Evaluating the D&M IS Success Model in the Context of Accounting Information System and Sustainable Decision Making

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Abstract: The Accounting Information System (AIS) is generally employed for the automation of operational processes and the enhancement of company efficiencies, but more recently, AIS developments have had a great effect on the process of sustainable decision-making among organizations. However, previous research on the AIS and its capabilities attributed its success to critical success factors. Therefore, in the current work, De Lone and Mc Lean’s Information System (D&M IS) Success Model is evaluated in terms of AIS in Jordanian organizations. The current study primarily aimed to determine the influence of system quality, service quality, information quality, system use and user satisfaction on AIS use, which is argued to eventually enhance the quality and sustainability of decision-making. The study employed a quantitative approach using a self-administered questionnaire for data collection involving 101 decision-makers who are familiar with AIS usage. Following the collection of data, it was validated using Structural Equation Modeling (SEM)—PLS. Based on the obtained results, system quality and information quality significant affected system use, but service quality did not. In turn, AIS was found to have a significant effect on user satisfaction. Furthermore, system use and user satisfaction had positive effects on AIS, which eventually affected the sustainability of decision-making, representing the net AIS benefits. The study contributes to existing IS literature, particularly in the field of determining the factors that influence the AIS net benefits, with the proposed model validated in Jordanian organizations using AIS. The study can be used as a guide to shed light on the importance of AIS and it also provides implications, limitations and opportunities for future studies.

Keywords: DeLone and McLean IS success model; accounting information system; AIS use; user satisfaction; AIS quality; sustainable decision-making

1. Introduction

The present modes of businesses have been transformed by the prevailing dynamic digitalization, globalization, knowledge and information competition and dissemination [1,2]. The current era of technology has brought about high investments in data processing computerization in various industries [3–5]. Such technological advancements are related to the use of information technology (IT) and information system (IS) applications and methods as a result of which business changes have been innumerable. Thus, IT/IS usage can pave the way for opportunities and benefits for both large and medium-sized (SMEs) businesses [6,7]. SMEs have jumped on the bandwagon of businesses searching for new methods to improve their productivity and maintain their competitiveness [8,9].

Computerized ISs have been generally used in each business to bring about the achievement of objectives and goals and each business attempts to apply IS/related technology
for higher efficiency and effectiveness level in managing enterprises/institutions [10,11]. In fact, IS has become crucial as one of the business components used for resolving issues that crop up in the enterprises [12,13]. ISs have transformed into the top technologies that enterprises cannot do without when promoting and solving issues related to their businesses [14,15]. In this line of study, Lutfi et al. [2] indicated the role of IS in successful business endeavors and, as such, studies such as that by Fadelelmoula [16] defined it as the level to which an information system contributes to organizational goals achievement and influences its performance.

More specifically, the Accounting Information System (AIS) is the heart of the enterprise, without which activities cannot be integrated, coordinated or controlled [17,18]. AIS is a part of MIS that gathers, classifies, addresses, analyzes and provides financial information to third parties and management to help them reach informed decisions [19]. Similarly, AIS was defined by Nguyen and Nguyen [20] as a set of activities, documents and technology that interdependently work together to gather, process and report information to internal and external stakeholders in order to reach informed decisions in organizations. AIS primarily works towards recording events/transactions and producing information to evaluate performance, as well as providing a complete gathering and reporting financial transaction process [21]. AIS also covers a combination of computer-based and information technology related resources for tracking and reporting accounting activities.

Throughout the years, in the context of organizations in Jordan, efforts have been adopted when it comes to AIS use in enhancing business operations capabilities and efficiencies. The dynamic growth in the number of AIS users has urged the government of Jordan to allocate grants and initiatives to solve the scarcity of resources in companies [22]. Regardless of this fact, companies in Jordan as well as in other developing nations are still struggling to use AIS to its full potential, particularly when it involves the extension of such usage to businesses analytics and decisions support [7], owing to its decisional modules’ complexity and the implementation costs [23]. As a result, decision-makers have turned to exploiting its real-time information provision to evaluate and analyze functional data, and this manifested as positive outcomes of decision-making. Using AIS for efficient and effective information flow allows effective management decision-making, and eventually leads to achieving the objectives and aims of the organization [24,25].

Accordingly, this study identifies and assesses the influence of AIS on management decision-making sustainability because, regardless of the studies that have been carried out concerning AISs [2,5,26], the step-wise assessment of their impacts on management decision-making sustainability remains controversial. This work is thus based on the review of previous studies that supported the direct relationship between AISs and related IS areas and the quality of decision-making [20,27–30]. Similar to studies of this caliber in the literature [16,31], this study employs the De Lone and Mc Lean (D&M) IS Success Model [32] to evaluate the decision-making sustainability of managers through the assessment of AIS quality dimensions for AIS use and user satisfaction. The study analyzes the influence of associations between the proposed model’s variables and assumes that AIS results in superior decision-making sustainability. The influence of factors on decision-making sustainability and the way firms can enhance such quality is still ambiguous and as AIS use becomes streamlined in organizations, the understanding of the relevant chain and factors that play a part in enhancing the quality and sustainability of decision making becomes crucial for organizations.

In order to meet the current research objectives, Section 1 introduces the study with a brief background. This is followed by Section 2, which provides a literature review covering the theoretical foundation of the study, an empirical review and the empirical model used in the study. Section 3 presents the methodology adopted and covers data source, sample frame and data analysis, while Section 4 provides the obtained results along with the implications. Lastly, the final section concludes with the limitations and suggestions for future studies.
2. Literature Review

2.1. Accounting Information System

Based on AIS studies, its adoption enhances the quality of financial reporting and facilities optimum decision-making while bringing about financial transaction and internal control effectiveness [33–35]. According to Lutfi et al. [2], IS success can be perceived through various points of view such as output generated as expected, optimum productivity, enhanced performance and improved control over the decisions connected to the information that AIS generates. Aside from this, using AIS has also been evidenced to significantly impact the generated accounting information quality. Moreover, AIS use in business operational management supports strategic decision-making on the basis of accounting information quality [33,36].

In the Jordanian context, the implementation of AIS is common among large, listed business. In contrast, its implementation among small and medium businesses is rather novel. Therefore, AIS use among Jordanian listed companies is the focal point of the current work, particularly the information of value to the decision makers who depend on AIS usage. Undoubtedly, businesses all over the world have been seeking techniques for aggregating the advantages that they could achieve from the use of AIS and the estimated benefits of investments.

2.2. Information Quality

IS literature has been inundated with studies on information quality (IQ) that consider it to be a significant factor for using ITs in businesses. IQ refers to the system’s ability to furnish information that is accurate, timely, complete and relevant to the users to reach informed decisions. It is an essential measurement of the quality of output that IT generates [31,32,37,38]. In relation to this, quality information minimizes the errors that are made during the process of transaction, enabling the production of accurate and valuable information for decision making processes. Several works have been dedicated to investigating the association between IQ and the use of IT but such research has reported mixed findings without a solid conclusion. In related studies, Anggadini [39] revealed that information quality significantly impacts AIS use in the context of organizations in Indonesia, while Alzoubi [40] examined the use of AIS in the Jordanian context. In the latter study, the author distributed copies of the instrument to financial accountants and managers of the firms focused on and, based on the results, information quality significantly impacted AIS. However, other studies such as those by Al-Hiyari et al. [41] and Daoud and Triki [42] found an insignificant information quality–AIS relationship. Meanwhile, Lutfi et al. [43] revealed information reliability, as one of the information quality dimensions, to be significantly related to the use of IT. Therefore, this study proposes the following:

Hypothesis (H1). Information quality significantly influences the use of AIS.

2.3. System Quality

Along with IQ, system quality (SQ) is also considered one of the top constructs of the IS success model in De Lone and Mc Lean’s [32,38] model and it is described as the level of system technical efficiencies, in light of ease of usage, response time, reliability, security and flexibility. A high quality AIS is one that is capable of facilitating users, with the ratings based on the user’s perceptions of AIS and its ease of use. System quality is a significant determinant of using AIS within organizations and, based on De Lone and Mc Lean [32], IS which is designed and implemented effectively can lead to effective IS and, despite the fact that the construct was not theorized to directly affect AIS use in the IS success model, the majority of the dedicated studies have tested the direct relationship with inconclusive findings [31].

In this study, human-related factors were added to De Lone and Mc Lean’s IS success model in light of their influence on using AIS within organizations and their use of the system in making decisions. Based on the outcome, there is a significant system quality-IS
usage relationship [31,44,45]. In Lutfi et al.’s [43] examination of the post-IT implementation, they found a significant influence of system quality on IT use. This was similar to the results reported by Xu et al. [46] when they used the 3Q model to examine the effect of system quality on IS adoption—this model is an integrated model of technology use proposed by Nelson et al. [47]. The authors found SQ to significantly impact the use of IT.

Along this study line, Negash et al. [48] showed a positive association between SQ and web-based customer support systems but they focused on web-based IS in the organization and thus there is a need to examine the constructive in other settings and contexts. Hence, the present study proposes the following:

Hypothesis (H2). System quality significantly influences the use of AIS.

2.4. Service Quality

Another IS success model variable is service quality (SQ) and it is comprised of indicators—assurance and empathy. The information system provides knowledge that has to be devoid of hazards and risks and the system should be convenient to use in communicating and understanding the user’s needs. Basically, service quality measures the quality of services that IS provides and is a tool developed to be used by marketing researchers to test the quality of service. It is one of the determinants of IS effectiveness, supporting users through the IS department unit and often gauged through system reliability, responsiveness and empathy through support.

The analysis of IT service elements effectiveness has gained higher ground and service quality is a crucial IS dimension in a competitive environment for the organization attempting to search for service enhancement and measurement of IT use [31,49]. Concerning this construct, Arshah et al. [50] contended that effective SQ in terms of AIS facilitates and improves the integration of the system throughout the organization, along with the required support by the user, which all contributes to the performance of the organization. In a similar study, Chang et al. [51] found a positive service quality-IS use relationship.

Nevertheless, some studies found no significant relationship between the two constructs and these include Negash et al. [48] and, as such, service quality findings in the literature are still ambiguous. Based on the De Lone and Mc Lean [32] model, service quality dimensions may hold varying weights according to the analysis context and situation and thus, this study assumes the following:

Hypothesis (H3). Service quality significantly influences the use of AIS.

2.5. AIS Usage

IS-dedicated study referred to system usage as the level of efforts exerted to interrelate with the ISs, representing the amount of output delivered by the system in light of the time unit [13,36,52]. System usage actually hinges on the system assessment by the users in that whether they think it enhances the task’s performance and the quality of their decisions or otherwise [53]. This would naturally lead to increased user satisfaction and frequency of use [13,31]. User satisfaction is referred to as the level to which the users deem the system information to satisfy their requirements, which means satisfaction stems from the experience of the user in light of information search, their satisfaction, and decision-making outcome [54,55].

User satisfaction is a construct in the AIS context that is related to system usage [56], with the usage of the system providing support in decision-making, enhancing efficiency as well as productivity [53,57,58]. Both user satisfaction and use are factors that can be measured and past studies underlined three general use measures, which are time in hours, usage frequency and usage level [55,59–61]. Some other studies considered four measures in evaluating satisfaction of the user, namely SQ satisfaction, service satisfaction, information satisfaction, and the entire AIS satisfaction [62,63]. The evidence of positive
AIS use–AIS user satisfaction directs this study to propose the significant positive influence of AIS use on user satisfaction of AIS, and in turn, the sustainability of decision-making as follows:

**Hypothesis (H4).** *AIS use significantly influences the system user’s satisfaction;*

**Hypothesis (H5).** *AIS use significantly influences the sustainability of decision-making.*

### 2.6. User Satisfaction

Still another IS success model is user satisfaction and it is comprised of repeat visit and repeat purchase indicators. The former refers to the difference between the required information and the received information [64,65]. Generally speaking, information satisfaction stems from comparing between the information system’s needs and the received performance of the system. Contrastingly, the latter (repeat purchase) reflects global satisfaction with the system that has been analyzed by considering the satisfaction level of the IS and systems and the benefits of the input–output process received [66].

With regards to the decisions’ sustainability, it is the quality and values of the decisions made by the users that lead to a certain outcome or consequence [31,58]. In the context of AIS, the system’s provision of accuracy and precision, and the reliability of information act as measures used for the evaluation of the quality of decision-making [67,68]. On the basis of Bhattacharjee’s [69] study, the effective usage of the system partially depends on user satisfaction and thus it is argued that the level and AIS usage frequency along with the user satisfaction will lead to enhanced decision-making sustainability. Hence, it is proposed that:

**Hypothesis (H6).** *User satisfaction significantly influences the sustainability of decision-making.*

### 3. Theoretical Background and Framework

#### 3.1. D&M IS Success Model

This study adopted the D&M IS Success Model (2003) owing to its capability to evaluate complex information system and the creation, dissemination and implementation of procedural information and causal dimensions that may affect the users. According to Mason [70], the levels of effectiveness and the findings obtained from examining 180 studies concerning the performance of IS/IT, the D&M model (1992) determined the various IS success categories through six factors, which are SQ, IQ, us, user’s satisfaction (US), individuals and organization impact. The original model was updated by De Lone and Mc Lean [32] through the integration of SQ and by changing the individual’s impact and organization impact with net benefit. In the updated model, it is contended that the attitudes and subsequent behaviors of the individual are influenced by his belief in the quality of the system and his experience of its usage. According to the model, how relationships in terms of information quality, system quality and service quality influence perceptions of intentions towards use and satisfaction of the user, would in turn influence perceptions concerning the net benefits [32,71].

Additionally, the model’s usefulness as a framework for IS success (effectiveness) measurement [43,72], and its application to various analytical levels based on the performed tasks, were also considered. Stated clearly, the quality dimensions of the system (information, system and service) influence its successful performance on the whole. Model success is gauged through system use, user satisfaction and net benefits and, thus, the updated and developed version of the IS success model as the underpinning model for IS quality evaluation paves the way for its application in various situations, among which is AIS usage and adoption.

To this end, the study integrates additional antecedents for user satisfaction perceptions that are distinct from the system’s technical considerations, IQ and SQ. Such
integration attempts to reflect some of the aspects of the organization that plays a key role in successful IS use \[73,74\]. Because IS aims to develop and facilitate connections among various business establishments that operate within a single supply chain \[74\], considering the aspects outside of the technical system aspects and including some dimensions that can demonstrate the way IS users interact and work together is a crucial issue to examine. Accordingly, this study extends the model by adding net benefits of AIS use, which has not been included in AIS studies and the IS success model. Despite the fact that the IS success model has been extensively used for evaluating IS’ success in past studies, such studies largely ignored the use of the model for assessing AIS in the context of the organization \[43,75\] and the examination of the decision-making sustainability as the exogenous variable.

Despite numerous works offering some evidence about the significance of quality factors in enhancing the success of information systems, there are still limited works about the role of quality measurements in promoting the usage of AIS and user satisfaction as well as their role in the quality of decision-making, as shown in Table 1. Thus, recognizing the most essential quality factors for decision makers is considered one of the significant steps for ensuring the success of the usage and implementation of AIS, which could reflect in a critical way on quality decision-making via AIS use.

Past studies dedicated to evaluating the effect of IT/IS technologies on business performance \[56,76,77\] adopted the D&M Success model as the underpinning model. Their analysis showed the model’s strength in providing insight into the relationships between the IT/IS technologies and enhanced organizational performance.

| Author | Domain | Quality Constructs | User Experience Construct | Net Benefits |
|--------|--------|-------------------|--------------------------|-------------|
| [78]   | E-Filing Adoption | Information Quality System Quality Service Quality | User Intention User Satisfaction | Net Benefit |
| [79]   | electronic customer relationship management (E-CRM) | Service Quality | Customer Satisfaction | Success of ECRM systems |
| [80]   | B2B e-commerce | Information Quality System Quality Service Quality | Usefulness User Satisfaction | Non |
| [81]   | AIS | Information Quality System Quality Service Quality | User Satisfaction | None |
| [44]   | Online Learning | Information Quality System Quality Service Quality | Online Learning Adoption (Madrasati Platform) Satisfaction | Non |
| [82]   | cloud ERP continuance | Information Quality System Quality | Confirmation Perceived Usefulness | Continuance Intention |
| [83]   | AIS | Information Quality System Quality Service Quality | Non | AIS effectiveness |
| [84]   | cloud financial information system, | Satisfaction Trust | Continuance Intention |
| [85]   | Mobile Banking | System Quality Service Quality | User Satisfaction | Net Benefit |
Table 1. Cont.

| Author | Domain | Quality Constructs          | User Experience Construct | Net Benefits       |
|--------|--------|-----------------------------|---------------------------|--------------------|
| [86]   | AIS    | Information Quality         | User Satisfaction         | Job Performance    |
|        |        | System Quality              |                           |                    |
|        |        | Service Quality             |                           |                    |
|        |        | Information Quality         |                           |                    |
| [31]   | ERP    | System Quality              |                           | Non Individual Impact |
|        |        | Service Quality             |                           |                    |
| [87]   | AIS    | System Quality              | User Satisfaction         | Non AIS effectiveness |
|        |        | Information Quality         |                           |                    |
| [88]   | AIS    | System Quality              | Non User Intention        | AIS effectiveness  |
|        |        | System Quality              |                           |                    |
| [89]   | AIS    | Service Quality             | User Satisfaction        | Net Benefit        |

3.2. Theoretical Framework

This study aims to examine the effect of system quality (SYQ), information quality (IQ) and service quality (SQ) as independent variables and AIS use on user satisfaction and decision-making sustainability as dependent variables. The study also tests the relationship between AIS usage, US and decision-making sustainability.

The proposed theoretical research framework is presented in Figure 1.

4. Research Methodology

4.1. Measurement Development

The formulated hypotheses were tested using a questionnaire developed in English and translated into the Arabic language. The questionnaire items were adopted from prior studies on AIS/IS and the metrics were kept relevant to the study context (Appendix A). Moreover, the developed questionnaire was forwarded to three AIS/IS experts for perusal after which a preliminary empirical pre-test was conducted. In this regard, Memon et al. [90] stated that the questionnaire has to be tested and, accordingly, such testing was made by four senior managers and six directors employed in listed firms in Jordan—particularly those that are familiar with AIS usage. The pre-test ensures that the design of the questionnaire, clarity and relevance of the items are established [91]. Following the pre-test, some items were tweaked to enhance the questionnaire readability. The items were gauged on a Likert scale, with the extreme scales denoting the following; 1, strongly disagree and 5, strongly agree.
4.2. Data Collection

Decision-makers who use AIS comprised the survey target of this study and the survey was carried out over a two-month span (17 September 2021–19 November 2021). The questionnaire was distributed online to 185 listed Jordanian organizations in the financial, service and industrial sectors. From the 185 questionnaires distributed to AIS users as decision-makers, 101 copies were retrieved. The study’s sample size was decided upon based on Hwang et al.'s [92] recommendation, where the least sample size needed to be ten times the highest number of paths leading to the endogenous constructs. Accordingly, the least sample required was n = 60. Similarly, the number of respondents was recommended by Hair et al. [93] to be at least eight times greater than the study constructs number [94–96]. Thus, the minimum sample size required based on this recommendation was n = 48. Accuracy was established by conducting statistical power analyses for the estimate of sample size based on Cohen [97], and this was calculated using a priori power analysis with G* Power software. A sample size of 96 respondents was needed to obtain an alpha of 0.05, a moderate effect size of 0.15 and a power of 0.80, and because the sample size was comprised of 101 responses, it was deemed appropriate for SEM-PLS analysis [8,98,99]. Survey questionnaire procedures for the respondents are detailed in Figure 2.

![Survey procedures](image)

Figure 2. Survey procedures.

5. Analysis and Results
5.1. Internal Consistency Reliability

According to Hair et al. [93], internal consistency reliability is the level to which the entire (sub) scale indicators are directed towards the evaluation of the same concept.
Consistent with this, the composite reliability score value has to be at least 0.70, with an average variance extracted (AVE) value of over 0.50 as aligned with Hair et al.’s [93] suggestion (refer to Table 2). The study variables calculated AVE and composite reliability met the recommended value and were higher than 0.50, indicating the reliability of the measurement model. Additionally, the study also computed the Cronbach’s alpha values to establish the data’s internal consistency. In this regard, Sekaran and Bougie’s [100] rule of thumb for alpha value (i.e., \( \alpha > 0.9 \) shows excellent consistency, \( \alpha > 0.8 \) shows good consistency, while \( \alpha > 0.7 \) shows acceptable consistency). The study’s Cronbach’s alpha values met the threshold and this held true for AVE and composite reliability for the entire variables (refer to Table 2).

Table 2. Indicator Loadings, Internal Consistency Reliability and Convergent Validity.

| Constructs                      | Cronbach’s Alpha | Composite Reliability | AVE  |
|---------------------------------|------------------|-----------------------|------|
| AIS Information Quality         | 0.915            | 0.936                 | 0.747|
| AIS System Quality              | 0.826            | 0.884                 | 0.657|
| AIS Service Quality             | 0.911            | 0.933                 | 0.737|
| AIS Use                         | 0.901            | 0.938                 | 0.835|
| AIS User Satisfaction           | 0.944            | 0.960                 | 0.857|
| Decision-making sustainability  | 0.797            | 0.868                 | 0.624|

Based on the above table, Cronbach’s alpha obtained for all variables exceeded 0.70, which shows that all had good consistency and in the same way high reliabilities and AVE scores were also observed, evidencing the measurement model’s reliability.

5.2. Discriminant Validity

The degree to which a variable actually differs from other variables is reflected through discriminant validity, which is another condition for assessment [93]. It is the level to which a specific element is distinct from other elements [101]. The higher the discriminant validity, the greater will be the distinctiveness of the variable in encapsulating the phenomenon compared to other variables. Thus, this study determined the discriminant validity by obtaining the AVE square root—it needs to exceed the value of the correlations among the latent constructs [93].

Hence, discriminant validity was determined to confirm the model’s external consistency. The latent constructs comparison is presented in Table 3, where the AVE values squared of the constructs are DMQ (0.790), InfQ (0.864), SerQ (0.858), SysQ (0.811), AIS Use (0.914), and AIS USat (0.926).

Table 3. Matrix of Discriminant Validity.

| Constructs | Mean | SD  | 1    | 2   | 3    | 4    | 5    | 6    |
|------------|------|-----|------|-----|------|------|------|------|
| 1 DM-Q     | 3.634| 0.691|0.791 |     |      |      |      |      |
| 2 IQ       | 3.908| 0.931|0.458 |0.864|      |      |      |      |
| 3 SQ       | 3.456| 0.822|0.281 |0.535|0.858 |      |      |      |
| 4 SyQ      | 3.514| 0.894|0.447 |0.662|0.564 |0.811 |      |      |
| 5 AIS Usage| 3.901| 0.851|0.448 |0.498|0.428 |0.520 |0.914 |      |
| 6 AIS US   | 3.707| 0.895|0.550 |0.616|0.522 |0.581 |0.557 |0.926 |

Based on the AVE squared values tabulated in Table 3, the values exceeded the correlation between the latent variables, which means discriminant validity is established. The research initially explained the framework and showed the connections among the variables based on past literature that needed to be changed according to the confirmatory factor analysis conducted. CFA outcome did not require dropping any of the variables, although
some of the items were dropped and, consistent with Hair et al.’s [93] recommendation, at least three items remained for each variable.

Table 4 further sheds light on the values in Table 3. Specifically, Table 4 presents the support for some hypotheses with \( p \)-values of less than 0.05, and the rejection of others with a \( p \)-value higher than 0.05. The hypotheses testing involved five independent variables’ direct relationship with the dependent variable, with one of them found to be insignificant. As a consequence, two hypotheses had a direct significant effect on AIS use, while one was insignificant. Table 4 sheds more light on Figure 3.

### Table 4. Result of Hypothesis Testing.

| Hypothesis | Paths | Sta. Beta | Mean | Stan Errors | t-Values | \( f^2 \) | \( p \)-Values | Results |
|------------|-------|-----------|------|-------------|----------|---------|--------------|---------|
| H1.        | IQ—Usage | 0.233     | 0.241 | 0.118       | 1.961    | 0.041   | 0.051        | Sig     |
| H2.        | SyQ—Usage | 0.285     | 0.279 | 0.136       | 2.089    | 0.060   | 0.037        | Sig     |
| H3.        | SQ—Usage  | 0.142     | 0.143 | 0.111       | 1.281    | 0.019   | 0.200        | Insig   |
| H4.        | Usage—US  | 0.251     | 0.241 | 0.095       | 2.648    | 0.088   | 0.008        | Sig     |
| H5.        | Usage—DM-Q | 0.215    | 0.209 | 0.088       | 2.112    | 0.045   | 0.037        | Sig     |
| H6.        | US—DM-Q   | 0.441     | 0.450 | 0.090       | 5.056    | 0.197   | 0.000        | Sig     |

![Figure 3. PLS algorithm results.](image)

### 5.3. Assessing Predictive Relevance \( Q^2 \) and Coefficient of Determination (\( R^2 \))

The study employed PLS3 to calculate the predictive relevance (\( Q^2 \)), through the blindfolding procedure, with the cutoff higher than 0. Values of \( Q^2 \) that are greater than 0 indicate the predictive relevance of the model following Hair et al. [93]. Table 5 shows that all \( Q^2 \) values are higher than 0, which supports the model’s predictive relevance due to the relevance of the endogenous latent variables.

Moving on to the coefficient of determination (\( R^2 \)), it represents the variation of the endogenous variables’ percentage that independent variables explain jointly. Based on Falk and Miller’s [102] study, the value of \( R^2 \) has to be equal to or exceed 0.10 to be considered substantial. Table 5 presents the \( R^2 \) values for the entire factors and they all exceed 0.10.

### Table 5. \( Q^2 \) and \( R^2 \) Values.

| Dependent Latent Variable | Predictive Relevance (\( Q^2 \)) | Coefficient of Determination (\( R^2 \)) |
|---------------------------|----------------------------------|----------------------------------------|
| AIS Usage                 | 0.645                            | 0.314                                  |
| AIS User Satisfaction     | 0.143                            | 0.523                                  |
| Decision Making sustainability | 0.528                        | 0.324                                  |
6. Discussion and Implications

The current research makes several contributions to the literature as it evaluates the quality constructs of the D&M model and illustrates that the factors had significant influence on AIS use, aside from SerQ. The study supported and confirmed prior studies’ results concerning information quality and system quality and their significant effect on usage and user satisfaction [31,103–105], and further rejected the significant effect of SerQ on AIS usage. The findings confirmed some studies such as [31,43,106,107], but they contradict some D&M contentions based on SerQ as a significant dimension in evaluating the system usage and system success. Such a surprising finding can be attributed to the number of respondents that were not as satisfied with the services that their AIS department provides, with complaints regarding issues in communication, unmet promises and delays rooted in a lack of technical support. This may also be attributed to the study context specificity in that developing nations’ companies generally lack technical training, particularly the IS department, precluding the efficient and complete use of the AIS utilities and features. Hence, technical training sessions that provide more than fundamental computer skills training should made available to the decision-makers using AIS.

The results regarding the positive AIS usage and user satisfaction relationship was expected, with InfQ and SysQ influencing AIS usage as well, and ultimately enhancing USat. Based on the obtained findings, the highest predictor of AIS use is SysQ, and this may be because the constructs in the IS Success Model have varying levels of importance based on the attributes of the organizations [31,108]. It was observed by Petter et al. [72] that firms that have centralized computing (e.g., AIS) stress more on SysQ rather than InfQ. This finding supports past findings that highlighted the SysQ in AIS [43,57,62], with the inclusion of AIS flexibility and reliability features. This boosts the user’s motivation to make complete use of AIS and establish their key involvement, and eventually heighten their satisfaction (USat).

Past studies such as those by Alalwan et al. [68] and Hou [109] also revealed that the frequent use of AIS among users (particularly managers) results in enhanced decision-making sustainability. This finding shows that USat has a key role in enhancing managers’ decision-making and that the quality of information that AIS provides enables reliable and accurate decisions, supporting the assumption that the AIS department meets the needs of the users [61]. Moreover, the results empirically reinforced the argument made by Ouiiddad et al. [110] that IS adoption makes a great contribution to enhancing the decision-making capabilities of a firm.

The examined factors in this research were empirically evidenced to enhance AIS decision-making sustainability among firms, with AIS-based decision-making calling for the use of AIS data evaluation and processing. It is important for firms to come up with sophisticated processes to clarify the context and make AIS effectiveness and benefits meaningful for decision-makers. In turn, this needs a potential overview of data sources and the way they can be combined to shed light on the context [111]. In order to generate the above, AIS needs collaboration among the stakeholders and experts of domain systems to comprehend AIS processing and its implications—such collaboration is crucial for IS- and AIS-using businesses. In the same way, an overview of AIS sources and resources quality evaluation is another area that calls for more studies and examination.

Based on the results, the theoretical framework can be used to conduct an evaluation of the AIS’ ability to enhance decision-making sustainability. The study’s theoretical framework can also direct further research activities on the topic. The construct relationships based on the D&M Success Model underlined the AIS capabilities with decision quality reflected based on the problem complexity and the system use efficiency. In conclusion, AIS enhances managerial decision-making and achievements.

In summary, the present study’s results provided insight into the factors driving enhanced decision-making among managers through their AIS use. AIS allows management the control and observance of varying transactions, and to view issues based on different perspectives and reach decisions that are accurate, informed and fact-based. The study...
results provided intriguing evidence involving the significant role of AIS use in sustainable businesses performance. Based on this research outcome, businesses with extensive AIS use are prone to derive high values and impacts from AIS use under the D&M Success Model assumption. This outcome has proven pertinent to several empirical works in different IS or IT technology domains [43,112] where high IS or IT use significantly affects the equality of decision-making, which substantially influences values and impacts business sustainability.

Although Ramli [61] disclosed that AIS use enhanced user satisfaction, minimized errors, and optimized information accessibility, research on the impacts of AIS use on decision-making quality and business sustainability has remained rare to date. As a key business goal, decision-making has proven to be essential for sustainability in the past decade following the postmodern industrial era. AIS use has garnered much interest to achieve businesses sustainability and goals. Overall, sustainability significantly influences SMEs’ survival.

Moreover, the D&M model’s (2003) extension through the inclusion of variables of the quality of decision-making contributes to the IT/IS use literature and the results can be tested in other countries with similar economic and social backgrounds to the study context. However, owing to the size of the sample, results generalization and application to other developing countries should be undertaken with caution.

7. Conclusions, Limitations and Directions for Future Research

In conclusion, AIS value is produced through decision-making quality enhancement but, regardless of its importance, AIS usage for decision-making is still under-examined and it is frequently assumed that the effects of AIS are generally on enhancing decisions, which may be an assumption that is too general to believe as several factors and their interrelations may also influence decision-making sustainability. This study aimed to develop and evaluate the proposed model empirically to explain the way AIS InfQ, SysQ and SerQ influence the perspective of users in light of the system use and user satisfaction and, in turn, influence the user’s decision-making quality. Accordingly, 101 decision-makers, working in Jordanian listed firms were obtained, particularly those familiar with AIS and its use. The study is unique in its focus on the operational and transaction capabilities of AIS and its extension of examination to the capacity of AIS in enhancing decision-making. Hence, the study results hold crucial implications for the D&M (2003) underpinning model and its extension and insight towards the various set of factors that affect the sustainability of decision-making.

Nevertheless, with every study comes limitations, as no study can perfectly answer all the questions related to the phenomenon it examines. In this study, the first limitation is the small size of the sample, as the pandemic of COVID-19 is still an influence, it is challenging to collect data. This study used only 101 samples, which is a limitation on the number of respondents and, thus, future studies may increase the sample size to include other respondent groups. Another limitation is the context of the study, which is focused on Jordanian firms, limiting the generalization of results to other countries. This limitation may be addressed by future studies through the application of samples from other developing nations such as New Zealand, African and Asian countries. The third limitation is related to the adopted cross-sectional design that excludes responses from different time intervals. It is notable that some constructs, such as usage, require the period to pass for proper measurement. This limitation has been frequently mentioned in studies based on D&M and, as such, future studies may conduct comparative studies or observe the pre-adoption and post-adoption progression of AISs usage. Another limitation pertains to the new impact factors that the study integrated into the model, which is decision-making sustainability as a net benefit of AIS usage. It is thus important for future studies to examine the net benefits of systems by examining new factors such as AIS effectiveness or firm performance and focus on their contingent impacts. Additionally, potential researchers should assess the explicit mediating effect of AIS use between quality factors (services quality, system quality and information quality) and the decision-making quality to understand the possible
indirect associations, as this study only examined the quality factors—AIS use and AIS use—of quality decision-making links. Lastly, other variables also need to be examined such as training, user experience, internal control quality, and AIS maturity—the addition of such variables could enlighten stakeholders on the AIS strategic benefits and its role in supporting decision-making. The factors examination may also lay down their important role in shedding light on the direction that decision-makers should take. Future studies can conduct similar AIS studies for a longer time period, considering the inconclusiveness of this study.

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Appendix A

Table A1. Variables with measurement items factors.

| Information Quality (InfQ) | Items | Reference |
|----------------------------|-------|-----------|
| InfQ1                      | Information from the AIS is always timely | [59] |
| InfQ2                      | data provided by the AIS is useful | |
| InfQ3                      | information provided by the AIS is accurate | |
| InfQ4                      | Information from the AIS is easy to understand and related to decision-making | |

| System Quality (SysQ) | Items | Reference |
|-----------------------|-------|-----------|
| SysQ1                 | AIS user interface can be easily adapted to one’s personal approach. | [59] |
| SysQ2                 | AIS is easy to use. | |
| SysQ3                 | AIS responds quickly enough. | |
| SysQ4                 | AIS is always up and running as necessary. | |

| Service Quality (SerQ) | Items | Reference |
|------------------------|-------|-----------|
| SerQ1                  | The information I receive from the IS department is accurate. | [40,72] |
| SerQ2                  | Training provided by the IS department improves my quality of work. | |
| SerQ3                  | The IS department solves my problems and provide me prompt service. | |

| AIS Use | Items | Reference |
|---------|-------|-----------|
| Use1    | AIS is used frequently. | [60] |
| Use2    | I spend most of time per day using AIS for job-related work. | |
| Use3    | I depend highly on AIS use. | |

| AIS USat | Items | Reference |
|----------|-------|-----------|
| USat1    | I am satisfied with the SysQ. | [62] |
| USat1    | I am satisfied with the InfQ. | |
| USat1    | I am satisfied with the SerQ. | |

| Quality Decision Making (QDM) | Items | Reference |
|-------------------------------|-------|-----------|
| QDM1                          | Based on the information from AIS, the outcome of the decision that I make is usually precise (the AIS will lead to the same outcome every time I face the same problem). | [68] |
| QDM2                          | Based on the information from AIS, the outcome of the decision that I make is usually dependable. | |
| QDM3                          | Based on the information from AIS, the outcome of the decision that I make is usually correct (the outcome may have minor errors). | |
| QDM4                          | Based on the information from AIS, the outcome of the decision that I make is usually accurate (the outcome has no errors at all). | |
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