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Business Sustainability of Small and Medium Enterprises during the COVID-19 Pandemic: The Role of AIS Implementation

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Abstract: Small and medium enterprises (SMEs) are the pillars on which most businesses worldwide rest. Thus, without the support of qualified information systems, it can be very challenging for them to improve their performance and difficult for them to reach sustainability goals. Despite the essentiality of economic sustenance for a competitive advantage in the postmodern industrial era, Jordanian SMEs are hampered with multiple challenges, such as accounting information quality, which supports various organizational decisions. The prevalence of information technology (IT) optimizes accounting operations through accounting-based information. A computerized accounting system (accounting information system, or AIS) facilitates accurate reporting, processes large-scale transactions, and generates meaningful reporting for subsequent evaluation. Given the lack of AIS implementation in SMEs, despite its notable advantages, this study aims to investigate the AIS-implementation antecedents and their implications towards sustainable business performance among Jordanian SMEs. An integrated model was recommended based on the technology–organization–environment (TOE) framework and resource-dependency theory (RDT) for the incorporation of AIS-implementation elements and sustainable business performance into one model. A self-administered questionnaire was disseminated among 194 respondents within the context of Jordanian SMEs for data collection and evaluation using structural equation modelling (SEM). Based on the study outcomes, external pressure, compatibility, financial support, top management support (TMS), and external assistance significantly impacted AIS implementation, which subsequently catalyzed sustainable business performance. Such results could offer useful insights into how organizations could optimize AIS implementation for sustainable business performance and expand the current body of literature on IS- or IT-implementation antecedents and impacts. The implications of this study are that SMEs should develop effective AIS implementation in order to reach sustainability goals. Therefore, we recommend and encourage SMEs decision makers to utilize AIS for their businesses.

Keywords: AIS implementation; sustainable business performance; sustainability; TOE Framework; resource-dependency theory (RDT); SMEs



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1. Introduction

As a primary sector in both developed and emerging countries, SMEs play pivotal roles in the national-level gross domestic product (GDP) [1,2] where high GDP induces

economic growth. Such SMEs, which have shaped approximately 90% of businesses worldwide, demonstrate their capacity in tackling both economic and social intricacies while simultaneously attaining organizational goals [3], mitigating unemployment levels with work opportunities, and contributing to national income and productivity [4]. In line with the World Bank projection of approximately 600 million jobs to support the expanding global workforce by 2030 [4], governments worldwide (including Jordan with an SME-dominant economy) have come to prioritise SME development [5]. Most (98%) of Jordanian businesses are SMEs, which contribute to approximately 40% of the overall Jordanian GDP. Almost three-quarters (71%) of employment is found in the private sector [6]. The annual provision of work opportunities by Jordanian SMEs renders them a significant contributor to national employment statistics compared to large-scale organizations [6,7]. Overall, SMEs should be duly supported, given their essentiality as catalysts of local and global modern enterprise sectors.

The Jordanian SME sector has significantly induced economic progress [8] in line with local government efforts in enhancing SME contributions to the national economy. This sector has documented pivotal contributions towards high economic growth. For example, SMEs contribute to approximately 40% of the overall Jordanian nominal GDP, with almost 70% or three-quarters of private-sector employment. As a significant contributor to national employment statistics, SMEs could offer more work opportunities yearly compared to large-scale organizations. As organizational sustenance has garnered much attention in tandem with the rising importance of SMEs, SMEs need to be more competitive and productive as the catalyst of national economies [9]. In this vein, Dyt and Halabi [10] asserted that successful/unsuccessful SME distinctions depend on accounting information usage.

Accounting information proves essential for businesses, specifically SMEs, to resolve short-term complexities with relevant information and support control and monitoring operations in multiple critical areas: cash flow, expenditure, and costing [11]. Accounting information also complements long-term strategic planning for highly dynamic and versatile business operations [9]. Essentially, IT-oriented solutions to support accounting information collection and communication must be highly regarded for optimal business competition and productivity following IT advancements [12–14]. Summarily, IT plays an extensive and integrated role in the execution of accounting operations [15,16].

Notably, IT implies an effective means of improving accounting functions in SMEs [17]. Adequate IT utilization ensures the prompt and precise delivery of accounting reports and other financial information to company managers on their business operationalization and decision-making impacts on organizational performance [18,19]. As accounting and financial documents denote primary information sources for SMEs in line with past literature, advanced accounting knowledge and financial-reporting systems enable businesses to optimally achieve their goals [20]. Rapid IT expansion has necessitated the computerization of accounting and financial information with AIS: IS or IT instruments that complement financial and accounting data gathering, storage, and processing for managerial decision making [21].

The SMEs are at risk of encountering multiple complexities compared to large-scale companies given the current competitive environments [22]. For example, SMEs are more prone to failing in competitive knowledge-based business contexts [15]. Hossain [23] implied that SMEs demonstrated significantly low survival rates in the first five years of business, which adversely impacted employment rates and national income. Meanwhile, Kumar and Ayedee's [15] research affirmed that small-scale companies rapidly create and decrease work possibilities compared to big corporations. Thus, SMEs should successfully maintain sustainability for national economic development and productivity.

The 2019 novel coronavirus (COVID-19) pandemic that initially spread across China in February 2020 has inevitably and universally impacted the world [24–26] in terms of economic fallout, business disruption, and minimal GDP growth for the next few years [27–29]. The risks arising from COVID-19 resembles that of the 2008 global crisis in deterring economic performance and organizational sustainability. Gupta et al. [29] claimed the need for

coherent and integrated responses to alleviate the economic fallout, while Fernandes [28] recommended a revitalisation agenda for optimal growth and sustainability.

The Jordanian SMEs in this study are confronted with multiple intricacies, such as novel IT adoption given the competitive business environment. Particularly, SMEs require improved IT implementation to manage technological complexities and improve competitive positions for SME sustenance [30]. The heavy reliance of SME operationalization on IT subsequently facilitates revitalization and growth [31]. Based on previous studies, IT denotes one of the primary catalysts of SME sustenance [31,32]. The AIS utilisation among Jordanian SMEs is fairly low, parallel to other emerging economies, despite the prevalence of IT in daily business operations. For example, only 14% of Jordanian SMEs have implemented AIS for internal business reporting [33]. Similarly, Ahmad, Ayasra, and Zawaideh [34] indicated low data quality in AIS implementation among Jordanian SMEs. The limited use of IT or IS in business-operation support, specifically accounting functions, deters the organizational capacity to completely leverage and enhance their competitiveness [35] and instigates poor data quality in decision making. The insufficient deployment of IT- or IS-oriented alternatives inevitably hampers the Jordanian capacity to maintain competitiveness and optimize business productivity [36]. Effective AIS implementation is deemed crucial for organizations towards cost mitigation and high income or revenue, competitiveness, and productivity [37]. In other words, an efficient AIS could induce user system satisfaction and affect overall company operations and sustainability. Despite the aforementioned advantages, several local works disclosed that not all SMEs generate accounting reports.

The importance of the study and of the approach we propose is high for managerial practice, as this research study presented is based on the integrated model recommended according to the technology–organization–environment (TOE) framework and resource-dependency theory (RDT) for the incorporation of AIS-implementation elements and sustainable business performance into one model. Despite much research on sustainable performance from multiple factors [33,35–40], the AIS-implementation effect on organizational sustainability remains ambiguous. Business sustainability has been primarily investigated among SMEs in developed nations, with less emphasis on developing counterparts, thus depicting specific literature gaps. The effort and attention on the implementation stage (postadoption concerns), specifically in emerging nations, remain lacking, despite attempts to examine AIS in preadoption and formal adoption stages [5,9,41]. A full-scale deployment at the postadoption stage and subsequent implications on business sustainability, specifically in developing economies resembling Jordan, proves necessary for a sound understanding of the AIS-implementation effect on SMEs [42]. Furthermore, no consensus or studies on how businesses could determine potential AIS implications and values have been identified, despite multiple case studies on AIS from an organizational perspective [9,34,43–45]. Hence, it is deemed necessary to justify and validate the usefulness, feasibility, and impacts of AIS implementation in businesses [46,47]. As such, this study aims to bridge the aforementioned knowledge gaps.

It is deemed essential for both practitioners and scholars to acknowledge how AIS can create organizational values and impacts in tandem with the expanding AIS environment. The current study addresses this empirical concern by recommending a holistic AIS-implementation framework and assessing subsequent implications from an organizational perspective based on the following subobjectives: (1) to examine the antecedents of AIS implementation; (2) to examine the impact of AIS implementation on business sustainability.

Based on the aforementioned background, this work explores two main research questions, namely: (1) What are the antecedent factors that influence AIS implementation among Jordanian SMEs? and (2) Does AIS implementation affect business-performance sustainability among Jordanian SMEs?

2. Literature Review

SMEs—as would any other organizations—seek profits, and by proposing reasonable prices and quality for their services and products, they can generate revenues and profits. Nevertheless, competition produced by trade and dynamic technological shifts is ongoing and enforces SMEs to equip themselves. In this regard, Fanelli, Rosa, and Maria [39] indicated that the future survival and sustainability of SMEs could be made promising if their pertinent technology and resources (among other many factors) are sufficient and available, fittingly used, and cost-effective. Nowadays, the market is cutthroat, and thus, it is imperative that SME decision makers recognize the value of AIS implementation in enhancing their areas of productivity, performance, and sustainability, all of which dictate their continuing success and existence [5].

However, SMEs have distinguishing features than their larger equivalent. The first includes elements such as poor documentation and record keeping, less innovativeness, and unclear businesses strategies [1]. The SMEs managers usually dominate business decision making [3]. Moreover, their organizational structure is somewhat informal and much less complicated than larger businesses [5]. The second feature is resource-related traits; they usually meet troubles in looking for financial support and assistance and retaining technologically experienced workers [3]. Likewise, compared to larger firms, SMEs have a restricted market share and limited range of products [17], which make SMEs more product-oriented. All these distinctive characteristics have outstanding impacts on an SME's actions toward IS/IT-related innovation.

Ismail and Zin [37] emphasized insufficient financial knowledge, poor accounting records, and inadequate management as some of the essential aspects instigating SME failure following past research [38–40]. Meanwhile, enhanced SME financial management and accounting records are derived from upgraded accounting systems [41]. In this vein, accounting information substantially enhances and supports multiple business operations. The AIS is deemed adequate for competitiveness and sustainability [42] through the generation of timely and appropriate accounting reports and processing of financial information, which could influence SME managers' decisions and organizational processes towards overall business performance [19,48]. In Dyt and Halabi [10], the clearest failed/successful SME distinctions lie in their accounting-information approach and implementation.

The SMEs, typically classified by their limited processing scale [49], significantly influence economic progress worldwide. Most companies, including small-scale SMEs, strive to reap AIS benefits following its potentiality in gathering, storing, recording, and processing data to generate information for managers and decision makers [50], minimize ambiguous decision making, and optimize planning and controlling activities.

Recent research has acknowledged how SMEs have benefited through AIS implementation. Lutfi et al.'s [8] analysis on primary AIS-utilization criteria under the diffusion of innovation (DOI) theory, TOE Framework, and RBV theory divided the significant usage criteria into internal or technological and organizational elements with significant effects on AIS usage and external or environmental aspects with less significant impacts on AIS usage. Conclusively, TOE was found to affect AIS implementation. Lutfi et al. [5], who investigated the role of AIS utilization on its effectiveness with SEM, recommended a framework to evaluate the impacts of seven TOE aspects. Resultantly, AIS implementation could enhance AIS efficiency in the manufacturing industry. On another note, Esmeray [51] implied that AIS catalysis SME growth in terms of sales, revenues, and customers. Fanelli [43] revealed in his study that there is a high level of awareness among the managing bodies of SMEs of the importance of technologies, as they prefer to implement new technologies and new processes in order to maintain sustainability and competitiveness.

Lutfi et al.'s [5] recent study involving the impact of AIS implementation on its performance in Jordanian businesses revealed pertinent strategies to facilitate AIS implementation in SMEs within emerging nations for optimal performance. Five TOE factors (compatibility, management commitment, organizational readiness, competitive pressure, and government support) substantially affected AIS utilization. Likewise, Ismail and Zin [37] revealed that

AIS generates information for both external and internal users and induces efficient business management. Several studies have strived to ascertain the AIS-implementation impacts on organizational performance. Although Ramli [52] disclosed that AIS implementation enhanced user satisfaction, minimized errors, and optimized information accessibility, studies on the AIS implementation impacts on organizational sustainability has remained scarce to date.

As a key organizational goal, business sustainability has proven to be essential for competitive advantage in the past decade following the postmodern industrial era. AIS implementation has garnered much interest to achieve sustainability and organizational goals. Business sustainability can be defined as the synchronization of financial, social, and environmental objectives to deliver fundamental value-added business actions and catalyze their sustainability across all dimensions. Overall, sustainable performance significantly impacts SME survival.

2.1. Theoretical Understanding and Foundation

This study aims to assess AIS implementation (postadoption stages) and its impact from an organizational viewpoint. Relevant IS or IT studies have explored the issue from two alternative approaches. One research approach emphasized the variables affecting innovation-implementation decisions, while the other investigated innovation-implementation antecedents and impacts.

Based on literature reviews of the first approach, the TOE Framework offers a pivotal starting point to observe AIS implementation [53]. The TOE Framework determines the three factors impacting organizational technological processes. The technological element outlines perceived innovation characteristics involving observability, relative advantage, complexity, compatibility, and trialability. Tornatzky and Fleischer's [53] meta-analysis revealed the most commonly pertinent and positively significant attributes to be relative advantage and compatibility (examined in the current study). The organizational context denotes the amount of internally available constrained resources and top management and financial support to be most significant in innovation implementation within the current study setting. Lastly, the third factor indicates the "environmental context that refers to the arena in which a firm conducts its industry and its business, competitors, and dealings with external assistance and government" ([53], pp. 152–154). Notably, the framework corresponds to Rogers's [54] DOI regarding technological and organizational attributes as technology-diffusion catalysts.

Another study approach implies TOE-framework expansion by incorporating the technology-implementation effects grounded on the rationale underpinning RDT where companies function under a restricted setting and alleviate ambiguities through environmental management for effective operational sustainability [55]. In this vein, SMEs encounter both external and internal pressure from the management, which impacts resource acquisition [55]. Diverse organizational functions are impacted by their reliance on essential resources under RDT, thus instigating ambiguities and low company optimization [56]. Company success and productivity are impacted by constrained resources (AIS) for business sustainability and competitive stances towards effective operation in the SME setting.

Palpably, SMEs function with restricted resources from a business-sustainability perspective and rely on internal counterparts (AIS) to induce positive implications and attain organizational goals through IT [57]. Companies could generate more impactful and valuable outcomes through appropriate AIS to be integrated with business environments in line with RDT [58]. This theory is extensively applied and developed parallel to management-accounting development, following the shifts in businesses environments within IS studies [59]. Organizations strive to employ internal or external resources that could impact company performance and be on par with the dynamic business settings induced by globalization and technological development [58]. In other words, IS effects rely on the degree to which they are implemented in key organizational value-chain activi-

ties: extensive implementation leads to a high possibility of companies developing novel impacts from IS [60].

Summarily, TOE denotes the primary framework that has inspired most past studies to justify IS- or AIS-implementation antecedents. Notably, the effects of IS implementation following past research were grounded on RDT.

2.2. The Research Model and Hypotheses

Even though the impacts and advantages of adopting ISs for economies and businesses are well-established, the mechanisms by which SMEs can implement AIS are not apparent because the previous literature offers little guidelines and there is no established theoretical understanding. So far, the works carried out regarding the association between AISs and sustainability are rare. Part of the problem is that researchers and practitioners have not consistently agreed on what constitutes AIS. As Lutfi et al. [5] point out, it is challenging to measure an IS's impact and benefits on businesses if you cannot determine what that IS is. The lack of consensus on particular concerns has resulted in little research being conducted on the impact of AIS implementation on SMEs, despite the fact that the benefits of IS are generally acknowledged as being real.

Accordingly, the current research model incorporates significant theories (TOE Framework and resource-dependency theory) in the IS/IT domain [61]. Theoretical perspectives were adapted to assess AIS implementation and its impact on SMEs. The current study investigated the factors affecting AIS implementation in SMEs for business sustainability from multiple contexts based on past studies. The recommended model was structured post-variable review (see Figure 1) as a research process guideline. The three contextual elements incorporated in the model are (1) technological, (2) organizational, and (3) environmental. The aforementioned contexts are elaborated in the following section followed by the proposed correlations.

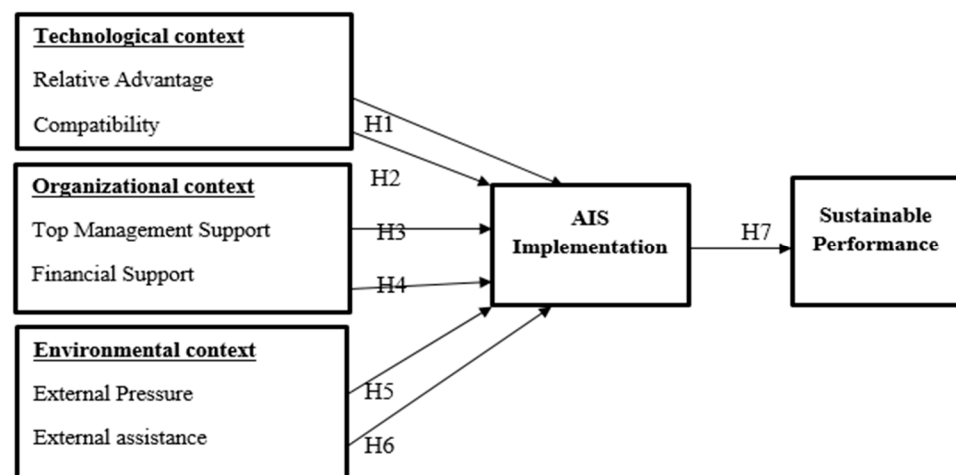


Figure 1. Model of the current study.

2.2.1. Technological Factors and AIS Implementation

Technological factors highlight the technical characteristics to be employed [62]. In Rogers [54], innovation constitutes features that could impact its implementation. As the most pivotal aspect in IS or IT implementation following past literature [63,64], relative advantage implies the extent to which an innovation observably offers more significant benefits than its alternatives and positively impacts IS or IT adoption as a whole [65,66]. Meanwhile, AIS encompasses several novel attributes that distinguish it from other forms of IT innovations: accounting and financial data collection, storage, and processing for internal-management decision making [21]. As such, the following hypothesis was developed:

Hypothesis 1 (H1). *Relative advantage positively affects AIS implementation.*

Compatibility denotes the extent to which an innovation is perceivably consistent with current practices and values [54]. Regarding AIS, compatibility could depict how present processes resemble that of AIS implementation and usage. Technological utilization requires novel skills and approaches for accurate use and implementation, as incompatibility would hamper technological implementations and innovation [67,68]. Compatibility is also regarded as the most significant catalyst of technological implementation compared to other innovation-affecting elements [69,70]. As such, the following hypothesis was developed:

Hypothesis 2 (H2). *Compatibility positively affects AIS implementation.*

2.2.2. Organizational Factors and AIS Implementation

Organizational factors constitute company attributes that impact technological implementation [71], exist within the organization, and explicitly relate to company resource management and operational-setting policies to fulfil their objectives [53,72]. Financial support is a primary factor impacting IS or IT implementation in SMEs [69,73]. Such companies frequently lack financial support and knowledge for intricate technological implementations [73] parallel to past empirical outcomes [74]. Companies with more organizational readiness could engage successfully in IS or IT activities following Rahayu and Day [64], thus resulting in the following hypothesis:

Hypothesis 3 (H3). *Financial support positively affects AIS implementation.*

TMS implies one of the organizational factors denoting the level of active managerial support, commitment, and engagement in technological-system planning and implementation to ensure technological adoption by employees [72,75]. It is deemed vital to ensure that organizational members are committed to accurately implementing available resources and successfully utilizing AIS in resolving the complexities arising from natural resistance to technological usage. As such, decision making substantially depends on company owners or managers [76]. Following past literature, IS or IT success heavily relies on managerial support with positive impacts on SMEs, thus depicting managerial support as a crucial element in AIS implementation [66,71]. Thus, the following hypothesis was developed:

Hypothesis 4 (H4). *TMS positively affects AIS implementation.*

2.2.3. Environmental Factors and AIS Implementation

Environmental factors can be outlined as the external elements existing outside the SME management's control. As an environmental aspect, external pressure implies the extent of pressure imposed on SMEs from industrial rivals. Porter and Millar's [77] analysis on the strategic rationale underpinning external pressure as an innovation-diffusion driver summarized that companies could modify competition rules, affect the industrial structure, and leverage novel means of outperforming rivals with innovation. Notably, this evaluation pertains to AIS. Organizations may be pressured towards technological adoption for competitive advantage in line with current works [3]. As external pressure substantially catalyzes SMEs towards AIS implementation, the following hypothesis was developed:

Hypothesis 5 (H5). *External pressure positively affects AIS implementation.*

External assistance denotes the role of government bodies, external experts, and consultants in actualizing technological implementations within organizations [53]. In line with past studies, the assistance quality of external IS experts, consultants, and vendors indicate some of the most vital AIS-implementation factors among SMEs [78]. As the lack of internal IS expertise in most SMEs lack [17] is a significant barrier to IS develop-

ment and SME progress [78], such enterprises must either seek external aid or establish internal end-user computing skills. Arguably, Lutfi et al. [8] contended that insufficient IS knowledge in SMEs could be compensated with external expert roles by alleviating IS-knowledge-related complexities. Similarly, Soh, Yap, and Raman [79] revealed high IS usage in SMEs with external consultants compared to enterprises without such expertise. Given the essentiality of external expertise, consultation, and facilitation in SME businesses to mitigate IS-knowledge intricacies [74,80], the present study regarded this aspect as an AIS-implementation indicator in Jordanian SMEs to comprehend its environmental implications. Consequently, the following hypothesis was developed:

Hypothesis 6 (H6). *External assistance positively affects AIS implementation.*

2.2.4. AIS Implementation and Business Sustainability

An organization aims to focus its efforts on long-term company goals through business sustainability [81,82], which is primarily impacted by its capacity to face external pressures and adapt to rapid environmental shifts, such as consumer preferences and technological development [83,84]. Business sustainability in SMEs is associated with organizational performance as a predictor [81], which is highlighted by three orientations: ecology, economy, and social orientation. The current study could optimize organizational performance as an indicator of business sustainability, apart from ecological and social performance [85].

Notably, AIS implementation denotes the degree to which AIS is incorporated into organizational tasks: the ultimate AIS-implementation goal for business optimization. Business sustainability could be successfully improved through AIS usage, which subsequently catalyzes global competitiveness. Based on Ali et al. [9], AIS-implementing businesses tend to document positive implications on business performance compared to counterparts with restricted AIS usage. Likewise, technological impacts rely on the degree to which it is utilized to conduct business activities under the TOE Framework [70]. Companies must first incorporate AIS to ascertain its effects on sustainable performance. The authors of the current study leveraged RDT to assert the presence of a theoretical AIS-implementation-impact connection. As in-depth and broad AIS implementations lead to unique, valuable, and sustainable organizational impacts that could not be imitated by competitors, the following hypothesis was developed:

Hypothesis 7 (H7). *AIS implementation positively affects business sustainability.*

3. Material and Methods

3.1. Measurements

This study regarded the Jordanian SMEs listed under the Amman Chamber Industry directory (sampling frame) to investigate the technological, organizational, and environmental implications on AIS usage [86,87]. A total of 941 out of 8000 listed companies matched the SME connotation adopted in this study. Small-scale organizations denote companies with 10 to 49 full-time employees (FTEs) while medium-sized counterparts characterize a business with 50 to 249 FTEs. Firm implied the unit of analysis in the study, while owners or managers with a sound understanding of company IS or IT practices and considerable influence on most organizational decisions implied the target respondents, following research concerns involving organizational viewpoints of AIS implementation [88]. Figure 2 below shows the research path of this section.

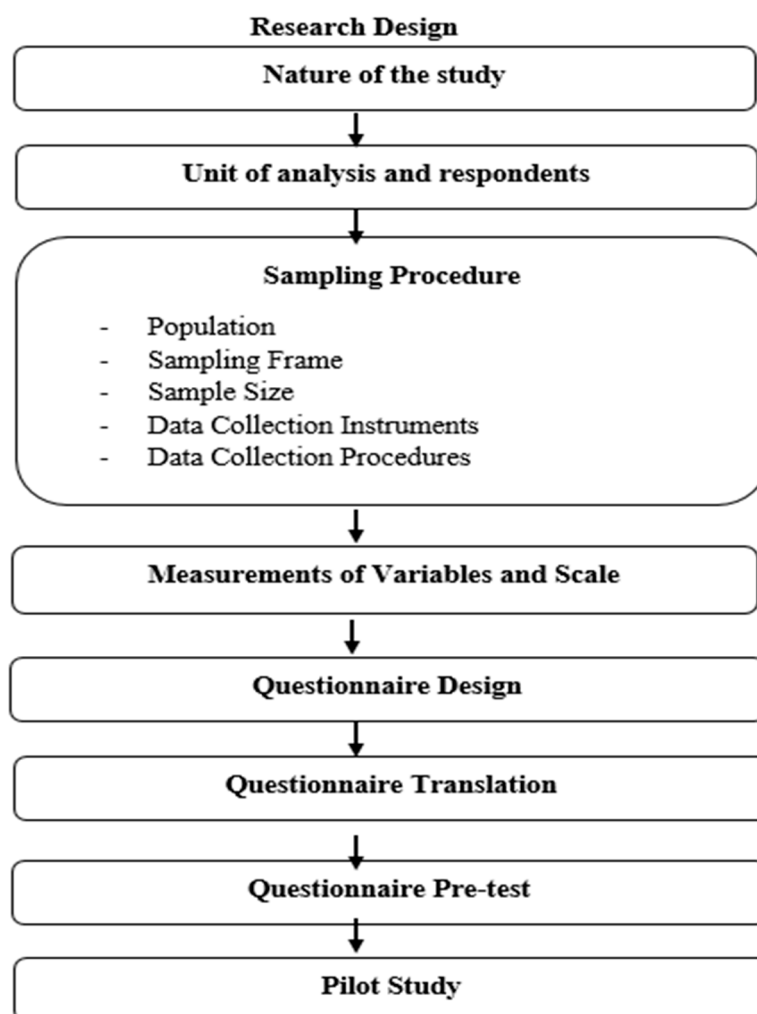


Figure 2. Research path.

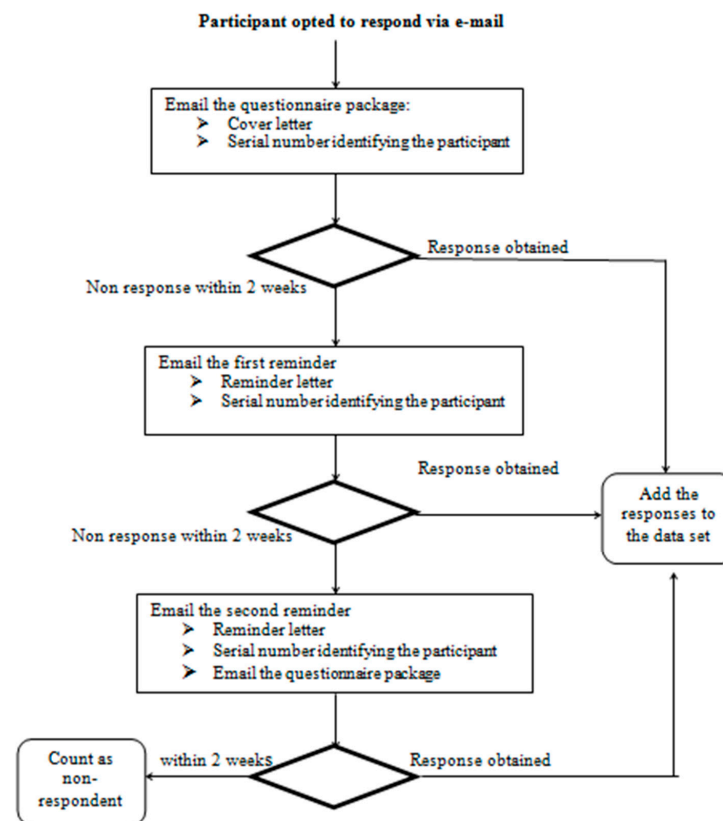
The research data were derived from a four-part questionnaire survey: demographic company information, factors affecting AIS implementation, business sustainability, and respondent profile. The questionnaire (entailing closed questions) was structured with a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) for respondents to address the study questions. Each study variable was assessed with an indicator variable adapted from past research. The process of adapting current assessment instruments was executed with reviews from seven experts: three SME development strategists, two AIS or IS professionals, and two SME owners or managers. It was deemed pivotal to elicit expert opinions in determining content and face validity. The measurement items for every variable are depicted in Table 1. The study tool was pretested with 40 Jordanian SME owners or managers pre-data gathering. Notably, 200 out of the 941 selected companies were recruited for pilot testing.

Table 1. Measurement items.

Latent Construct	Measurement Items No.	Source
AIS Implementation	3 items	[5]
Relative Advantage	6 items	[8]
Compatibility	3 items	[8]
Top Management Support	5 items	[81]
Financial Support	5 items	[8]
External Pressure	5 items	[5]
External assistance	6 items	[8]
Business sustainability	6 items	[81]

3.2. Data Collection

An online questionnaire was structured and emailed to all the 741 directory-listed companies for data collection. Although 213 responses were gathered after a series of follow-up protocols, only 194 counterparts proved valid for further analysis with a 26.1% response rate. The valid responses fulfilled the minimum prerequisite for subsequent evaluation with partial least-square structural equation modelling (PLS-SEM): 70 responses for a model encompassing seven independent variables [89]. Online surveys are advantageous following their slower pace, which could encourage survey completion. For example, respondents could provide more thoughtful and honest answers without being pressured by the interviewer for reliable study outcomes and the mitigation of biased answers. Online surveys provide respondents with the privacy of knowing that they can explicitly address sensitive questions without feeling embarrassed or ashamed if their responses are socially unfavorable, unlike physical interviews [90]. Survey questionnaire procedures for the respondents who responded online are detailed in Figure 3.

**Figure 3.** Online survey procedure.

4. Data Analysis

The current study implemented the approach of PLS-SEM for testing hypotheses, a multivariate statistical method that enables the simultaneous evaluation of multiple variables (one or more independents and/or dependent variable) in one model. This technique also functions optimally with complex models involving specific latent variables that encompass moderating counterparts with considerably lower sample sizes [89,91]. Consequently, the study favored PLS for hypothesis testing over other methods to evaluate the gathered data based on sample size (194), which is less than the required threshold value. Furthermore, the current research model contains eight latent variables, which increase the complexity of the suggested model. Finally, the recommendation of several researchers was followed that if the exploratory nature of the research incorporated the DOI and resource-dependency theories and the TOE Framework (a prediction-oriented nature or of an extension of an existing theory), then such integration necessitates applying a path-modelling approach. In line with past scholars' recommendations, PLS-SEM should be implemented in prediction-based research or studies that are extensions of a current theory [89,92].

5. Results

5.1. Demographic Characteristics

Table 2 outlines the study respondents' demographic information with many individuals (47.4%) holding the position of Chief Executive Officer (CEO). Approximately 50.5% have working experiences of eight years and above. Most of the study respondents (57.7%) were male, parallel to the male-dominant Jordanian culture. Agewise, 58% of the respondents were 30 years old and above, which indicates a substantial proportion of middle-aged individuals. Meanwhile, 69 (35.6%) respondents were between 40 and 49 years old. Concerning educational level, 43.3% of the respondents held a bachelor's degree. The descriptive statistics implied that most respondents had sufficient working experiences and knowledge to address the questionnaire and render the study data to be reliable.

Table 2. Descriptive statistics of demographic characteristics ($n = 194$).

Characteristic		Frequency	Percent
Position	CEO	92	47.4%
	Senior manager	53	27.3%
	Manager	49	25.3%
Experience (number of years in position)	3 years or less	51	26.3%
	4–7 years	45	23.2%
	8–11 years	52	26.9%
	More than 11	46	23.6%
Gender	Male	112	57.7%
	Female	82	42.3%
Age	20–29 years	42	21.6%
	30–39 years	49	25.3%
	40–49 years	69	35.6%
	50 years and above	34	17.5%
Education level	Diploma or below	32	16.5%
	Bachelor's degree	84	43.3%
	Master's degree	62	31.9%
	PhD	16	8.3%

5.2. Assessment of Measurement Model

Measurement or outer-model evaluation denotes an essential step in PLS-SEM, which highlights several perceived indicator constructs as unreliable and limits the author from progressing to structural or inner-model assessment [89]. Specifically, the measurement

model assesses item and construct validity and reliability. Table 3 presents pertinent indicators that characterize the measurement model. The study data implied construct reliability and validity, as all the scores exceeded the thresholds values of 0.70, 0.70, and 0.50 for Cronbach's alpha (CR), composite reliability (CR), and average variance extracted (AVE), respectively [89]. The items also demonstrated convergent and discriminant validity, as all the factor loadings exceeded 0.40 on their respective constructs [89]. Discriminant validity was ascertained by comparing the squared roots of AVE and correlation coefficients between constructs with Fornell–Larcker analysis. All the squared roots of AVE proved to be higher on the diagonal line than the correlation coefficients between constructs, thus depicting construct-level discriminant validity (see Table 4). Conclusively, the measurement model fulfilled the reliability and the convergent and discriminant validity prerequisites at the construct and item levels by regarding all of the presented indicators. The study authors could safely commence with structural-model evaluation for hypothesis testing.

Table 3. Relevant indicators of the measurement model.

Latent Construct	Item	Item Loading	Cronbach's Alpha	Composite Reliability	AVE
		>0.4	>0.7	>0.7	>0.5
Business Sustainability (BS)	BS1	0.873	0.841	0.884	0.558
	BS2	0.799			
	BS3	0.734			
	BS4	0.751			
	BS5	0.692			
	BS6	0.567			
AIS Implementation (AISIM)	AIS IM1	0.772	0.738	0.832	0.557
	AIS IM2	0.698			
	AIS IM3	0.822			
Relative Advantage (RA)	RA1	0.503	0.843	0.887	0.565
	RA2	0.707			
	RA3	0.803			
	RA4	0.796			
	RA5	0.816			
	RA6	0.741			
Compatibility (CO)	CO1	0.756	0.725	0.842	0.638
	CO2	0.901			
	CO3	0.713			
Top Management Support (TMS)	TMS1	0.830	0.862	0.899	0.632
	TMS2	0.844			
	TMS3	0.842			
	TMS4	0.725			
	TMS5	0.709			
Financial Support (FS)	OR1	0.653	0.855	0.898	0.630
	OR2	0.836			
	OR3	0.877			
	OR4	0.853			
	OR5	0.720			
External Pressure (EP)	CP1	0.455	0.776	0.854	0.542
	CP3	0.511			
	CP4	0.801			
	CP5	0.888			
	CP6	0.889			
External Assistance (EA)	GR1	0.719	0.821	0.872	0.528
	GR2	0.838			
	GR3	0.825			
	GR4	0.734			

Table 4. AVE square root (correlations among latent constructs).

	BS	AIS IM	Co	EP	EA	FS	TMS	RA
BS	0.752							
AIS IM	0.379	0.742						
Co	0.449	0.352	0.797					
EP	0.291	0.390	0.321	0.742				
EA	0.151	0.159	0.201	0.031	0.732			
FS	0.090	0.282	0.173	0.430	0.063	0.789		
TMS	0.421	0.282	0.357	0.342	0.159	0.119	0.788	
RA	0.692	0.2616	0.530	0.328	0.174	0.108	0.379	0.741

Note: The values in bold represent the square root of the AVE.

5.3. Assessment of Structural Model

The PLS-SEM subsequently performed structural-model evaluation post measurement model analysis to test the model effects in line with one of the study objectives: to examine the significance of the primary effects between TOE factors and AIS implementation and subsequent implications on business sustainability [89]. The PLS algorithm and bootstrapping test were applied with 5000 resamples to ascertain the path coefficients level and significance for hypothesis testing. Table 5 presents the standardized path coefficients (β -values), critical ratios (t-values), and p -values (in case of supported hypotheses) of every recommended hypothesis. Summarily, six out of the seven hypotheses were supported at 95% and 99% confidence levels, respectively. The AIS implementation impacts on business sustainability ($\beta = 0.362$, $t = 5.867$, $p < 0.01$) revealed the strongest effect and supported H7. Regarding technological factors, compatibility was significantly and positively associated with AIS implementation ($\beta = 0.210$, $t = 2.865$, $p < 0.05$) while relative advantage proved to be insignificant ($\beta = 0.052$, $t = 0.231$). Thus, H2 was supported as opposed to H1. Concerning the organisational domain, financial support revealed significant and positive impacts on AIS implementation ($\beta = 0.132$, $t = 1.875$, $p < 0.05$), thus supporting H3. The TMS proved significant in determining AIS implementation ($\beta = 0.136$, $t = 1.898$, $p < 0.05$) and supported H4. Regarding environmental factors, the external assistance–AIS implementation connection proved significant ($\beta = 0.142$, $t = 1.906$, $p < 0.05$) and supported H6. Meanwhile, the role of external pressure on AIS implementation was deemed positive and significant ($\beta = 0.213$, $t = 2.137$, $p < 0.05$) and supported H5.

Table 5. Results of hypothesis testing of the direct relationship model.

Hypothesis No.	Relationships	Path Coefficient	T-Value	p -Value	Effect
H1	RA \rightarrow AIS IM	0.052	0.231	—	Insignificant
H2	CO \rightarrow AIS IM	0.210	2.865	0.011 **	Significant
H3	TMS \rightarrow AIS IM	0.136	1.898	0.044 **	Significant
H4	FS \rightarrow AIS IM	0.132	1.875	0.046 **	Significant
H5	EP \rightarrow AIS IM	0.213	2.137	0.027 **	Significant
H6	EA \rightarrow AIS IM	0.142	1.906	0.042 **	Significant
H7	AIS IM \rightarrow BS	0.362	5.867	0.000 ***	Significant

Note: Significant at ** $p < 0.05$, and *** $p < 0.01$ (one-tailed test).

6. Discussion

The current study strived to examine AIS implementation and its subsequent effect on business sustainability from an organizational perspective given the paucity of theoretical foundations underlying AIS. An integrated model was recommended based on the TOE Framework to justify AIS implementation, RDT, and the correlation between AIS implementation and its role on the perceived effects. The TOE factors, compatibility, TMS, financial support, and external pressure and assistance proved to be substantial AIS-implementation antecedents following the statistical assessment outcomes.

In terms of the technological domain, compatibility appeared to have the strongest effect on AIS implementation among all the other TOE factors under investigation. This result is in accordance with similar previous studies and the prediction of DOIs [5,8]. In this vein, companies tend to extensively utilize highly compatible technologies (AIS) concerning current organizational practices, work processes, and IT infrastructure. Nevertheless, the outcomes failed to complement the proposed hypothesis, as relative advantage insignificantly impacted AIS implementation compared to initial assumptions, DOI theory predictions, and past literature, which demonstrated a significant impact of relative advantage on other IT or IS applications [64,70]. Intriguingly, the study result paralleled several empirical works [93–95] that revealed an insignificant impact of relative advantage on IT or IS implementation. One possible explanation for the insignificant role of relative advantage is that AIS could be conveniently obtained despite cost-based variances among SMEs following high competition [9]. As such, low AIS cost, high AIS accessibility, and the desire to be on par with industrial competitors potentially motivates SME owners or managers towards system implementation beyond benefit-oriented considerations. Another potential justification is that as the current research found, SME managers intended to implement AISs because of compressions exerted by their opponents. Consequently, they tend to implement AISs simply for the reason that competitors drive and force them to do so. To make it more clear, SMEs managers implement AISs to avoid being left behind within their industry or to enhance their image and reputation in industry, irrespective of any considerations of benefits (advantages). Therefore, SMEs managers might not have measured the relative advantages in the implementation of AIS.

Concerning the organizational domain, TMS and financial support substantially impacted AIS implementation within the sampled SMEs, while TMS positively affected AIS implementation. For example, organizations with high levels of management commitment and support were inclined to implement AIS. This outcome corresponded to past literature on the extent of owners' and managers' engagement in AIS implementation and their comprehension involving the essentiality of AIS for SMEs to incorporate and utilize IS or IT. Likewise, financially stable SMEs extensively implemented AIS following past research [8,74,96,97] that demonstrated substantial impact on IS or IT usage. Compatibility promoted businesses to employ AIS and resource availability and readiness (financial and technical resources) for optimal AIS implementation. Overall, SMEs reflected high levels of readiness and resources (human and equipment resources) for optimal AIS implementation.

Regarding the environmental domain, AIS implementation among SMEs was substantially affected by two proposed factors: external assistance and external pressure. External pressure demonstrated itself to be the second-most significant factor affecting AIS implementation after compatibility following path-coefficient value assessments. This outcome paralleled past literature and TOE predictions [8,32,61,70] where the essentiality of competitive pressure implied IS- or IT-implementation processes (AIS in SMEs). Perceivably, the prerequisites of a competitive environment could be fulfilled for optimal business sustainability over industrial competitors. The SMEs should better reflect AIS-implementation patterns. External pressure might compel SMEs towards AIS implementation, specifically when specific AIS implies a competitive advantage. This study found reasonable support on the substantial external assistance–AIS implementation correlation. The study outcomes could offer sufficient support for government regulations on AIS implementation. Active Jordanian government bodies should facilitate accounting software (AIS) implementation with multiple affordable programmes and incentives to obtain expert opinions from external agencies, thus justifying the low SME dependence on informal networks.

The study results provided intriguing evidence involving the significant role of AIS implementation on sustainable organizational performance. Based on the study outcomes, SMEs with extensive AIS implementation are prone to derive high impacts and values from AIS implementation under the RDT assumption. This outcome has proven pertinent to several empirical works in different IS or IT technology domains [61,74,98,99] where

high IS or IT implementation substantially affects technological values and impacts under RDT predictions.

7. Implications

This research has empirically elaborated on the factors influencing AIS implementation among Jordanian SMEs for high organizational value (business sustainability). As AIS-related research remains scarce despite multiple studies on IS or IT application usage, the present research has contributed several theoretical and practical implications on AIS and SMEs. Theoretically, the study offered a validated and robust model for scholars to forecast the AIS implementation and impact antecedents (business sustainability), thus affirming the usefulness of the TOE Framework and RDT for organizational-level research, complementing the theoretical implementation for studies on AIS effects and values, and expanding the past body of literature on IS or IT implementation assessment by justifying overall IS or IT innovation effects. The TOE Framework-RDT integration in one study model served to examine the implementation and effects of other technological forms, increase the explanatory and predictive power of the TOE Framework and RDT, and generate practitioner and academician-benefiting outcomes.

In terms of practical study contributions, SME managers and practitioners, policymakers, and industry stakeholders who intend to comprehend the reasons underlying low AIS implementation in SMEs compared to large-scale corporations could benefit from the study outcomes. From a managerial viewpoint, with respect to the significant impact of AIS usage on the business's sustainability, this means that SMEs with higher AIS implementation would recognize a greater impact in all operation aspects. Hence, this study result has complemented earlier studies by reinforcing this association. Effective AIS implementation can help SMEs to improve their productivity and competitive position as well as create accurate information and timely decision making to enhance SMEs' performance and sustainability. Thus, SME managers must recognize that AIS implementation is vital for growth and sustainability. Additionally, compatibility and external pressures are the top two essential drivers to effect AIS implementation. SME decision makers, governments, and providers should prioritise these factors. SME decision makers must weigh AIS's compatibility and not be attracted to the benefits and advantages of AIS; they need to confirm that AIS is compatible and friendly with their existing businesses practices and environment. It is rational also to suggest that external pressure influences the implementation of AIS, when SME managers perceive that implementing AIS could strengthen their competitive situation and reinforce them in achieving sustainability. This study results suggests that the agencies should simplify SMEs managers in becoming more aware of a surrounded competition. Once SME managers observe external pressures and recognize the compulsion of using AIS, the implementation rate could rise.

Financial support was found to significantly affect AIS implementation. As Jordanian SMEs have financial constraints, the findings suggest that information-system providers should customize their systems to assemble SMEs resources and offer training and after-sales services in order to increase the knowledge of the systems' users. Moreover, governmental agencies should allocate financial support to SMEs to stimulate and smooth AISs implementation.

Although TMS is ranked in the lesser part of the relationships, it is imperative to recommend that SME managers attain sufficient accounting and technological knowledge. SME managers can play critical roles in the intensive implementation of AIS by motivating employees to implement AIS, identifying businesses information necessities, dealing with qualified systems providers, and choosing the right software and systems to meet the business's requirements. Moreover, given that external support is found to be a significant driver for SMEs in AIS implementation, regulators can establish policies to encourage SMEs to implement AIS. Notwithstanding, some SMEs cannot organize such training courses to effectively enhance workers' innovation capacities following financial constraints. In this regard, the role of external assistance in facilitating SMEs to enhance employees' in-

novation capacities proves essential. External assistance (government agencies) could provide support and raise awareness among SMEs to gain more AIS-technology access. For example, the Jordanian government could elevate awareness on the essentiality of AIS implementation and subsequent advantages of real-life implementation among SMEs. Seminars, training courses, publications, expert visits, and campaigns on the importance of AIS implementation could be launched for organizational responsiveness to AIS implementation and SME sustainability. Meanwhile, government bodies could motivate SMEs to incorporate more sophisticated and complex systems resembling ERP for reduced cost and improved quality, productivity, customer service, decision making, planning, resource management, and organizational empowerment.

8. Conclusions, Limitations, and Future Studies

The current research strives to establish a business-sustainability model from an organizational viewpoint and identified a significant and positive association between compatibility, TMS, financial support, external pressure and assistance, and AIS implementation. Organizational sustainability in Jordanian manufacturing SMEs has been explicitly impacted by AIS implementation. Summarily, the business-sustainability model could be incorporated into manufacturing SMEs as the study model reflected high explanatory power, which could forecast sustainable innovation and company sustainability in Indonesian food-processing SMEs and other developing economies.

This study encountered specific limitations that should be regarded in outcome interpretations and recommendations for future empirical works. As the current research was solely performed in one sector, Jordanian manufacturing SMEs, future studies could be enriched by gathering data across multiple sectors and nations for outcome generalization. Such study duplications could demonstrate similar or comparable outcomes, enhance one's comprehension of implementation and impacts, and authenticate future assessment scales, conceptualizations, and outcome generalizability. The research results corresponded to 194 respondents' answers, which proved sufficient for model-fitting assessment and statistical inferences despite multiple follow-up attempts. As such, future works could validate the research outcomes with larger samples that facilitate covariance-based SEM for robust outcomes and a sound comprehension of the relationships between latent variables and high confidence levels.

As this cross-sectional data failed to support the causal correlation between factors, longitudinal data could resolve such restrictions. Potential scholars should assess the explicit impacts of TOE factors on IS or IT effects to understand the possible direct associations as this study only examined the TOE variable–AIS implementation and AIS implementation–business sustainability links. Given that the study constructs were limited to SMEs, this research recommended a model that integrated AIS implementation and company sustainability with specific latent and observed variables that include large-scale organizations. Future works could compare AIS implementation and business-sustainability model applications between SMEs and large companies. Finally, the current work investigated the relationships between TOE factors and AIS implementation, then the association between AIS implementation and business-performance sustainability. Future research should test the direct relations of the of TOE variables on technologies impact in order to recognize these potential direct effects.

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