their findings demonstrated the potential for cloud computing adoption among small and medium-sized projects in developing countries. Additionally, Bambang and Margani (2020) and Alrabei, et al. (2022) revealed that

cloud technology has become a valuable resource, offering cost savings in business technology and helping companies retain their capital. These studies relied on the Technology Acceptance Model (TAM) to better understand the adoption of cloud computing by small business owners. Through cloud-based accounting information systems, the studies showed positive effects on small and medium-sized companies' attitudes towards cloud-based accounting. Al-Ajmi (2016) and Al-Barak (2016) highlighted the positive impact of using accounting information systems in commercial banks, considering dimensions such as human resources, procedures and instructions, credit organization data, software used, and IT infrastructure in credit decisions. Another study by Deng (2022) indicated that the presence of an accounting information system can accelerate the economic development of small and medium-sized enterprises. The study compared the performance of an improved accounting system with traditional systems and found that data monitoring accuracy increased through a cloud computing-based accounting system compared to traditional accounting systems. Balasem et al. (2021) examined the impact of cloud computing technology on the accounting information system by surveying a sample of academics and professionals. They concluded that relying on cloud computing technology in accounting helps accelerate and organize accounting work, thereby increasing the effectiveness of accounting information systems. Javadpour et al. (2021) emphasized the prevalence of big data and cloud computing in the banking industry and the facilitation of banking facilities for individuals. The study highlighted the use of predictive algorithms in problem-solving and proposed specifications to achieve the highest possible accuracy. Ehiriudu et al. (2020) demonstrated the influence of accounting information systems on credit management and recommended the implementation of accounting information systems for production companies in Nigeria to enhance their credit management processes. Finally, Palazuelos et al. (2018) found that loan officers' willingness to facilitate access to credit for small and medium-sized enterprises is positively influenced by their overall perception of the Artificial Intelligence Quotient (AIQ), but only if it is properly audited.

2.1 The Hypotheses of the Study

After reviewing the accounting literature and previous studies that addressed the research topic, the study formulated the following hypotheses:

H_1: *The trust in the accounting information system significantly influences the decision to grant credit.*
H_2: *Cloud computing significantly moderates the relationship between trust in the accounting information system and decision to grant credit.*

3. Methodology

3.1 Construct Measurements

Table 1 provides the structure of the research constructs. In this study, some measures were adopted from some prior studies, however, some items were first reworded to make them more appropriate for the context of the present study. Then, the instrument was sent to experts in the field of confidence in accounting information for content validation of each item. The measure for the independent variable, the trust in the accounting information system, was taken from Dwirandra et al. (2020), while the measure for the dependent variables, the measures for decision to grant credit was adapted from Palazuelos et al. (2018), while the interaction variable, cloud computing, was taken from Moudud-Ul-Huq et al. (2020). Table 1 summarizes the measurement items for all the three constructs of the study. The study has explored the existing trust in the accounting information system and tested its alignment with the level of decision to grant credit. The study further assumed that whenever the existing accounting information system trust level is high, the level of decision to grant credit is high and vice versa. To test this assumption, the study used partial least squares structural equation modelling (PLS-SEM). This method is usually preferred when the research objective is theory development and explanation of variance or prediction of the constructs.

Table 1
Factor Loading

First-order construct	Second-order construct	Code	Measurement Item	Loading
Accounting Information System-Security		AIS-Security	SS1	0.871
			SS2	0.885
			SS3	0.9
			SS4	0.715
			SS5	0.869
			SS6	0.898
			SS7	0.755
			SS8	0.868
Accounting Information System-Confidentially		AIS-Confidentially	IC1	0.902
			IC2	0.703
			IC3	0.844
			IC4	0.701
			IC5	0.847
			IC6	0.787
			IC7	0.886
			IC8	0.892

Table 1
Factor Loading (Continued)

First-order construct	Second-order construct	Code	Measurement Item	Loading
Accounting Information System-Privacy		AIS-Privacy	IP1	0.883
			IP2	0.852
			IP3	0.857
			IP4	0.868
			IP5	0.857
			IP6	0.89
			IP7	0.891
			IP8	0.877
Accounting Information System-Integrity		AIS-Integrity	PI1	0.868
			PI2	0.89
			PI3	0.88
			PI4	0.859
			PI5	0.869
			PI6	0.848
			PI7	0.876
			PI8	0.868
Accounting Information System-Availability		AIS-Availability	SA1	0.819
			SA2	0.851
			SA3	0.879
			SA4	0.79
			SA5	0.71
			SA6	0.841
			SA7	0.773
			SA8	0.703
Accounting Information System Trust		AIS-Trust	AIS-Security	0.848
			AIS-Confidentially	0.82
			AIS-Privacy	0.718
			AIS-Integrity	0.794
			AIS-Availability	0.805
Cloud Computing		CC	CC1	0.882
			CC2	0.797
			CC3	0.841
			CC4	0.814
			CC5	0.853
			CC6	0.879
			CC7	0.837
			CC8	0.878
Decision to Grant Credit		GCD	GCD1	0.869
			GCD2	0.76
			GCD3	0.756
			GCD4	0.717
			GCD5	0.868
			GCD6	0.833
			GCD7	0.862
			GCD8	0.841

3.2 Hypotheses Development

Once the conceptual framework was finalized, the next step was hypotheses development.
The first hypothesis was developed to explore the influence of trust in the accounting information system on decision to grant credit:

H_1: *The trust in the accounting information system significantly influences the decision to grant credit.*

The second hypothesis was created to test the interaction between cloud computing and the accounting information system trust:

Cloud computing is an endogenous variable in the model. Hence the second hypothesis was developed as follows:

H_2: *Cloud computing significantly moderates the relationship between the trust in the accounting information system and decision to grant credit.*

4. Result

4.1 Structural Model

The structural model was created to demonstrate the relationship among the latent constructs (AIS-trust, GCD and CC). The model also presents the cause and effect of the constructs. More importantly, the cause and effect hypothesized and the model was assessed according to the values of path coefficients, standard errors, t values and p values.

4.2 PLS-SEM Design Considerations

Sample Size and Measurement

This study selected commercial banks in Jordan as a study sample due to the argument that the banks are more able to increase decision to grant credit and more likely to have ability to increase the accounting information system trust. Indeed, commercial banks are a suitable sample for this study because they have possibilities to provide accounting information and make good decisions to grant credit, and they have cloud computing. A survey design approach was adopted at the commercial banks in Jordan. A total of 225 questionnaires were retrieved, which was valid for statistical analysis. The coding of each variable was as in Table 1. The questionnaires contain the measurement items related to the three main constructs of this study. This study has one independent variable (accounting), one moderator (cloud accounting) and one dependent variable (grant credit decision); each of the measurement items in this section was measured using a five-point scale, ranging from 1=strongly disagree to 5=strongly agree, as recommended by Sekaran and Bougie (2016).

Indicator Reliability

In as much as reliability is a condition for validity, it is not found to have loadings of less than 0.7, so, all indicators are retained because their outer loadings are all 0.7 or higher. The resulting estimation of the path model are presented in Figure 1 and Table 2.

Table 2
Evaluation of Cronbach's Alpha, AVE and CR

Construct	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
AIS-Trust	0.857	0.897	0.637
AIS-Security	0.943	0.953	0.718
AIS-Confidentially	0.931	0.944	0.679
AIS-Privacy	0.955	0.962	0.760
AIS-Integrity	0.954	0.961	0.757
AIS-Availability	0.917	0.933	0.637
CC	0.944	0.953	0.719
GCD	0.931	0.940	0.665

Internal Consistency Reliability

Table 3 illustrates Cronbach's alpha values for the constructs AIS-Trust, CC and GCD, which are 0.943, 0.867, and 0.935, respectively, this indicates the high levels of internal consistency reliability, because they are greater than 0.70.

Convergent Validity

Validity is associated with the model's capability to describe the indicator's variance. The AVE may also give some evidence for convergent validity. The AVE threshold level of 0.5 is evidence of convergent validity (Bagozzi & Yi, 1988); all of the constructs are above this level. It appears that all constructs have reached discriminant validity, thus, they are maintained in the model to keep content validity. The AVE for the latent constructs AIS-Security, AIS- Confidentially, AIS-Privacy, AIS-Integrity, AIS-Availability, CC and GCD are 0.691, 0.656, and 0.658, respectively, which is above the minimum level of 0.50. Therefore, the measures of the constructs have high levels of convergent validity.

Multicollinearity

Once the determined measurement was validated, high multicollinearity made the standard error high. We examined for multicollinearity based on variance inflation factors (VIF) and the results were below 5, implying that there was no multicollinearity in the model.

Table 3
VIF Values

Construct	VIF
AIS-Trust	3.900
AIS-Security	1.901
AIS- Confidentially	2.036
AIS- Privacy	1.872
AIS- Integrity	1.549
AIS- Availability	2.267
CC	2.113
Moderator	4.070

Discriminant Validity

The Fronell-Larcker criterion (1981) is a popular method to evaluate discriminant validity. To build the discriminant validity, the square root of average variance obtained (AVE) of each latent variable ought to be bigger than the latent variable correlations (LVC). When the variables maintain an AVE value of more than 0.5, the discriminant validity results are said to be satisfactory (Chin, 2000). Table 4 shows that discriminant validity is met; it is larger than the corresponding LVC.

Table 4
Fronell-Larcker Criterion

	AIS-Availability	AIS-Confidentially	AIS-Integrity	AIS-Privacy	AIS-Security	CC	GCD
AIS-Availability	**0.798**						
AIS-Confidentially	0.643	**0.824**					
AIS-Integrity	0.527	0.473	**0.87**				
AIS-Privacy	0.538	0.591	0.502	**0.872**			
AIS-Security	0.632	0.539	0.445	0.556	**0.848**		
CC	0.629	0.596	0.511	0.489	0.522	**0.848**	
GCD	0.734	0.693	0.517	0.59	0.748	0.626	**0.815**

Measurement Model

Smart PLS 3.0 was used to test the structural model and hypotheses. To evaluate the predictive power of the structural model, R^2 was calculated. R^2 indicates the amount of variance explained by the exogenous variables (Hair et al., 2012). Using a bootstrapping technique with a re-sampling of 500 (Hair et al., 2013), the path estimates and t-statistics were calculated for the hypothesized relationships. Table 5 and Figure 1 show the structural model analysis. The results showed that the relationships between AIS-Trust and GCD were significant (B=0.645, t value=9.412) and the relationships between ICS and IT were significant (B=0.374, t value=3.621) and that the explanatory power (R^2) of the relationship was 0.700; thus, H_1 was supported. The interaction between AIS-Trust and CC was significant (B= −0.057, t value=2.309), and thus H_2 was supported.

3. Result of Statistic Testing

3.1 Measurement Model

Partial least squares PLS was used to test the relationship existing between the latent variables of the model.

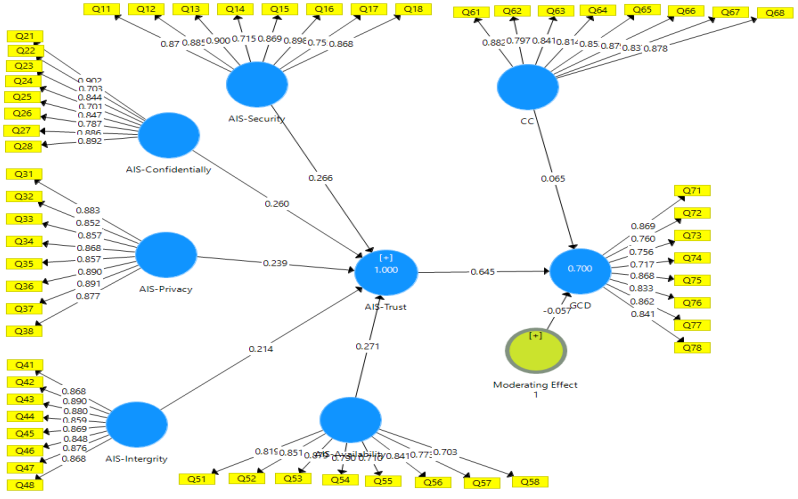
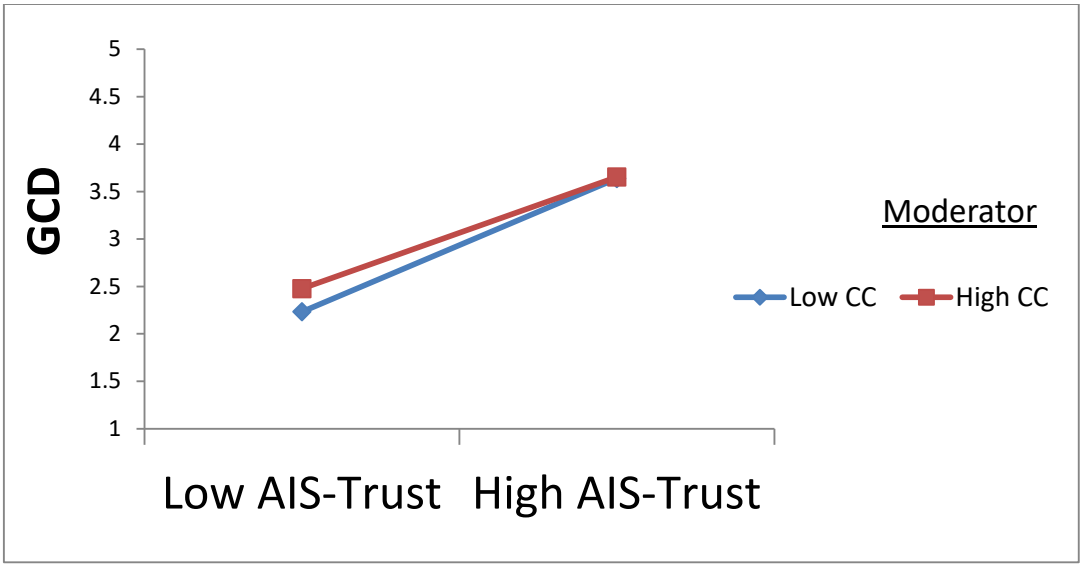


Fig. 1. PLS Path Model Estimation

Table 7
Results of Hypothesis Testing

Hypothesis	Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values	Decision
H_1	***AIS-Trust → GCD***	***0.645***	***0.647***	***0.068***	***9.412***	***0.000***	***Supported***
H_2	***AIS-Trust×CC → GCD***	***−0.057***	***−0.056***	***0.025***	***2.309***	***0.021***	***Supported***

Hypothesis 2 stated that CC moderates the relationship between AIS-Trust and GCD. The results in Table 7 (T value=2.309, P value<0.05) demonstrate that H2 is supported. Hence, there is a moderating impact of Cloud Computing on the relationship between AIS-Trust and GCD.



4. Conclusion

The main objective of this study is to estimate the factors that may influence GCD. The results showed evidence that AIS-Trust influences GCD. The findings illustrate a direct and significant impact on Commercial Banks GCD. Moreover, the findings of this paper demonstrate that CC moderates the relationship between the independent variable (AIS-Trust) with the dependent variable (GCD).

5. Discussion

Many researchers have examined the relationship between the reliability of accounting information systems and credit-granting decisions. The results of this study expanded the literature and provided empirical evidence on this issue from an emerging market. For instance, previous studies provided mixed results (Al-Masry, 2021; Satadamrul, 2014; Najla and Alkhami (2022); Ferdinand et al., 2021). Meanwhile, this study came to prove a clear understanding of this relationship in Jordan to support the previous studies. Ferdinand et al. (2021) found that accounting information does not affect credit decision-making, while Palazuelos et al. (2018) claimed that cloud technology has now become a valuable resource for information that has a significant impact on the quality of accounting information. Similarly, Ehiriudu et al. (2020) concluded that there is an impact from the accounting information system on credit management, and this may differ from our study in some respects.

It is worth mentioning that credit decisions are granted in accordance with information and regulatory requirements within the bank, which is considered a necessary means to ensure that appropriate decisions are taken; therefore, it is necessary to maintain an effective link between internal systems and cloud computing in order to sustain this relationship. The bank's management must concentrate on providing best communication systems, tools and information technology in order to control errors, deviations, and identifying their causes to reduce credit risks.

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