The effect of digital accounting systems on the decision-making quality in the banking industry sector: a mediated-moderated model

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Abstract

Purpose – Recently, the increasing development of digital accounting systems has raised their effects on the quality of decision-making. Consequently, this research aims to evaluate the effects of digital accounting systems success factors on the advancement of decision-making quality in Jordanian banks

Design/methodology/approach – The questionnaires were sent to 187 decision-makers who are actual users of digital accounting systems in Jordanian banks. A quantitative research approach was adopted to test the proposed research model based on the partial least squares-structural equation modeling method.

Findings – The empirical results of the current research revealed that data and information quality had a significant impact on the overall decision-making quality with the digital accounting systems, whereas system quality had an insignificant impact on it. The results empirical also confirmed that information quality has mediated the relationship between data and system quality and decision-making quality. Eventually, analytical decision-making culture has moderated the relationship between information quality and decision-making quality.

Originality/value – The current research will provide attractive implications and recommendations for practitioners, accounting managers and decision-makers about evaluating the effect of digital accounting systems on improving the decision-making quality in Jordanian banks.

Keywords Digitalization, Jordanian banks, Digital accounting, Jordanian context, PLS-SEM, Decision-making quality

Paper type Research paper

1. Introduction

All business entities must have a functional accounting department to operate correctly. Even nonprofitable entities are operated by choices that are taken based on different financial reports (Kapoor and Goel, 2017). As the storm of technology has hit the whole wide

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world in the past few decades, it was only a matter of time until it reached day to day professions. Technological advancements shaped a new way of performing various tasks within the accounting profession, resulting in a whole new revolution growing every day (Smith, 2015). At first, automation aimed to reduce the workload on accountants by using technology in performing redundant tasks and shifting their attention to more advanced situations, which led to a major increase in their productivity. Accountants used to work using papers and calculators to make the records and verify whether the ledgers were accurate. However, nowadays, it is all about using new accounting information systems and tools that have dramatically changed the accounting profession to be much more efficient (Schmitz and Leoni, 2019).

Digital accounting systems is traditionally known as a system that an organization uses to collect and process its financial data and information so that it can be used by decisions-makers, thus enhancing organizational performance (Dagiliene and Šutiene, 2019; Huy and Phuc, 2020). However, current digital accounting systems differ from earlier ones in several ways, especially as software nowadays deals with Big Data, which has created new data mining opportunities (Balios, 2021; Oatley, 2021). Further, the implication of blockchain technology and the Internet of Things (IoT) are driving the current and next movement of digital transformation (Sandner *et al.*, 2020). Blockchain, for example, can increase security and transparency by providing a joint ledger (Diedrich, 2016).

With all the previously mentioned and several other technological advancements in several fields including accounting, the term business intelligence became more widely used in literature (Niu *et al.*, 2021; Zhang *et al.*, 2020; Wieder and Ossimitz, 2015; Popovič *et al.*, 2012). Business intelligence can be described as computerized methods of turning data into information (Pirttimäki *et al.*, 2006), which is ultimately used to improve organizational decision-making (Dagiliene and Šutiene, 2019; Popovič *et al.*, 2012). There is no doubt that the business intelligence concept includes digital accounting systems (Rikhardsson and Yigitbasioglu, 2018), which is the focus of the current study. Even though it is not clearly understood how the investment in business intelligence is linked to the value of a business (Krishnamoorthi and Mathew, 2018; Mithas *et al.*, 2013), the business intelligence market has presented and expected to present a significant and growing percentage of market share (Klisarova-Belcheva, 2017).

The information generated by these systems benefits the success of organizations. However, if it is not really put to use in the decision-making, this information will have little influence on an organization's ultimate performance (Al-Okaily, 2021). Researchers in the field of information systems, inclusive of accounting software, have a gap to fill related to the relationship between digital accounting systems and business success, which remains unclear until now (Schryen, 2013). Further, organizations today require evaluating the benefits and costs of digital accounting systems to justify the expenditure and document its contribution to the organization's value (Petter *et al.*, 2008, 2012). Thus, the entity's value can be easily linked to the quality of the decision-making process. For instance, LaValle *et al.* (2011) document that top-performing organizations use rigorous analysis to make decisions at twice the rate of lower-performing ones. These analyses are used to shape strategies and support daily decisions-making processes.

On the other hand, the expected benefits of digital systems could not always be achieved if the organizations ignore factors affecting how to use the information provided by these systems (Al-Okaily, 2021; Sharma and Yetton, 2003). For successful information systems, organizations must excel not only in establishing the technological part of the systems, but also in promoting a positive environment of use of information, especially in the attitude of using the information in decision-making processes (Popovič *et al.*, 2012). Moreover, the use

of these systems in some cases is optional, so we can expect a more substantial impact of analytical culture in these voluntary settings. Analytical culture may have significant implications on the quality of decision-making. Many studies (Puspitawati, 2021; Ahmed, 2021; Jasim and Raewf, 2020) neglect factors affecting how the information provided by these systems is used, which produce a gap the researchers try to fill in this study. The topic of success of digital accounting systems has only gradually evolved in recent literature and there have been a few attempts to research the impact of digital accounting systems on organizational decision quality. However, there is still a large gap to be filled, particularly regarding the culture of the analytical decision-making that contributes to the system's success. The analytical decision-making dimension is added to the model of this study and its moderation effect on the association between information quality and decision-making quality is examined to contribute to the open question in the literature in this regard.

Işık *et al.* (2013) suggest that the benefits of business intelligence have not been sufficiently researched and thus need further attention, especially as the implementation of these systems is complex and requires considerable resources that need to be justified (Yeoh and Popovič, 2016). However, none of the earlier studies has provided an in-depth analysis of digital accounting success in Jordan. Mainly as the success of these systems depends on the quality of many factors, including data, information and the systems quality, as documented by several studies in other contexts (Al-Okaily and Al-Okaily, 2022; Ouiddad *et al.*, 2020; Wieder and Ossimitz, 2015; Popovič *et al.*, 2012). Consequently, our study aims to provide a comprehensive understanding in a Jordanian context of the relationships among success dimensions. This paper carries original insights regarding digital accounting success through the inclusion of diverse segments of digital accounting systems and an analytical decision-making culture in the model. It can be predicted that the evaluation of the relationships between the dimensions of such a model will permit the understanding of its factors of success.

Considering all the developments in the digital accounting systems, which are claimed to be advancements of the previous settings (Gonzales, 2011), this research examines if the current digital accounting systems succeeded in enabling better organizational decision-making quality? The key contribution of this research is to propose a theoretical model to measure the digital accounting effect on decision-making quality using the DeLone and McLean modified success model in developing countries (i.e. Jordan). As a theoretical development, this research also extended and altered the model by integrating the cultural factor as a critical factor of digital accounting contribution to decision-making quality. In addition to this context-specific contribution and the theoretical expansion, our study also reduces the knowledge gap regarding the success of digital accounting systems by particularly operationalizing the dimensions on an organizational level among Jordanian banks listed in Amman Stock Exchange.

The remainder of this paper is organized as follows. Section 2 provides a literature review. Then, hypotheses are developed in Section 3, along with a brief illustration of the theoretical underpinning. The research model is then conceptualized in Section 4. Sections 5 and 6 presented and discussed the study results. The last two sections are dedicated to implications, limitations and directions for future work.

2. Literature review

Toward the end of the 20th century, wireless networking technology began to emerge, the intranet and extranet began to change the way accountants' access and share information between them and their outside surroundings. Moreover, social media established a new way of communication between accountants and their clients. Nowadays, technological

inventions aim to dramatically change the accounting profession more than ever (Belfo and Trigo, 2013; Dimitriu and Matei, 2014).

Digital revolutions have affected the business world tremendously by changing and developing immensely. Entities have been forced to familiarize themselves and cope with new and upcoming trends due to increased technological growth and the need to operate emerging technologies. Automation has been in progress to cultivate in connected business, such as the auditing sector, where four key concepts, as documented by experts, have been exposed to be important to the automation; cloud accounting, IoT, blockchain and big data. These approaches were opening to be known in the accounting sector and researchers are also highlighting their potentials to create automation in accounting. Accountants now have the time to spend on more sophisticated analysis and achieve statistical accounting with better competence to forecast the firm's financial state (Zhang *et al.*, 2020).

When the four previously mentioned concepts are introduced in the accounting field in various amounts, they generate the opportunity for electronic reading, analysis and transmission of the necessary information for accounting procedures (Zhang *et al.*, 2020; Qasim and Kharbat, 2020; Moll and Yigitbasioglu, 2019). When they are correctly collaborating, there is a considerable chance to decrease the manual records by individuals and a single individual can disclose exclusively in the technology to prepare all of the accounting records (Uwadiae, 2015). For example, blockchain technology helped in several aspects of the accounting field. First, because almost all the documents are automated, it is easy to direct them for numerous other applications. Second, all the members have admission on all the transactions on the blockchain; therefore, it raises the audit capability and reliance. Finally, it reduces fraud since the changes on the blocks are extremely hard; as a result, it might occur very rarely and even if it occurred, all the participants could realize such an alteration happened. The other benefit of using blockchain in this manner is that two parties contributing to a deal can exchange the invoice through the blockchain, which marks the transaction procedure faster, paperless and also avoid any misused (Fanning and Centers, 2016). Applying this technology, as the application of all other new technologies, has its difficulties, weaknesses and harmful effects. There is a debate that there are not enough tools to make sure that the system works as it is supposed to, which leads to the little dependability of the system (Qasim and Kharbat, 2020)

With all these technological innovations, the term business intelligence became more common in literature (Niu *et al.*, 2021; Zhang *et al.*, 2020; Wieder and Ossimitz, 2015; Popovič *et al.*, 2012). Business intelligence can be defined as the various computerized methods of converting data into information (Pirttimäki *et al.*, 2006), which is eventually used to enhance the process of decision-making (Dagiliene and Šutiene, 2019; Popovič *et al.*, 2012). Digital accounting systems are an essential part of business intelligence tools (Rikhardsson and Yigitbasioglu, 2018), which is the focus of the current study.

On the other hand, decision quality measures the extent to which the outcomes of a decision match the expectations within an organization (Visinescu *et al.*, 2017). Previous studies showed that decision quality is influenced by several factors, including the information quality of the decision-making process. However, practitioners and academic research suggest that, in many entities, users do not necessarily make the connection between the decision-making process and their business intelligence capabilities (Visinescu *et al.*, 2017; Işık *et al.*, 2013).

3. Theoretical underpinning and hypotheses development

The McLean and DeLone success model has been used in several studies related to the success assessment of information systems (Al-Okaily, 2021; Wieder and Ossimitz, 2015;

Işık *et al.*, 2013; Popovič *et al.*, 2012). The model's introduction started with DeLone and McLean (1992), which identified categories that have been referred to as the common dimensions of information system success, such as the quality of the system, the quality of information produced, and the usage level.

Because of some criticism and suggestions related to the changing nature of the information systems, the model was later modified in 2003 by including an additional dimension linked to the service quality (Petter and McLean, 2009). Other researchers later suggested a few other modifications, such as incorporating information technology support, user attitude, integrating individual and organizational impact as separate dimensions and finally, the addition of feedback links (Gorla *et al.*, 2010; Urbach and Müller, 2012). This model and all its amendments, emphasizes the understanding of the connections between the different dimensions of information systems success which leads to the final success variable; presented as the "net benefits" in the original model. The current study uses some of the main success dimensions of the models and extends the model by incorporating the cultural factor as a critical factor of digital accounting contribution to decision-making quality as presented in Figure 1.

3.1 Data quality

In management science, there is a clear distinction between information and data. Data is facts that do not carry a specific meaning, while information is data that processed and gathered to collectively carry a logical meaning. Data quality refers to the representation quality of related facts. The distinction between information quality and data quality clearly appears in the information systems context (DeLone and McLean, 1992, 2003). Research suggests that data quality is a critical success factor for information systems (Kulkarni *et al.*, 2017; Yeoh *et al.*, 2008). In managing the success of their information systems, organizations refer to data problems as a critical and challenging factor. It is claimed that a great percentage of projects related to business information systems fail due to data quality issues. These issues include for example; poor data maintenance and handling, flaws in the process of migration from one system to another, and unreliable importing source of data, especially external ones (Ferencek and Kljajić Borštnar, 2020; Işık *et al.*, 2013). Thus, we assume the following:

H1. Data quality is positively related to decision-making quality.

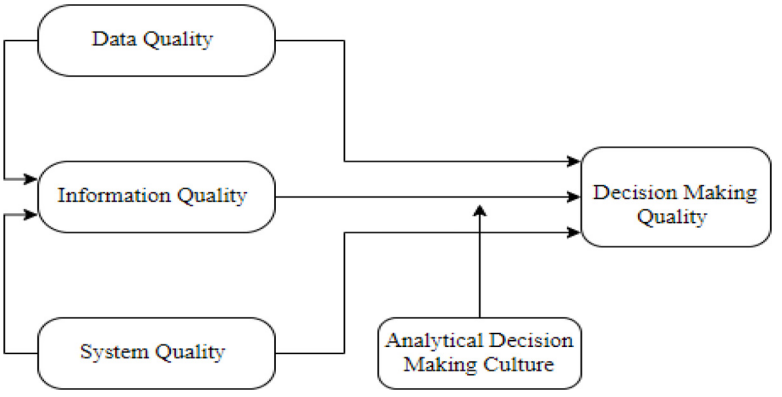

Figure 1.
Research model

Furthermore, because providing high-quality information for decision-making includes processing data in a way that is useful for users, this implies that data quality is an antecedent of information quality. Hence, it is logical to anticipate that high-quality data contribute to better information. Accordingly, we also hypothesis the following:

H2. Data quality is positively related to information quality.

3.2 Information quality

Uncertainty is considered a key factor that affects organizations' decision-making on many types of operations. The role of uncertainty in decision-making has received considerable research attention within the last few decades. According to previous studies, information gathering could be considered the most adopted approach used to decrease uncertainty (Sniazhko, 2019). The need for high-quality information is recognized as an essential element for organizations to make coherent decisions and succeed in today's rapidly changing business environment (Al-Okaily *et al.*, 2020a; Al-Okaily *et al.*, 2020b; Pirttimäki *et al.*, 2006). Information is expected to reduce uncertainty by identifying the available alternatives to choose from in the decision-making process and anticipating the consequences of selecting one option over another. Accordingly, we hypothesis the following:

H3. Information quality is positively related to decision-making quality.

Based on the previous hypotheses, we can indirectly predicate that data quality will enhance decision-making, as information quality facilitates the relationship between data quality and decision-making quality. Wieder and Ossimitz (2015) found a significant relationship between decision-making quality and information quality and revealed mediating effects of data and information quality. Moreover, some studies provide support for the indirect effect of system quality, through information quality, on organizational success (Phuong and Dai Trang, 2018; Lin, 2010; Gorla *et al.*, 2010). Gorla *et al.* (2010) point out the relevance of the system quality–information quality association for digital accounting success model. Thus, the current study assumes the following hypotheses:

H4. Information quality mediates the relationship between data quality and decision-making quality.

H5. Information quality mediates the relationship between system quality and decision-making quality.

3.3 System quality

The system quality indicates whether the system has the essential factors to accomplish the required tasks. These factors include, for example, reliability, flexibility, accuracy and ease of use (DeLone and McLean, 2016). According to previous studies, system quality could be seen as positively associated with the decision-making quality as it decreases the effort of the decision-making process, which enhances the quality of this process (Gonzales *et al.*, 2015; Arnott and Pervan, (2015). However, some studies have shown some contradictory results (Al-Fraihat *et al.*, 2020; Motaghian *et al.*, 2013), which motivate the current study to contribute to the ongoing debate and develop the following hypothesis:

H6. System quality is positively related to decision-making quality.

A flexible system can be modified easily and quickly, which efficiently meets changes in the needs of information users. This originates relevant and updated output, implying a high quality of information with respect to the content of information; a low-quality system usually results in low quality of information. This is due to the output of these systems being irrelevant, inaccurate and even sometimes incomplete information (Phomlaphatrachakom, 2020; Gorla *et al.*, 2010). From this, the current study assumes the following:

H7. System quality is positively related to information quality.

3.4 Analytical decision-making culture

Inside organizations, people from different cultures may decide in a different way (Yates and de Oliveira, 2016). For successful information systems, organizations must excel not only in establishing the technological part of the systems but also in promoting a positive environment of use of information, especially in the attitude of using the information in decision-making processes (Popovič *et al.*, 2012). Moreover, the use of these systems sometimes is optional so we can therefore expect a stronger impact of analytical culture in these voluntary settings.

Analytical culture may have significant implications on the decision-making quality. The influence of poor data quality may differ across decision environments (Işık *et al.*, 2013). The decision-making literature suggests that the organizational decision-making culture will likely affect the decision-makers' choice of using information (Singh *et al.*, 2002). One example is the study by Popovič *et al.* (2012) that found that the use of information in business processes is positively impacted by an organizational culture of analytical decision-making. Although the same study has found a direct influence of information quality on its utilization, where the quality of information negatively impacts their use in business processes within environments where analytical decision-making is the adopted culture. These inconsistent results motivate the present study to suggest the following hypothesis:

H8. Analytical decision-making culture moderates the association between information quality and decision-making quality.

4. Research methodology

4.1 Instrument measurement

The questionnaire used constructs and measures that have been validated in the prior literature. The measures were selected based on related literature to ensure validity and reliability. For example, four items were derived from the work of Lin *et al.* (2006) and Gable *et al.* (2008) to assess system quality that covered the technical characteristics of the digital accounting system. Four measures also were taken from prior literature to measure information quality (Lin *et al.*, 2006; Gable *et al.*, 2008), which assessed the features of information provided by the digital accounting system. For data quality, four items were derived from Torres and Sidorova (2019) study that was used in this research to assess the data underlying digital accounting system solutions in terms of accuracy, comprehensive, correct and consistent. To gauge analytical decision-making culture, we used three indicator acquired from Popovič *et al.* (2012) study. Decision-making quality was evaluated using four items adapted from a study by Alalwan *et al.* (2014) and Ouiddad *et al.* (2020) that assessed the impact of digital accounting systems on decision-making quality. All measurement

items were displayed in Appendix 1 and were assessed using a five-point Likert scale of 1 (strongly disagree) to 5 (strongly agree).

4.2 Data collection

The Jordanian banking sector has a high investment in enterprises systems such as digital accounting as a vital tool to get competitive advantages in today's business world (Abu Afifa and Saleh, 2021a, 2021b; Al-Okaily, 2021). The sample frame of this research is 16 Islamic and commercial banks that contribute to about a quarter of the national economy. A full list of digital accounting users working in these banks was not obtained because of privacy and security reasons (Al-Okaily *et al.*, 2021). Therefore, we used a purposive sampling technique to select system end-users such as financial managers, accounting managers and supervisors, auditors and accountants. G*Power software was used to calculate the minimum sample size. By running *a priori* power analysis using a medium effect size with a significant level of 0.05 and the power of 0.95, thus, the suggested minimum sample size needed to assess the research model developed is 119. However, our research sample size was increased as recommended by Barlett *et al.* (2001), to mitigate error in sample size and to consider the occurrence of nonresponse by some participants. Overall, 350 questionnaires were distributed to decision-makers (e.g. accounting managers) at the bank headquarters in Amman (capital city) asked them to help and distribute questionnaires to actual users. That is due to accounting managers being particularly responsible for accounting processes in their banks and having sufficient information about the actual user. A total of 211 questionnaires were collected before screening the data. Of the total responses, 187 valid responses were used for further analysis. The description of respondents' information is shown below in Table 1.

Table 1. Demographic characteristics summary

Measure	Option	Frequency
Gender	Male	109
	Female	78
Age	Less 30	56
	30–40	74
	41–50	41
	Over 50	16
Education	PhD	7
	MSc	51
	BSc	124
	Diploma	5
Job title	Manager	11
	Director and supervision	34
	Analyst	27
	Auditors	26
	Accountants	81
	Missing	8
Experiences in the position	Less 5	45
	5–10	67
	11–15	57
	Over 15	18
Experiences in accounting systems use	Less 5	39
	5–10	91
	11–15	33
	Over 15	24

5. Research results

The measurement model examination is the basic stage to assess the reliability and validity of the measurement model for partial least squares-structural equation modeling (PLS-SEM). With regard to the evaluation of the measurement model, the reliability of the questionnaire items is assessed using the factor loading (FL) of 0.7, the internal consistency reliability is evaluated based on Cronbach's alpha (α) and composite reliability (CR) of 0.7 and more, the convergent validity based on average variance extracted (AVE) of 0.5 and more. As seen in Table 2 and Figure 2, all items FL were within the suggested range. Moreover, the CR and AVE of all research factors above the cut-off values of 0.7 and 0.5, respectively. Consequently, all of these values were within the accepted scope, and this verifies the possession of measurement model reliability is established and thus the research can proceed securely.

Regarding discriminant validity, it shows the degree to which the measurement items reflect their factor differently from all other items in the proposed model. In fact, the discriminant validity can be assessed using three ways, namely, the heterotrait-monotrait (HTMT) ratio way (Henseler *et al.*, 2015), Fornell and Larcker correlation way and cross-loading's way (Hair *et al.*, 2014). The first way is an alternative way to assess discriminant validity in PLS-SEM, as Henseler *et al.* (2015) suggested. Discriminant validity can be evaluated based on the multitrait and multimethod matrix, namely, the HTMT of correlations. HTMT values near 1 indicate an insufficiency of discriminant validity. Hence, Table 3 illustrates the values of the HTMT criterion, which satisfies the lowest value of HTMT and is within the suggested range.

The second way is to evaluate discriminant validity based on the Fornell–Larcker correlation matrix. In this way, Fornell and Larcker (1981) recommend that discriminant

Table 2. Outcomes summary for reflective measurement (outer) model

		Reliability and Validity				
		Convergent validity		Internal consistency reliability		Discriminant validity
Variable	Indicators code	FL >0.7	AVE ≥0.5	α ≥0.7	CR CR ≥ 0.7	HTMT <0.9
Data quality	DQ1	0.834	0.591	0.768	0.852	Yes
	DQ2	0.766				
	DQ3	0.738				
	DQ4	0.733				
Information quality	IQ1	0.903	0.806	0.920	0.943	Yes
	IQ2	0.882				
	IQ3	0.930				
	IQ4	0.876				
Systems quality	SQ1	0.860	0.792	0.912	0.938	Yes
	SQ2	0.905				
	SQ3	0.938				
	SQ4	0.854				
Analytical decision-making culture	ADMK1	0.908	0.764	0.846	0.907	Yes
	ADMK2	0.892				
	ADMK3	0.820				
Decision-making quality	DMQ1	0.929	0.859	0.945	0.960	Yes
	DMQ2	0.955				
	DMQ3	0.917				
	DMQ4	0.905				

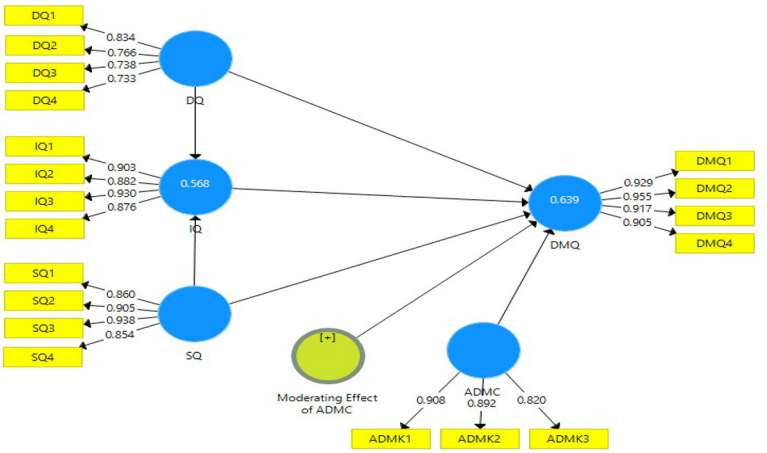

Figure 2.
Measurement model results

#	ADMC	DMQ	DQ	IQ	SQ
ADMC					
DMQ	0.838				
DQ	0.760	0.684			
IQ	0.702	0.704	0.845		
SQ	0.821	0.610	0.555	0.524	

Table 3.
Heterotrait-monotrait (HTMT) ratio

validity is well-established when the AVE of a single factor is greater than the squared multiple correlations of that factor with other factors (Hair *et al.*, 2014; Hair *et al.*, 2011). Therefore, in agreement with that, discriminant validity in the Fornell and Larcker principle exists if the diagonal items are greater than other off-diagonal items in the rows and columns. As shown in Table 4, the values in a bold font represent the square root of AVE of all factors. In this regard, it is found that the square root of the AVE of each of the 12 latent factors is higher than its correlation with any other factor in the path model.

The cross-loadings is the third way used to evaluate discriminant validity which focuses on the items' cross-loadings where an item expected to load more on its proposed factor than the other factors (Hair *et al.*, 2014). As displayed in Table 5, the outcomes showed that all factors load higher on their corresponding factors than other factors in the path model. Therefore, the analysis indicates that most factors and signals in the track model show

#	ADMC	DMQ	DQ	IQ	SQ
ADMC	0.874				
DMQ	0.759	0.927			
DQ	0.614	0.584	0.769		
IQ	0.623	0.657	0.738	0.898	
SQ	0.729	0.568	0.464	0.479	0.890

Table 4.
Fornell–Larcker correlation matrix

#	ADMC	DMQ	DQ	IQ	SQ
ADMK1	0.908	0.757	0.584	0.594	0.713
ADMK2	0.892	0.650	0.505	0.539	0.660
ADMK3	0.820	0.561	0.518	0.490	0.518
DMQ1	0.666	0.929	0.493	0.564	0.498
DMQ2	0.706	0.955	0.542	0.613	0.527
DMQ3	0.700	0.917	0.557	0.643	0.521
DMQ4	0.735	0.905	0.567	0.613	0.554
DQ1	0.498	0.467	0.834	0.652	0.394
DQ2	0.454	0.448	0.766	0.563	0.329
DQ3	0.463	0.415	0.738	0.529	0.356
DQ4	0.474	0.464	0.733	0.515	0.347
IQ1	0.564	0.621	0.649	0.903	0.441
IQ2	0.573	0.568	0.651	0.882	0.420
IQ3	0.560	0.571	0.689	0.930	0.430
IQ4	0.540	0.601	0.660	0.876	0.430
SQ1	0.593	0.489	0.400	0.421	0.860
SQ2	0.650	0.524	0.410	0.426	0.905
SQ3	0.677	0.533	0.438	0.443	0.938
SQ4	0.675	0.471	0.405	0.415	0.854

Table 5.
Cross-loadings correlation matrix

acceptable discriminant validity. Therefore, as a conclusion, the proposed path model has an adequate level of validity and reliability.

After verifying the measurement model, the subsequent stage in the PLS analysis is assessing the structural model and hypotheses testing. Table 6 below shows the sum-up of results after examining the hypotheses of this study (path coefficients-β). First, results mainly show that decision-making quality is significantly and positively affected by IQ and DQ that have the highest influential role among other drivers of decision-making quality, which means that all of these hypotheses were supported. In contrast, an insignificant relationship between SQ and DMQ has been found, which does not agree with the relevant hypothesis and was not supported. On the other hand, data quality and SQ have a significant and positive influence on IQ, which agrees with the current hypotheses. As shown in Figure 3, results supported the postulated hypotheses by examining the mediating effect of trust. This point out that IQ has partially mediated the association between both data quality and system quality with decision-making quality. Finally, ADMK has moderated the association between IQ and DMQ, as displayed in Figure 4.

#	Paths	Beta	Standard error	T-value	P-value	Decision
H1	DQ → DMQ	0.545	0.048	11.350	0.000	Accepted
H2	DQ → IQ	0.657	0.032	20.645	0.000	Accepted
H3	IQ → DMQ	0.277	0.052	5.364	0.000	Accepted
H4	DQ_ → IQ → DMQ	0.182	0.035	5.216	0.000	Accepted
H5	SQ → IQ → DMQ	0.048	0.013	3.629	0.000	Accepted
H6	SQ → DMQ	0.026	0.054	0.477	0.633	Rejected
H7	SQ → IQ	0.174	0.037	4.747	0.000	Accepted
H8	Moderating role of ADMC	0.084	0.027	3.147	0.002	Accepted

Table 6.
Results of hypotheses testing

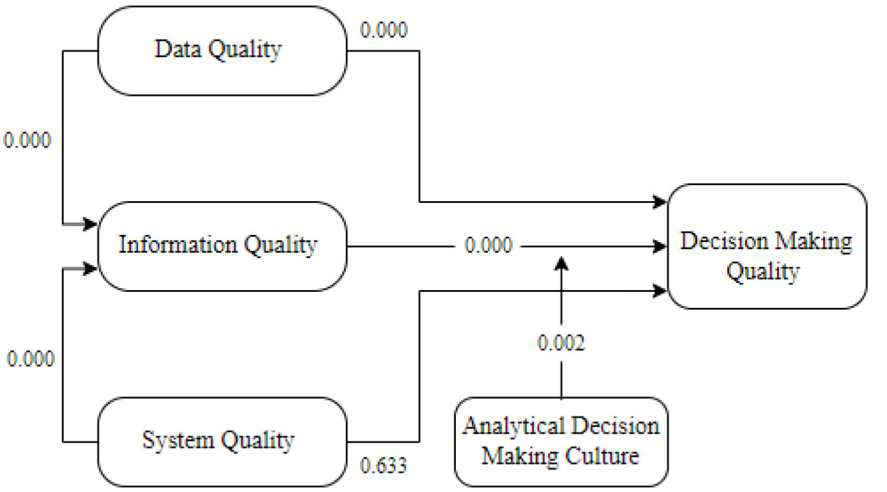

Figure 3.
Result of hypotheses testing

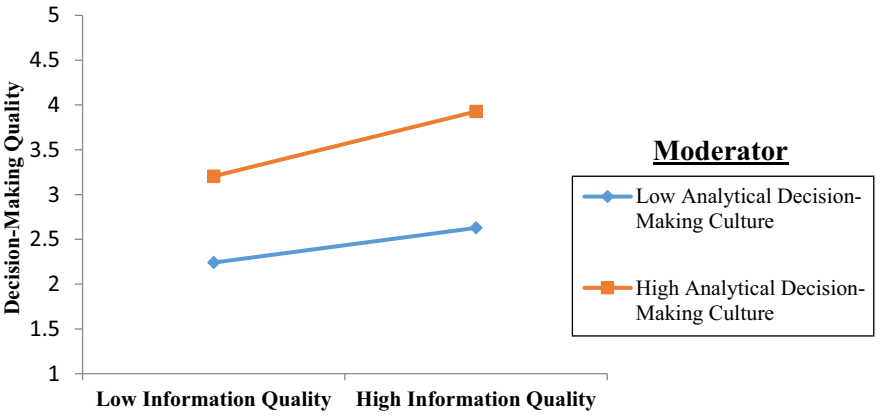

Figure 4.
Moderating role of analytical decision-making culture

6. Research discussion and implications

The current study contributes to the literature by assessing some of the related factors of the information system success model and by demonstrating that data and information quality, except for system quality on improve the decision-making quality in the digital accounting systems among Jordanian banks as displayed in Figure 3. As expected, empirical results provide strong evidence about the role of data quality in both decision-making quality and information quality with the digital accounting systems, hence *H1* and *H2* were accepted. These results are consistent with earlier studies results as Kulkarni *et al.* (2017) and Yeoh *et al.* (2008) which stated that data quality is an essential success factor for information systems, which in turn affects providing high-quality information for decision-making includes processing data in a way that is useful for individual and organizational performance.

Regarding the mediation effects of information quality, the findings empirically confirmed a significant positive influence of information quality both directly and indirectly in improving the decision-making quality with the digital accounting systems in Jordanian banks; hence, *H3–H5* were also accepted. These results align with the findings of DeLone and McLean, (2016) in their IS success model which state that quality of information is a critical role in enhancing organizational and individual performance. Likewise, Pirttimäki *et al.* (2006) indicated that the need for high-quality information is essential for organizations to make coherent decisions and succeed in today's rapidly changing business environment. On the other hand, our current study findings are also consistent with the findings of Wieder and Ossimitz (2015), which found a significant relationship between decision-making quality and information quality and revealed mediating effects of data and information quality.

Unexpectedly, the empirical outcomes also revealed that system quality has no significant impact on the decision-making quality with the digital accounting systems. In contrast, system quality significantly impacted information quality and hence, *H6* was rejected and *H7* was accepted. However, our study results only showed significant results between system quality and a positive impact on information quality but also confirmed that system quality had an insignificant impact on decision-making quality (*H6*). Although these findings are consistent with some prior studies (Al-Okaily, 2021; Wanko *et al.*, 2019; Wibowo and Sari, 2018; Hidayat and Akmad, 2017), they are not consistent with the original work of DeLone and McLean (1992), which consider system quality as a critical factor to assess the information system success model. Thus, this result means that users believe it is hard to use the digital accounting systems and it is perceived as not easy to use since it needs more effort and time of the decision-making process, which in turn does not improve the quality of this process (Gonzales *et al.*, 2015). Ouiddad *et al.* (2020) found similar outcomes that indicated that this outcome might be because of the difficulties managers face while using digital systems.

Finally, regarding the interaction effect between analytical decision-making culture, information quality and decision-making quality, the *t*-values are positive and significant (t-values = 3.147, $p < 0.002$) and hence *H7* was accepted. In this regard, analytical decision-making culture strengthens the positive relationship between information quality and decision-making quality. Figure 4 illustrates that information quality is more predictive of the decision-making quality when the level of analytical decision-making culture is high. This can be explained that analytical culture may have significant implications on the quality of decision-making. In addition, our findings are in agreement with Popovič *et al.* (2012), who reported that the use of information in business processes is positively impacted by an organizational culture of analytical decision-making.

Overall, our outcomes provided the theoretical model to assess the ability of digital accounting systems in improving the quality of decision-making among Jordanian banks. This theoretical model can also act as a guideline for future research activities in the related domain. Specifically, we were capable of emphasizing the impact of data, information and system quality on the effectiveness of the decision-making quality among Jordanian banks. Along with the research objectives, the research proposed model in this study was designed to test whether the quality of information mediates the relationship between data and system quality on decision-making quality. However, the empirical results of the current study found that information quality, directly and indirectly, impacted the decision-making quality with the digital accounting systems and plays an important role in improving the

decision-making quality in Jordanian banks. With regard to the moderation effects of information quality, analytical decision-making culture has moderated the relationship between information quality and decision-making quality. Thus, the study results also contribute toward an improved understanding of the essential factors behind the advancement of decision-making quality by decision-makers in Jordanian banks through digital accounting systems usage.

7. Limitations and future research

Similar to any other research, our study has some limitations that require to be considered when interpreting its results. These limitations introduce opportunities for researchers in future aiming to understand how digital accounting technologies help contribute to decision-making process quality. One of the study limitations is represented findings generalization. This study was done in the context of banks in Jordan; thus, our outcomes may not be generalizable to other contexts. The results might not be generalizable to other sectors and vice versa. Therefore, future works should focus on other sectors such as the service and manufacturing sectors that also used digital accounting in their business activities. Furthermore, this study gathered data from bank headquarters in Amman (capital city) of Jordan and future research is recommended to expand this research to other cities. Respondents' in other parts of the country may response differently. Another limitation is related to the nature of the study, which is cross-sectional. This sometimes makes it an issue to infer conclusions related to cause-and-effect relationships. A longitudinal study could assess the same sample and model respond in future research. This will introduce a time lag between the evaluation of the predictors and outcome constructs. Future studies also may replicate this effort with other research approaches, including case studies which may permit deeper insights. One additional limitation is the nature of predictor constructs used in this work which are related to technological factors. For example, user training as a lack of adequate training programs is a constraint in reaching the full expected benefits.

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Further reading

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Appendix. Measurements items and sources

Factors – Code Measurements – Items Sources

Data Quality/Torres and Sidorova (2019)

- DQ1 The data available for the DAS is accurate
- DQ2 The data available for the DAS is comprehensive
- DQ3 The data available for the DAS is correct
- DQ4 The data available for the DAS is consistent

Information Quality/Lin *et al.* (2006) and Gable *et al.* (2008)

- IQ1 The information provided by the DAS is always timely
- IQ2 The information provided by the DAS is useful
- IQ3 The information provided by the DAS is easy to understand
- IQ4 Importance of information related to decision-making

System Quality/Lin *et al.* (2006) and Gable *et al.* (2008)

- IQ1 The information provided by the DAS is always timely
- IQ2 The information provided by the DAS is useful
- IQ3 The information provided by the DAS is easy to understand
- IQ4 Importance of information related to decision-making

Analytical Decision-Making Culture/Popovič *et al.*, (2012)

- ADMK1 The decision-making process is well established and known to its stakeholders
- ADMK2 The bank's policy is to incorporate available information within any decision-making process
- ADMK3 I consider the information provided by the DAS regardless of the type of decision to be taken

Decision-Making Quality/Alalwan *et al.* (2014) and Ouiddad *et al.* (2020)

- DMQ1 Based on the information from DAS, the outcome of the decision that I make is usually correct (the outcome may have minor errors)
- DMQ2 Based on the information from DAS, the outcome of the decision that I make is usually accurate (the outcome has no errors at all)
- DMQ3 Based on the information from DAS, the outcome of the decision that I make is usually precise (the DAS will lead to the same outcome every time I face the same problem)
- DMQ4 Based on the information from DAS, the outcome of the decision that I make is usually dependable

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