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Investigating the Effect of Information Systems and Decision Quality on Organizational Performance in Business Firms

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Abstract: The development of information systems raised the quality of decision-making, significantly impacting businesses' organizational performance. To evaluate this impact, the current research aimed to investigate the relationship between information systems (IS) success factors, decision-making quality (DMQ), and organizational performance (OP). A quantitative research approach was adopted, and a survey was sent to 163 decision-makers who use information systems in business firms. The study model was evaluated using PLS-SEM. The study's empirical results indicated that information quality (IQ) significantly positively impacted decision-making quality (DMQ). However, system quality (SQ) did not affect decision-making quality (DMQ). Furthermore, information quality (IQ) was found to mediate the relationship between system quality (SQ) and organizational performance (OP). Finally, the decision-making quality (DMQ) was found to moderate the relationship between information quality (IQ), system quality (SQ), and organizational performance (OP). This study provided field practitioners with important recommendations and future work to evaluate the impact of information systems (ISs) impact on organizational performance (OP).

Keywords: Information system, Information quality, Decision-making quality, Organizational performance.

Introduction

Regardless of profitability, every business entity requires an information system within its department to function effectively. Decisions made within even non-profit organizations are based on various reports (Kapoor & Goel, 2017). Over the past few decades, as technology has swept across the globe, it was inevitable that it would permeate everyday professional life. These technological advancements have revolutionized how tasks are performed through information systems (IS), leading to a continuous and growing revolution (Smith, 2015). Initially, digitalization reduced the workload by employing technology for repetitive tasks, allowing organizations to focus on more advanced situations. This shift significantly improved organizational performance and productivity (Irfan et al., 2008). However, the key to efficiency is strategically utilizing information systems and tools (Schmitz & Leoni, 2019). Traditionally, an information system (IS) is as a system that enables data collection and processing, facilitating its use by decision-makers to improve organizational performance (OP) (Dagiliene & Šutiene, 2019).

To ensure the success of IS, organizations must not only excel in creating the technological aspects but also foster a positive environment for information utilization, particularly in decision-making processes (Sun et al.,2018;) (Popovič et al., 2012). Many studies Ahmed (2021); Jasim and Raewf (2020); Puspitawati (2021). The topic of information system success has only recently gained attention in the literature, and few attempts have been made to examine the impact of these systems on the organizational performance. A significant gap remains, particularly regarding the decision-making quality that contributes to the success of these systems. This study introduces the dimension of Decision-Making Quality (DMQ) to the existing model and explores its effect on the relationship between information quality, information system on organizational performance (OP), aiming to address this unanswered question in the literature. However, earlier studies have not conducted an in-depth analysis of information system success, mainly due to its dependence on various factors, including

information and system quality, as highlighted by numerous studies in different fields Al-Okaily (2022) and Ouiddad et al. (2020) and Popovič et al. (2012). This research seeks to investigate whether current information systems have succeeded in enhancing the quality of organizational decision-making in improving organizational performance. This study contributes to the body of knowledge by proposing a model that measures the impact of information systems on organizational performance through decision-making quality, utilizing DeLone and McLean (D&M) success model.

The organization of this study is as follows: Section 2 offers a background, while Section 3 presents the main concepts, research hypotheses, and study model. The study methodology is outlined in Section 4, followed by the presentation of the study results in Section 5. Lastly, Section 6 encompasses the study discussion, limitations, and future work.

Background

The rapid technological revolutions of recent times have tremendously impacted the business world, leading to significant changes and advancements. Entities have been compelled to adapt to emerging trends and effectively keep up with technological growth. Automation has become a prevalent concept in various business sectors, with four key components—cloud accounting, Internet of Things (IoT), blockchain, and big data—recognized as crucial elements in this process, as indicated by Qasim and Kharbat (2020). These approaches have gained prominence within firms, with researchers acknowledging their potential to drive automation.

By effectively integrating these four concepts, there is a significant opportunity to reduce individuals' reliance on manual record-keeping. Instead, a single individual can solely rely on technology to generate all the necessary reports. For instance, blockchain technology has proven beneficial in various aspects of firms. Firstly, as most documents are automated, they can easily be directed to numerous other applications. Secondly, all participants have access to the transaction history on the blockchain, which enhances system efficiency and reliability. Lastly, it reduces the occurrence of fraud due to the inherent difficulty in altering blockchain data, providing transparency to all participants.

Additionally, blockchain facilitates faster, paperless invoice exchanges between parties involved in a transaction, eliminating potential misuse (Fanning & Centers, 2016). However, it is essential to acknowledge that the application of this technology, like any other new technology, comes with its challenges, weaknesses, and potential adverse effects. One ongoing debate revolves around insufficient tools to ensure the system functions as intended, reducing system reliability (Qasim & Kharbat, 2020).

Main Concepts, Research Hypothesis, and Model

D&M success model is widely utilized by various studies examining the ISs success as indicated by Al-Okaily et al. (2021); Popovič et al. (2012). The model was initially introduced by DeLone and McLean (1992), who set several categories as standard dimensions of information system success. These dimensions include system quality (SQ), and information quality (IQ).

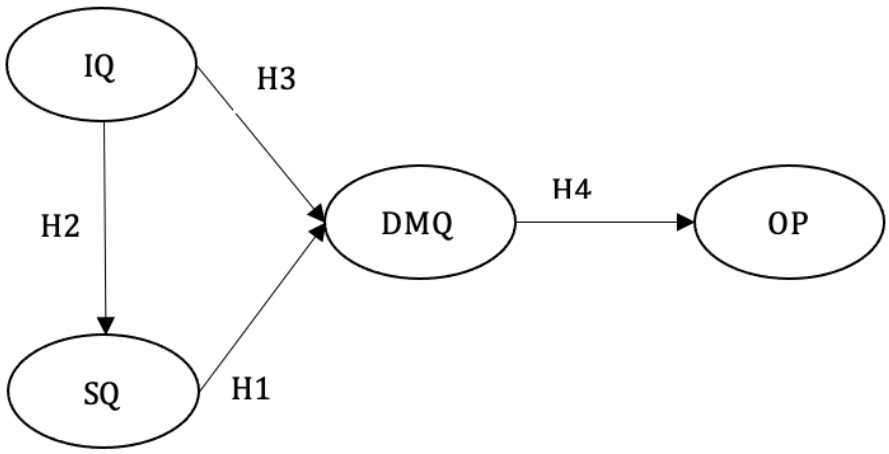

Figure 1. Study first model

The model, along with its subsequent modifications, assures the perception of the interconnections between these dimensions of information system success, ultimately leading to the final success variable referred to as "net benefits" in the original model Add ref. In the present study, the Decision-Making Quality (DMQ) dimension has been incorporated as a critical factor in assessing the contribution of information systems to organizational performance, as depicted in Figure 1.

System Quality (SQ)

System quality refers to essential factors within a system that enables it to fulfill the desired tasks. These factors encompass flexibility, accuracy, reliability, ease-of-use, and availability (DeLone & McLean, 2016). Prior studies have indicated a positive association between system quality and decision-making quality, as an effective system reduces the effort required in the decision-making process, thereby enhancing its overall quality (Arnott & Pervan, 2016). However, some studies reported conflicting results (Al Fraihat et al., 2020; Motaghian et al., 2013), prompting this study to contribute to this field of studies. Consequently, the following hypothesis is formulated:

H1. System quality (SQ) directly affects decision-making quality (DMQ).

Information Quality (IQ)

High quality information is acknowledged as an important factor for firms to make successful decisions and succeed in the current dynamic and fast business advancements (Elezaj et al., 2023; PirttimÃ¤ki et al., 2006). IQ reduces uncertainty based on the available alternatives for decision making by understanding the potential consequences associated with selecting one option over another. Based on this understanding, the following hypotheses were proposed as follows:

H2. Information quality (IQ) positively affects system quality (SQ)

H3. Information quality (IQ) positively affects decision-making quality (DMQ)

Decision-Making Quality (DMQ)

Decision-making is identified as the process of identifying and selecting the most suitable action from various alternatives to achieve organizational goals. This process is considered critical aspect for firm's management at all levels REF. The quality of decisions made significantly impacts organizational performance, with high-quality decisions yielding positive outcomes, while low-quality decisions can adversely affect the organization. Moreover, the availability and quality of resources, such as systems and information, can influence the quality of decision-making either positively or negatively. In this context, system quality and information quality play crucial roles as facilitators, providing decision-makers with the necessary tools and information to make effective decisions and enhance the overall quality of the decision-making process. Based on these considerations, the following hypothesis has been formulated:

H4. Decision-making quality (DMQ) positively affects organizational performance (OP).

Organizational Performance (OP)

Organizational performance (OP) is recognized as the achievement of the business processes after realizing firm goals (Cahyono et al., 2023). In information technology, the software system has many factors that affect organizational performance. These factors lie in the software quality attributes, information quality, and decision-making quality. Each factor has measures that affect OP based on how these factors are used to improve the firm's competencies (Ravichandran & Lertwongsatien, 2014). In addition to the available resources and capabilities to improve the quality of decision-making process and then enhance OP (Santhanam & Hartono, 2003).

Methodology

Measurement Instrument

The survey employed in this study utilized constructs and measures previously supported in the existing literature to ensure the validity and reliability of the study survey. For instance, to assess SQ, four items were derived from the works of Cahyono et al. (2023) and Guy et al. (2008), which focused on the technical aspects of the IS. Similarly, three measures were adopted from previous literature to evaluate IQ, specifically examining the characteristics of information generated by IS Lin (2010) and Guy et al. (2008). DMQ evaluated using three items adapted from the studies conducted by Alalwan et al. (2014) and Ouiddad et al. (2020). Finally, to gauge organizational performance, three items were employed, adapted from a recent study conducted by Cahyono et al. (2023).

Data Collection

The research data was gathered from various firms in Jordan involving different users, including managers, supervisors, and employees. A total of 250 survey were distributed to decision-makers within these organizations. After data collection, 177 questionnaires were collected before conducting a thorough screening process. Of these collected responses, 163 valid responses were deemed suitable for further analysis. Table 1 presents a detailed description of the respondents' Demographic information.

Table 1. Respondents' demographic information.

Measure	Option	Frequency
Gender	Male	93
	Female	70
Age	Less than 30	46
	30-40	58
	41-50	37
	Above 50	22
Education	Diploma	5
	BSc.	81
	MSc.	66
	Ph.D.	11
Job title	Employee	104
	Supervisor	41
	Manager	18
Experience	Less than 5	32
	5-10	54
	11-20	36
	Above 20	41

Results

Assessing the measurement model is a fundamental stage in evaluating the reliability and validity of the PLS-SEM. The measurement model evaluation involves several criteria. First, survey items' reliability was assessed using factor loading (FL) test of 0.7. Furthermore, Cronbach's alpha (α) test was utilized to evaluate the internal consistency of the survey items and composite reliability (CR) of 0.7 and above. Finally, average variance extracted (AVE) of 0.5 and above was utilized to assess the convergent validity.

Table 2 and Figure 2 present the results, indicating that all items' factor loadings are within the suggested range. Additionally, all research factors' CR and AVE values surpass the cutoff values of 0.7 and 0.5, respectively. These results confirm the measurement model's reliability.

Discriminant validity measures how the measurement items differentiate their respective factors from other items in the proposed model. Three methods to assess discriminant validity exist the heterotrait-monotrait (HTMT) ratio, Fornell and Larcker correlation, and cross-loadings. The HTMT ratio, proposed by (Henseler et al., 2015), is an alternative method in PLS-SEM. Values close to 1 indicate insufficient discriminant validity. Table 3 displays the HTMT criterion values, satisfying the recommended threshold and indicating adequate discriminant validity.

Table 2. Results summary for the outer model measurements

		Reliability and Validity				
		Convergent validity		Internal consistency validity		Discriminant validity
	Indicators	FL	AVE	α	CR	HTMT
Value		>0.7	≥0.5	≥0.7	≥0.7	<0.9
System quality	SQ1	0.905	0.779	0.910	0.934	Yes
	SQ2	0.917				
	SQ3	0.900				
	SQ4	0.803				
Information quality	IQ1	0.962	0.835	0.902	0.938	Yes
	IQ2	0.846				
	IQ3	0.930				
Decision-making quality	DMQ1	0.925	0.863	0.921	0.950	Yes
	DMQ2	0.928				
	DMQ3	0.934				
Organizational performance	OP1	0.973	0.841	0.922	0.941	Yes
	OP2	0.898				
	OP3	0.877				

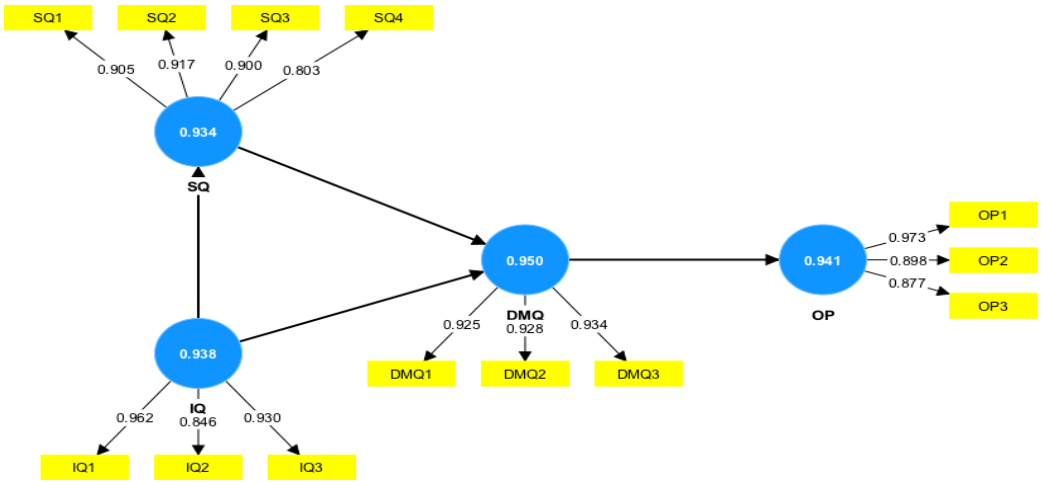

Figure 2. Measurement model

Table 3. Heterotrait-monotrait (HTMT) test

Indicator	DMQ	IQ	OP	SQ
DMQ				
IQ	0.128			
OP	0.050	0.247		
SQ	0.217	0.737	0.217	

Table 4. Fornell-Larcker correlation matrix

Indicator	DMQ	IQ	OP	SQ
DMQ	0.929			
IQ	0.131	0.914		
OP	0.041	0.275	0.917	
SQ	0.209	0.748	0.234	0.882

One approach to assess discriminant validity is through the utilization of the Fornell-Larcker correlation matrix. Fornell and Larcker (1981) propose this method, wherein discriminant validity is deemed to be established if the average variance extracted (AVE) of a factor surpasses the squared multiple correlations between that factor and other factors. Table 4 presents the square root of AVE values for latent factors. These values, highlighted in bold font, are more significant than the correlations with other factors, affirming discriminant validity according to the Fornell-Larcker principle.

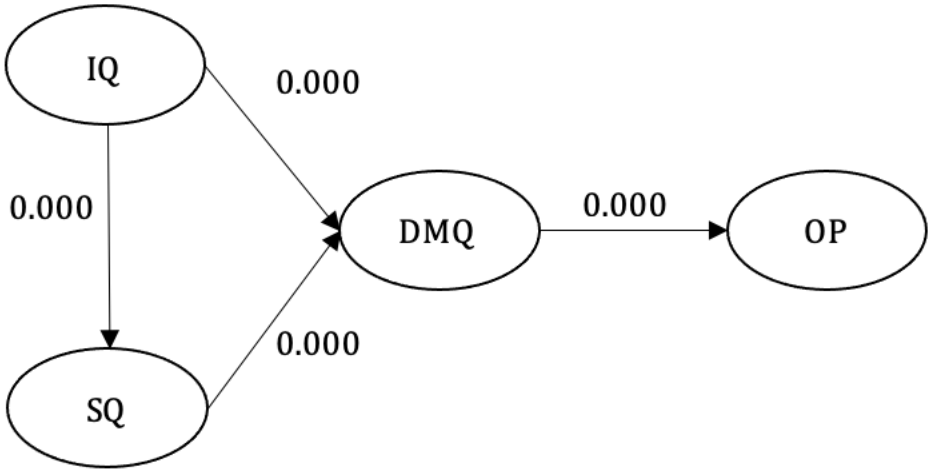

Figure 3. Study second model test results

Table 5. Hypothesis test results

-Hypothesis	Path	Beta (β)	P-value	Decision
H1	SQ ⟶ DMQ	0.290	0.000	Accepted
H2	IQ ⟶ SQ	0.786	0.000	Accepted
H3	IQ ⟶ DMQ	0.890	0.000	Accepted
H4	DMQ ⟶ OP	0.330	0.000	Accepted

Table 5 presents the test results for the four hypotheses examined in the study. The findings indicate that the beta (β) value falls within the acceptable range, and the P-value associated with the hypothesis demonstrates its level of significance.

Discussion and Conclusion

The present study makes a valuable contribution to the existing literature by examining critical factors in the IS success model and expalining their impact on organizational performance. This study focuses on SQ, IQ, and DMQ effect on OP. The empirical findings provide strong evidence supporting the positive influence of system quality and information quality on decision-making quality, thereby accepting hypotheses H1 and H2. These findings are in-line with the studies conducted by Kulkarni et al. (2017) and Yeoh and Popovič (2016), which indicate that IQ as a crucial factor for the success of ISs leading to high quality information for decision making and organizational performance improvement. Furthermore, IQ positively impacted DMQ and OP in Jordanian firms, resulting in the acceptance of hypotheses H3 and H4. These findings are in-line with study conducted by DeLone and McLean (2016) confirming the crucial role of IQ in improving OP. Similarly, PirttimÃ¤ki et al. (2006) indicates the importance of IQ in decision making for firms. In addition, the study findings are consistent with the study conducted by Wieder and Ossimitz (2015), which identifies a significant relationship between both IQ and DMQ.

Limitations and Recommendations

The limitations of this study are acknowledged and should be taken into account when interpreting the results. one of these limitations lies in the generalizability of the results due to the limited sample scope of Jordanian firms. The study was conducted on a limited sample of firms in Jordan. Thus, the findings may not be applicable in other fields. Moreover, the data collection was limited to firms in the capital city of Jordan, and it is recommended for future research to extend the scope of the study to include other cities. These limitations present opportunities for further research to understand how information systems contribute to the organizational performance. Thus, future research needs to consider more industries, which also utilize information systems in their daily business processes.

Scientific Ethics Declaration

The author declares that the scientific ethical and legal responsibility of this article published in EPSTEM journal belongs to the author.

Acknowledgements or Notes

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References

Ahmed, A. A. A. (2021). Corporate attributes and disclosure of accounting information: Evidence from the big five banks of China. *Journal of Public Affairs*, *21*(3), e2244.

Alalwan, J. A., Thomas, M. A., & Weistroffer, H. R. (2014). Decision support capabilities of enterprise content management systems: An empirical investigation. *Decision Support Systems*, *68*, 39–48.

Al Fraihat, D., Joy, M., Masa'deh, R., & Sinclair, J. (2020). Evaluating e-learning systems success: An empirical study. *Computers in Human Behavior*, *102*, 67–86

Al Okaily, A., Al Okaily, M., & Teoh, A. P. (2021). 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, M., & Al Okaily, A. (2022). An empirical assessment of enterprise information systems success in a developing country: the Jordanian experience. *TQM Journal*, *34*(6), 1958–1975.

Arnott, D., & Pervan, G. (2016). A critical analysis of decision support systems research. *Formulating Research Methods for Information Systems*, *2*, 127–168

Cahyono, Y., Purwoko, D., Koho, I. R., Setiani, A., Supendi, Setyoko, P. I., Sosiady, M., & Wijoyo, H. (2023). The role of supply chain management practices on competitive advantage and performance of halal agroindustry SMEs. *Uncertain Supply Chain Management*, *11*(1), 153–160.

Dagiliene, L., & Šutiene, K. (2019). Corporate sustainability accounting information systems: A contingency-based approach. *Sustainability Accounting, Management and Policy Journal*, *10*(2), 260–289.

DeLone, W. H., & McLean, E. R. (2016). Information systems success measurement. *Foundations and Trends® in Information Systems*, *2*(1), 1–116.

Fanning, K., & Centers, D. P. (2016). Blockchain and its coming impact on financial services. *Journal of Corporate Accounting & Finance*, *27*(5), 53–57.

Guy, G., Sedera, D. ;, & Chan, T. (2008). Re-conceptualizing information system success: The ıs-impact measurement model. *Journal of the Association for Information Systems*, *9*(7), 377–408.

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1), 115–135.

Irfan, D., Xiaofei, X., & Chun, D. S. (2008). Developing approaches of supply chain management systems of enterprises in Pakistan. *International Arab Journal of Information Technology (IAJIT)*, *5*(3).

Jasim, Y. A., & Raewf, M. B. (2020). Information technology's impact on the accounting system. *Cihan University-Erbil Journal of Humanities and Social Sciences*, *4*(1), 50–57.

Kapoor, N., & Goel, S. (2017). Board characteristics, firm profitability and earnings management: Evidence from India. *Australian Accounting Review*, *27*(2), 180–194.

Kulkarni, U., Robles-Flores, J. A., Popovič, A., Kulkarni, U. R., & Antonio Robles-Flores, J. (2017). Business intelligence capability: The effect of top management and the mediating roles of user participation and analytical decision making orientation. *Journal of the Association for Information Systems*, *18*(7), 1.

Lin, H. F. (2010). An investigation into the effects of IS quality and top management support on ERP system usage. *21*(3), 335–349.

Motaghian, H., Hassanzadeh, A., & Moghadam, D. K. (2013). Factors affecting university instructors' adoption of web-based learning systems: Case study of Iran. *Computers & Education*, *61*(1), 158–167.

Ouiddad, A., Okar, C., Chroqui, R., & Beqqali Hassani, I. (2020). Assessing the impact of enterprise resource planning on decision-making quality: An empirical study. *Kybernetes*, *50*(5), 1144–1162.

PirttimÃ¤ki, V., LÃ¶nnqvist, A., & Karjaluoto, A. (2006). Measurement of business intelligence in a Finnish telecom-munications company. *Electronic Journal of Knowledge Management*, *4*(1), pp83-90-pp83-90.

Popovič, A., Hackney, R., Simões Coelho, P., & Jaklič, J. (2012). Towards business intelligence systems success: Effects of maturity and culture on analytical decision making. *Decision Support Systems*, *54*, 729–739.

Puspitawati, L. (2021). Strategic information moderated by effectiveness management accounting information systems: Business strategy approach. *Jurnal Akuntansi*, *25*(1), 101–119.

Qasim, A., & Kharbat, F. F. (2020). Blockchain technology, business data analytics, and artificial intelligence: Use in the accounting profession and ideas for inclusion into the accounting curriculum. *Journal of Emerging Technologies in Accounting*, *17*(1), 107–117.

Ravichandran, T., & Lertwongsatien, C. (2014). Effect of information systems resources and capabilities on firm performance: A resource-based perspective. *Journal of Management 21*(4), 237–276.

Santhanam, R., & Hartono, E. (2003). Issues in linking information technology capability to firm performance. *MIS Quarterly : Management Information Systems*, *27*(1), 125–153.

Schmitz, J., & Leoni, G. (2019). Accounting and auditing at the time of blockchain technology: A research agenda. *Australian Accounting Review*, *29*(2), 331–342.

Smith, S. S. (2015). Accounting: Evolving for an integrated future. *Finance & Management Strategy*, *10*(1), 1–12.

Wieder, B., & Ossimitz, M. L. (2015). The impact of business intelligence on the quality of decision Making – a mediation model. *Procedia Computer Science*, *64*, 1163–1171.

Yeoh, W., & Popovič, A. (2016). Extending the understanding of critical success factors for implementing business intelligence systems. *Journal of the Association for Information Science and Technology*, *67*(1), 134–147.

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