

Research Article

Factors of E-Business Adoption in Small and Medium Enterprises: Evidence from Saudi Arabia

Mir Shahid Satar ¹ and Ghadah Alarifi ²

¹Assistant Professor at College of Administrative and Financial Sciences, Saudi Electronic University, Saudi Arabia Riyadh

²Assistant Professor at Department of Business Administration, Princess Nourah Bint Abdulrahman University, Riyadh, Saudi Arabia

Correspondence should be addressed to Mir Shahid Satar; mirshahid261@gmail.com

Received 21 January 2022; Revised 14 March 2022; Accepted 22 March 2022; Published 4 April 2022

Academic Editor: Zheng Yan

Copyright © 2022 Mir Shahid Satar and Ghadah Alarifi. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

The research was aimed at identifying and empirically investigating the factors influencing the adoption of e-business in SMEs of Saudi Arabia. The Technology-Organization-Environment (TOE) framework was complemented with the individual context elements to develop the conceptual model for the present study. The framework was developed based on the two-pronged strategy: an extant literature review and a focus group interview with panel of experts. Subsequently, a questionnaire-based survey was conducted, and data from 111 SMEs were collected. The researchers tested the model and related hypotheses, employing multiple regression analysis. The results indicate that the firm size, competitive pressure, entrepreneur's innovativeness, and IT savviness significantly influence the e-business adoption in SMEs. The findings and conclusions of the study, as well the future research prospects, are discussed.

1. Introduction

E-business has attracted considerable attention across industries because of its ability to transform business processes, structures, and models [1]. Accordingly, the e-business has strategic advantages for small and medium enterprises (SMEs) as well [2, 3]. Nonetheless, when compared to large organizations, the global number of SMEs that have implemented e-business is relatively limited [4], with most of such SMEs are from developed countries [5].

SMEs account for a considerable portion of the overall number of firms in Saudi Arabia [6]. Nonetheless, SMEs in the Kingdom are found unable to fully utilize e-technologies due to a variety of issues [7–9]. Small businesses typically use e-business technologies on an ad hoc basis, such as developing websites and using email services [10]. As a result, it is critical to understand what specific factors influence SMEs' adoption of e-business.

Until now, the available literature on e-business adoption has been principally grounded on two major theories, i.e., diffusion of innovation (DOI) theory [11] and the tech-

nology, organization, and environment (TOE) theory [12]. The TOE theory is directly derived from the DOI concept. As a result, the TOE framework complements the DOI theory. When it comes to e-business adoption, the TOE concept is commonly employed framework in the literature [13–15]. Despite the fact that people's cultural backgrounds or ethnic features have been demonstrated to have a substantial impact on their decision to adopt such technology [16, 17], the existing literature largely ignores the impact of such factors. Moreover, the model misses elements relating to individual employee and manager characteristics [18].

The goal of this study is to examine the factors that influence SMEs in Saudi Arabia to adopt e-business. A conceptual framework was created and empirically tested in this direction. The framework was synthesized through a two-pronged strategy: at the outset, an extant literature survey was conducted to review the factors from existing studies, and subsequently, a focus group interview with a group of experts was employed to synthesize a list of relevant factors. The two-pronged strategy was chosen because of the need to synthesize the most relevant and contextual aspects of e-

business adoption among an invariably huge number of factors proposed in the existing literature.

The suggested conceptual framework corresponds to the TOE framework. However, it was complemented with the addition of an individual context. As a result, the proposed framework consists of 9 independent variables in terms of analysis (IT resources, relative advantages, firm scope, firm size, perceived financial cost, government support, competitive pressure, entrepreneur's innovativeness, and IT savviness), classified in four dimensions (technological, organizational, environmental, and individual context), with "e-business adoption" as the dependent factor. Subsequently, a structured questionnaire survey was conducted to empirically test the conceptual model. As such, the current study attains significance by virtue of its dedicated focus on SMEs in Saudi Arabia, where e-business adoption is yet to be comprehensively studied. Meanwhile, the proposed three-dimensional framework has scope for comparisons and replication in future studies. Furthermore, because the findings focus on the most important e-business adoption variables, they have significant management implications. The study will thus accordingly fulfil the need of stakeholders in developing and evaluating the e-business strategies in SMEs of Saudi Arabia.

The following sections make up the paper: the first section summarizes the existing literature and provides a critical assessment of the findings. The review of topical aspects, as well as the formation of hypotheses, is followed by a summary of the qualitative analysis for the establishment of the conceptual framework. The paper's methodology is presented in the second section, followed by a discussion of the findings. At the end of the paper, there is a general conclusion.

1.1. Theoretical Background. The advantages of using technology to capitalize on opportunities created by globalization have been advocated in the past [19]. Today, technology has improved at a rapid pace, allowing SMEs to get fast access to foreign markets [20] and offering opportunity to improve their local performance as well [21]. The strategic role of the internet has enabled firms to achieve significant cost savings [22], with the radical shift in the way they seek competitive advantages [23]. More recently, the Internet and its new technologies have been suggested to assist both established and start-up enterprises in contributing to the UN's Sustainable Development Goals [24]. Similarly, according to the World Development Report, technology is enabling firms to go global and grow faster [25]. Unlike in the past, firms are now using the electronic media to focus on strategic decisions about product creation and other unique coordination procedures [26, 27]. Consequently, the SMEs are recommended to reevaluate their strategies and upgrade their skill sets in response to the ever-increasing demand for change to gain competitive advantages in dynamic business environments [2, 28]. In this direction, e-business has emerged as a potential model to achieve operational efficiency, improve collaboration or networking, and thereby create avenues for sustainable competitive advantages in SMEs [22]. Nonetheless, in developing

countries, Internet-enabled technology adoption and dissemination are still falling short of expectations [29, 30]. This holds true for Saudi Arabian SMEs as well. Many Saudi businesses tend to outsource their e-business needs to third parties for a variety of reasons, including cost, security, and a larger consumer base [31, 32].

Nevertheless, within the developing countries, digital technologies offer a platform for SMEs to leapfrog stages of development [33] and improve their productivity [34] as well as the competitiveness [35]. Despite technology facilitating the development of electronic markets, Internet commerce, etc., a substantial percentage of SMEs is found reluctant to adopt the technology and have not capitalized on this new way of conducting business [10, 36]. This raises the question of what precise factors specifically impact SMEs' adoption of e-business. As a result, a number of studies have been undertaken in the literature to explore the e-business adoption of SMEs. For the sake of gaining a comprehensive view of the subject under examination, the key themes and antecedents emerging in this direction have been summarized in Table 1.

1.2. Summary of the Review Analysis. The following literature gaps were revealed by the review analysis:

- (i) E-business within SMEs is gradually receiving academic attention. This is evident by a growing number of e-technology studies in SME context [7, 57, 60, 78]
- (ii) The TOE framework emerges as the most comprehensive and recommended approach, as many studies have used it as a foundation for their analyses [7, 41]. However, the framework misses the vital elements relating to individual employee and manager characteristics [18]
- (iii) The empirical studies have used multitude of approaches to examine the e-business adoption factors. However, rare studies have employed explicit inclusion or exclusion criteria for factors. This represents a significant limitation in the direction of consolidating the findings
- (iv) Government support is rarely included in the analysis of extant literature [41]. Accordingly, many authors stressed the need to conduct research in this direction [45, 50]
- (v) Meanwhile, although a few studies, particularly in the Saudi Arabia context, have been conducted [7, 32, 79], they do not present a comprehensive examination of e-business adoption within such countries. For instance, the majority of these studies focus on either an internal or external set of factors, rather than both. Furthermore, these studies concentrate solely on the microstrategic aspects of e-business (such as e-commerce)
- (vi) One of the most interesting results is that existing research has found a wide range of factors that

TABLE 1: E-business adoption factors with their source reference.

E-business factors	Reference
<i>Information system/information technology</i>	
Security and privacy concern	[37]; [38]; [39].
Facilitating conditions	[40]; [41]; [39].
Compatibility	[42]; [31]; [43].
Perceived ease of use	[7]; [44]
Lack of resources	[42]; [45]; [46]; [47]; [48]; [29].
IT infrastructure	[38]; [49]; [46]; [50]; [22]; [51]; [52]; [17].
Acceptance of e-technology	[53]; [54]; [55].
Internet penetration	[51].
Technological readiness	[45]; [50]; [14]
Technology innovation	[35]; [50]; [56]; [43].
Technology integration	[35]; [14].
Internet skills	[40]; [57]; [17]; [51].
Relative advantages	[7]; [35]; [13]; [58]; [59]; [14].
<i>Firm characteristics/top management support</i>	
Perceived usefulness of the e-business	[35]; [60]; [58]; [43].
Perceived financial cost	[54]; [32]; [60]; [43]; [61].
Return on investment	[62]; [61].
Management commitment and support	[7]; [35]; [63].
Top management emphasis	[57]; [46]; [64].
Firm size	[65]; [57]; [66]; [41]; [64].
Centralized decision-making of SME owner/entrepreneur	[32]; [67]; [46]; [47].
E-business know-how	[17].
Firm scope	[57]; [68]; [51].
Age of organization	[52].
Resistant to change behaviour of entrepreneurs	[69]; [55]; [70].
Strategic vision	[35]; [71].
<i>External factors</i>	
Government resource support	[35]; [32]; [72]; [60].
Trading partner pressure	[45]; [73].
Competitive pressure	[45]; [13]; [63]; [48]; [59]
Peers and social network	[34]; [73].
Government regulatory support	[72]; [13]; [15].
Consumer willingness	[51].
<i>Individual characteristics</i>	
Locus of control	[67]; [74].
Opportunity perception	[60]; [47].
Proentrepreneurial attitude	[56]; [70].
Individual innovativeness	[35]; [75].
CEO's attitude towards innovation	[57]; [63]; [60]; [76].
CEO e-business knowledge	[57]; [63]; [60].
<i>Other factors</i>	
Language	[77]; [32].

TABLE 1: Continued.

E-business factors	Reference
Cultural environment	[52].
Socioeconomic environment	[52].
Return on investment	[62]; [61].
Social diffusion of e-business innovation	[38]; [60]; [30]; [29].
IS vendor support	[63].

influence e-business adoption. Over the time, the authors have classified these characteristics into a variety of categories. This shows that the subject is fragmented, making comparisons difficult and thus preventing the development of reliable overall findings. As a result, deciding on the most important factors is a significant challenge

The current study was formulated to overcome the inadequacies in the literature described above. The study has particularly two goals: first, to create a conceptual framework using the popular yet reliable TOE framework, which includes the important determinants of e-business adoption; and second, it attempts to test that framework using quantitative data, thus allowing for comparisons and replication studies in the future.

1.3. Conceptual Framework Development. One of the primary goals of the research is to develop a conceptual framework that clarifies the significant factors that affect e-business adoption in Saudi Arabian SMEs. A review of recent literature revealed a plethora of such factors (see Table 1). As a result, one of the most difficult tasks was deciding which criteria would be included in the suggested framework. The major goal was to add factors that were highly relevant to the study's broader context (Saudi Arabian SMEs). Therefore, prior to collecting empirical data, a qualitative analysis was undertaken to prevent the error of selecting factors lacking theoretical or empirical rationalization. This was done with the aim to improve the study's reliability. Accordingly, a focus group interview with a group of experts was conducted to assess the factors produced in Table 1 [80]. The panel consisted of 15 SMEs managers from Saudi Arabia's two largest corporate capitals, Jeddah and Riyadh (ibid). The SMEs were chosen at random from a directory provided by the general authority for small and medium enterprises (SMEA). The participating managers were given a long list of factors (Table 1), and one member of the research team served as moderator [81]. After iterative deliberation, the group unanimously agreed on 9 factors that SMEs should consider while making e-business decisions. Managers were free to suggest variables other than those on the predetermined list. All the recommended factors, on the other hand, began to correspond to the one of the predetermined categories. The procedure resulted in a list of following 9 factors which were used in the subsequent analysis.

- (1) IT resources (ITR)
- (2) Relative advantages (RA)
- (3) Firm scope (SC)
- (4) Firm size (FS)
- (5) Perceived financial cost (FC)
- (6) Government support (GS)
- (7) Competitive pressure (CP)
- (8) Entrepreneur's innovativeness (OI)
- (9) IT savviness (ITS)

The conceptual model (Figure 1) corresponds to the TOE framework. The TOE methodology was chosen since the literature strongly backs up its validity [14]. Meanwhile, it is widely recognized that a model with multiple dimensions has better explanatory ability than one with only single dimension. [29]. Further, the TOE framework adopts an interactive approach that speculates that changes in an organization are influenced not only by individual employees but also by the features of their organization [82]. As a result, the different components and their interactions can be studied in a single dynamic framework [29]. This interactive approach is well suited to explain the IT innovation adoption (ibid). Nevertheless, TOE theory is subjected to criticism. One of these, according to Ghobakhloo and Tang [18], is that the model misses elements relating to individual employee and manager characteristics. In light of the above, the present study considers the relevant individual characteristics that influence SMEs' adoption of e-business in addition to organizational, technological, and the environmental characteristics of TOE framework.

1.4. Technological Context. The technological context elements are key considerations for technology adoption and implementation in businesses [51, 57]. The authors have used different factors like facilitating IT conditions [40], IT infrastructure [57], perceived usefulness [7, 35], e-business know-how [17], security and privacy concern [39], and internet skills [17, 40, 57] in their empirical analysis. Organizations with better technology or IT infrastructure are thought to leverage e-business technologies more effectively [51]. Meanwhile, the IT resources represent the technologies (software/hardware) together with the IT human resource competencies [50]. Meanwhile, the factor of perceived usefulness or relative advantages is used as the antecedent to user acceptance of e-technology ([35]; [59]; [83]). The expected benefits of e-business adoption to the company are referred to as relative advantages [58]. The SMEs in general are not convinced or do not perceive the benefits of being the first adopter of new technologies. This behaviour of SMEs can be partly attributed to the tendency of SMEs to be driven by short-term operational efficiency rather than the strategic, long-term benefits [58, 71]. The literature confirms that the perceived benefits of e-business by SMEs are a determining factor for e-business adoption in such enter-

prises ([41]; [59]; [14]). Meanwhile, as a flip side of the comparable advantages, the prospective barriers must also be identified. Regardless of how large the benefits are, adoption is meaningless to the company if the relative advantages cannot be realized owing to a lack of resources [48]. Therefore, the available resources are precondition towards adoption of e-business.

In the present study, following the refinement of topical factors through literature review and focus group, the two factors, i.e., IT resources and relative advantages, were used to access the level of technological readiness. So, the following two hypotheses are established:

Hypothesis 1. SMEs with greater IT resources are more likely to adopt e-business.

Hypothesis 2. SMEs that see e-business as having more advantages are more likely to adopt the e-business.

1.5. Organizational Context. The organizational context is described to as the firm's availability of financial, human, and other resources and capabilities [45], which are deemed essential for e-business adoption ([29, 41, 57]). The extant literature has investigated the influence of varied organizational context elements for e-business adoption, for example, the factors of compatibility, costs, and communicability [41, 43, 54], firm size [41, 57, 64], firm scope [57], firm scope [53], employee knowledge of e-business [46, 57, 64], supply chain pressure [46, 57], resource shortage [42, 54], and lack of vision [46]. Generally, SMEs depend on structures and systems which are comparatively simpler and adaptable [84]. These unique characteristics in combination with others affect the e-technology adoption in SMEs [85].

Based on the preliminary qualitative analysis, the most significant organizational elements deemed essential for e-business adoption within Saudi Arabian SMEs are (a) firm scope, (b) firm size, and the (c) perceived financial cost.

1.6. Firm Scope. The horizontal expansion of a firm's operations, i.e., firm scope, is said to increase the external coordination costs, inventory holding costs, and the search costs in a firm [51]. As a result of the growing complexity and the resulting need to analyse more data and coordinate with other organizations, businesses are increasingly turning to e-business methods [68]. E-business lowers the cost of searching throughout the supply chain and enhances inventory management strategies [51]. As a result, new research reveals that the size of a company influences its readiness to use e-business tactics [57]. As a result, we can form the following hypothesis:

Hypothesis 3. Greater firm scope is positively associated with the e-business adoption in SMEs.

1.7. Firm Size. In general, larger companies are better able to manage their e-business adoption than smaller companies due to their unique abilities to achieve economies of scale, provide a vast resource base, have more negotiating power, and manage risks [66]. As a result, in a variety of

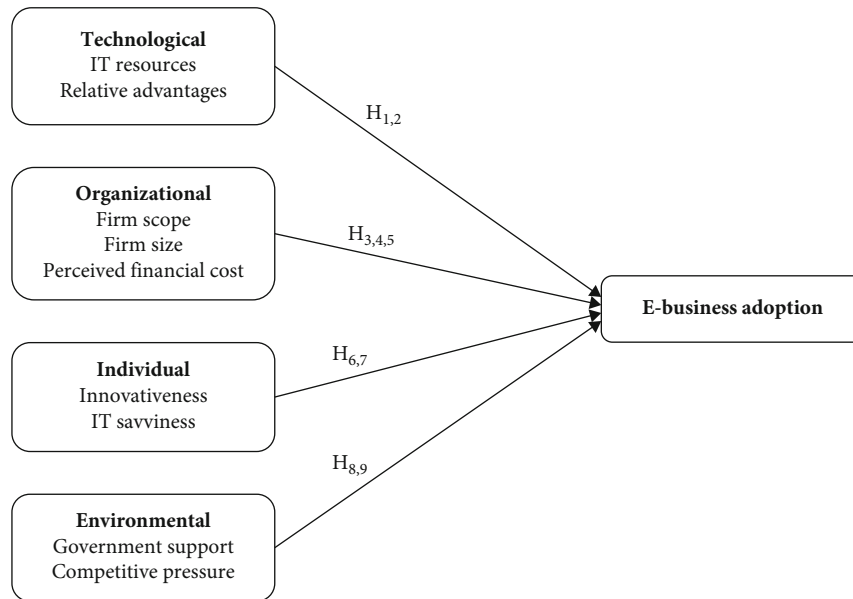


FIGURE 1: Proposed conceptual framework.

circumstances, firm size is viewed as important drivers of e-business adoption [41]. Therefore, the study hypothesized the following:

Hypothesis 4. Firm size is positively associated with e-business adoption.

1.8. Perceived Financial Cost. For SMEs, adopting and implementing new technologies can be difficult and costly [86]. In general, the firm's readiness to adopt e-technology is negatively affected by the costs [14, 60]. According to Zhu et al. [15], the expense of setting up basic equipment for online transactions, such as hardware and software installation, as well as employee training, is a barrier to certain firms embracing e-business. Therefore, the following hypothesis is established:

Hypothesis 5. SMEs who perceive higher financial cost of using e-business are less likely to adopt e-business.

1.9. Individual Context. In addition to the above technological, organizational, and environmental context, this study examines the variables pertinent to individual characteristics as well. The rationale for inclusion of individual characteristics is that due to high locus of control, the decision-making within SMEs is predominantly determined by the entrepreneur/owner himself [67, 74]. Thus, examining the motivation of small business owners or the decision-maker's cognitive style will indicate how the company will react when presented with opportunities or risks linked with e-business technology in the marketplace [47, 60]. The owner/entrepreneur orientation will determine the range of perceptions regarding the acceptance of the impact of e-business technology [76]. These perceptions might range from being proentrepreneurial to being antichange [56, 70]. The literature contains anecdotal evidence in support

of the role of owner's/entrepreneur's behaviour in technology adoption within SMEs [35, 55, 69].

The study considers the two pertinent individual characteristics of SME owners/entrepreneurs as influencing the e-business adoption decision within SMEs: the entrepreneur's innovativeness and the owner's IT savviness.

Innovativeness in an entrepreneurial perspective is referred as the individual's ability to pursue new opportunities, execute creativity, support, and experiment with new ideas and processes [87]. As a dimension of entrepreneurship orientation [88], the innovativeness is recognized as fundamental attribute for entrepreneurial action [89]. In the present context, the innovativeness relates to how quickly a SME owner/entrepreneur accepts technological innovation compared to others in the same sociocultural environment [75, 90].

Second, it is believed that user competence and expertise can aid in the general adoption of technology [91]. The owners who are computer illiterate, for example, are barriers to technology adoption [92]. When CEOs understand and realize the benefits of e-business for their companies, they are more likely to devote resources towards technology adoption [58, 63]. Therefore, the following hypotheses can be suggested:

Hypothesis 6. SMEs with IT savvy owners are more likely to adopt e-business.

Hypothesis 7. SMEs with owners demonstrating more innovativeness are more likely to adopt the e-business.

1.10. Environmental Context. The literature has described varied aspects of environmental context which influence the e-business or technology adoption and implementation within the firms. In general, the environmental context implies the impact of external environment which includes

the competitors, customers, and the government policies and regulations [45]. Accordingly, the literature has investigated the influence of industry pressure which collectively includes the trading partner influence, competitive pressure, and the government policies [93]. Several previous studies found positive relation between industry pressure and e-business adoption [63]; [59]. For example, the both suppliers and customers can impact e-business technology adoption [73]. Alternatively, the competitive landscape puts pressure on the SMEs to adopt similar technologies to sustain the business relationships [48].

The government support, industry competition, and the firm's globalization orientation were found as relevant environmental characteristics impacting the e-business adoption by SMEs [72]. Legislative support for e-business, openness of e-business legislation, and legal protection for businesses while making purchases over the internet are all examples of government regulatory assistance. Regulatory support from the government has been recognized as a key driver of e-business adoption in the previous studies [13, 15]. However, it is not acknowledged in the literature in the context of Saudi Arabian SMEs. In the context of the present study, government support represents both the government resource support and the government regulatory support.

Based on the two-phase qualitative analysis, this study used two primary dimensions to study the construct of "environmental context" in e-business adoption, i.e., (a) government support and (b) competitive pressure. Therefore:

Hypothesis 8. The government support is positively associated with the e-business adoption in SMEs.

Hypothesis 9. The competitive pressure positively fosters the e-business adoption within SMEs.

2. Methodology

The research was motivated by the need to produce a comprehensive yet significant set of factors which influence the e-business adoption within Saudi Arabian SMEs. Given the plethora of factors proposed in the existing literature, the study first used qualitative analysis (expert opinion) to narrow the huge list and establish a conceptual framework (Figure 1). The subsequent methodology was structured as first constructing a questionnaire, establishing its content validity, followed by the data collection. The analysis began with assessing the factors' dependability and validity, followed by an examination of the proposed hypotheses.

Based on the scale items developed from the existing literature, a questionnaire was created (see Table 2). The degree of responses was measured using a five-point Likert scale with options ranging from "strongly agree" to "strongly disagree." To avoid linguistic differences, the questionnaire was translated into Arabic [94]. Following that, the questionnaire was distributed to three managers and three academics to ensure the clarity and content validity of the measurement items [95]. Their suggestions were used to improve the clarity and comprehension of the questionnaire's contents. The SMEs were chosen at random from a

directory provided by the SMEA. The questionnaire was distributed online via Google Forms, a simple author electronic form [96]. For geographically dispersed SMEs, online web distribution was deemed appropriate due to its low cost and time effectiveness. Furthermore, the current COVID-19 conditions limited the use of nononline data collection methods.

Between April 2020 and October 2021, the survey was sent to the owners and managers of 322 SMEs. Despite multiple follow-ups, only 111 valid questionnaires survived the data collection process. The questionnaire collected two data blocks: (1) the demographic profile of each respondent/firm (respondent's position in the firm, number of years in business, number of employees, and type of business sector) and (2) the target questions on e-business adoption (see Table 3).

2.1. Measurements

2.1.1. Dependent Variable. E-business adoption is the dependent variable, which as per insights from Gibbs and Kraemer [98] is proxied by the scope of e-commerce use by SMEs in this research. Respondents were asked whether they use e-business technology in their operations. The scores (yes=1, no=0) were added up, and the Gibbs and Kraemer [98] study's metric was used. The measurement approach is in line with the existing measures of studies like Zhu et al. [51].

2.1.2. Independent Variables. The present study investigates 9 independent factors with one dependent factor of e-business adoption (see Figure 1). All the other factors were assessed with multiple items adopted from extant literature (see Table 2). The measurement scale was the 5-point Likert scale for all these factors.

2.1.3. Regression Analysis. For the current study, a multiple regression analysis was used to investigate the relationship between the dependent and independent variables [99, 100]. The regression analysis is appropriate for interpreting what might be causing the variation in the dependent variable by understanding the functional relationships between the dependent and independent variables [101, 102]. As a result, multiple regression can be approached using various analytical strategies such as simultaneous, hierarchical, and stepwise regression [103]. The present study examined all independent variables of e-business adoption simultaneously and on an equal footing. The simultaneous regression approach is considered appropriate when there is no logical or theoretical basis (either in terms of the data's hypothetical causal structure or its importance to the research objectives) for prioritizing one variable over the other [104]. With these considerations, the simultaneous model of multiple regression has been used in diverse contexts (see [105, 106]). Furthermore, the other multiple regression approaches like hierarchical and stepwise regression are considered inappropriate in situations where there is little theory to guide prioritization among a pool of potential independent variables. For example, in stepwise regression, the significance test for determining the individual independent variable's contribution to R^2 is conducted without the knowledge of other tests conducted at the same time for the other competing

TABLE 2: Measurement items.

Factor	Number of items	Source
IT resources	4	[46]; Kuan and Chau, 2001; [47]
Relative advantage	3	[55]; [73]; Kuan and Chau, 2001
Firm scope	2	[91]; [47]
Firm size	3	[60]; [61]
Perceived financial cost	3	[55]; [15]
Owner's innovativeness	4	[70]; [83]
Owner's IT savviness	4	[55]; [86]; [87]
Government support	4	[42]; [55]
Competitive pressure	4	[42]; [60]; Hsu et al., 2014; [55]; Kuan and Chau, 2001

TABLE 3: Respondent SME profile.

Item	Category	Number	Percentage (%)
Respondent's position	Owner	58	52
	Not owner (managers/assistant managers)	53	48
	Total	111	100
Firm's duration in the industry	1 year	24	21
	2-5 years	39	36
	Greater than 5 years	48	43
	Total	111	100
Number of employees	2-49	71	64
	50-200	40	36
	Total	111	100
Business sector	Manufacturing	34	31
	Retail/wholesale	16	14
	Service	61	55
	Total	111	100.0

independent variables. This limits the statistical validity of the multiple R^2 at each step [104]; [103].

2.1.4. Tests for Assumptions of Multiple Regression. At the outset, the items were checked for data outliers like normality, linearity, and multicollinearity in order to fulfil the requirements of multiple regression analysis [95]. To test for the assumption of absence of multicollinearity problem, a "collinearity diagnostic" measurement was undertaken. The results for tolerance value are approaching 1, and the variance inflation factor (VIF) are less than 2. The results of both these indices correspond to the accepted reference ranges [95], thus indicating that there was no multicollinearity problem among the independent variables in this study. Further, the independence of error terms was checked through conducting Durbin-Watson test [107]. The Durbin-Watson test scores in the study indicated that there was no autocorrelation (reference range between 1.50 and 2.50 as per [107]), ensuring that the assumptions of independence of error terms are not violated. Additionally, the collinearity assumptions must be met. These assumptions are relevant for the dependent variable as well as the independent variables, and the relationship between the dependent and independent variables is linear. The independent assumption was met in this study because

TABLE 4: Model summary.

Model	R	R Square	Adjusted R square	Std. error of the estimate
1	.622 ^a	.388	0.333	1.51823

TABLE 5: ANOVA.

Model	Sum of squares	df	Mean square	F	Sig.
Regression	395.079	9	43.897	7.060	.000 ^b
Residual	627.934	101	6.217		
Total	1023.013	110			

the SME samples were drawn at random from the general population of SMEs in Saudi Arabia.

3. Results and Analysis

According to the regression results produced in Table 4, the value of adjusted R square is (adjusted $R^2 = .333$ and significance value = 0.00), suggesting that the 33.3 percent of the

TABLE 6: Coefficients.

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.	Tolerance	VIF
	B	Std. error	Beta				
(Constant)	-1.775	.979			.050		
IT resources (ITR)	.014	.020	.144	0.700	.501	.666	1.400
Relative advantages (RA)	.015	.028	.041	0.535	.605	.673	1.452
Firm scope (SC)	.028	.013	.092	2.153	.5971	.601	1.008
Firm size (FS)	.174	.011	.281	15.818	.000	.725	1.083
Perceived financial cost (FC)	.164	.125	.074	1.312	.221	.644	1.500
Government support (GS)	.015	.019	.003	0.019	.985	.801	1.323
Competitive pressure (CP)	.088	.021	.143	4.190	.002341	.722	1.830
Entrepreneur's innovativeness (OI)	.121	.010	.059	12.100	.000	.946	1.342
IT savviness (ITS)	.080	.038	.152	2.105	.001	.824	1.510

$F = 7.060$, and Durbin-Watson = 1.784.

variance in the dependent variable (e-business adoption) is explained by the independent variables collectively (Table 5). All the independent factors have a positive association with the dependent variable, as seen in Table 6. Notwithstanding this, only four of the variables (firm size, competitive pressure, entrepreneur's innovativeness, and IT savviness) have a significance level of less than 0.05, while the others have a significance level larger than 0.05. Alternatively, it can be deduced that just four of the nine hypothesized variables have a positive and statistically significant influence on e-business adoption for Saudi Arabian SMEs. As a result, the Hypotheses Hypothesis 4, Hypothesis 6, Hypothesis 7, and Hypothesis 9 are confirmed.

According to the results from the multiple regression analysis, the correlations of IT resources and relative advantages with e-business adoption are not statistically significant. This is contrary to the existing evidence [7, 35, 41]. One probable explanation is that Saudi Arabia's general business climate has significantly improved with the commencement of strategic programs targeted at spreading technical innovation and enhancing the overall business climate (e.g., see Vision-2030; [30, 108]). This resulted in improved recognition and understanding of the significance of e-technology for business development [30].

Among the variables of organizational context, only the firm size demonstrated a positive and significant relationship with the dependent variable of e-business adoption. This corresponds to the existing evidence in literature where firm size is predicted as a strong determinant of e-business adoption in varied contexts [41, 64]. The correlation between firm scope and perceived financial cost, on the other hand, is not statistically significant. This contravenes with most of the evidence in the existing literature ([32, 54, 57, 68]). One of the possible justifications of above finding is the fact that the cost of e-business-related equipment (like hardware and software) is not excessively high for SMEs. These costs have steadily decreased with the advancement of computers and availability of ready-to-use and convenient software's [109]. Meanwhile, in the Saudi Arabian context, there have been numerous recent government-led

technology-intensive programs and initiatives (under Vision 2030) aimed at assisting national SMEs in achieving competitiveness and improving business climate and technology investment [108, 110], thus resulting in improved recognition and understanding of the significance of e-technology for business development [30]. Within the environmental category, only the factor of competitive pressure demonstrated a positive and significant creation with the dependent variable of e-business adoption. This is in line with the existing evidence in the literature [93] where the competitive business and industry landscape is argued to pressurize the SMEs to adopt technologies for competitive advantage [48, 72]. Meanwhile, the nonsignificant results of government support contravene with many prior studies [50]. The inconsistent results could be explained by the diverse contexts of each investigation. Subsequently, the present studies confirmed the positive and statistically significant results for individual level factors of entrepreneur's innovativeness and IT savviness. The result partly corresponds to the existing literature, such as AlBar and Hoque [35], Morteza et al. [91], and Ifinedo [63]. These results establish the high significance of individual characteristics in determining the e-business adoption within SMEs.

4. Conclusion

E-business has attracted considerable attention across industries because of its ability to transform business processes, structures, and models [1]. Accordingly, the e-business has strategic advantages for SMEs as well ([2]; 2003; [3]). The broad awareness and understanding of the different antecedents of e-business adoption are therefore crucial for SMEs that was aimed at exploiting e-business advantages. The current research complements the minimal empirical work that has been done in this area, specifically in the context of Saudi Arabian SME's. Accordingly, the primary aim of this study was to investigate the factors that influence SMEs in their adoption of e-business technologies in Saudi Arabia. A conceptual framework was created and empirically tested in this direction. The framework was synthesized through a two-

pronged strategy: at the outset, an extant literature survey was conducted to review the factors from existing studies, and subsequently, a focus group interview with a group of experts was employed to synthesize a list of relevant factors. The two-pronged strategy was chosen because of the need to synthesize the most relevant and contextual aspects of e-business adoption among an invariably huge number of factors proposed in the existing literature. The suggested conceptual framework corresponds to the TOE framework. However, it was complemented with the addition of an individual context dimension. As a result, the proposed framework consists of 9 independent variables in terms of analysis (IT resources, relative advantages, firm scope, firm size, perceived financial cost, government support, competitive pressure, entrepreneur's innovativeness, and IT savviness), classified into four dimensions (technological, organizational, environmental, and individual context), with the "e-business adoption" as the dependent factor. Subsequently, a structured questionnaire survey was conducted to empirically test the conceptual model and hypotheses. The multiple regression analysis revealed that the adoption of e-business by SMEs in Saudi Arabia is influenced by several factors which include firm size, competitive pressure, owner's/entrepreneur's innovativeness, and IT savviness.

4.1. Implications for Research. The current research suggested an improved conceptual framework that incorporates the essential aspects related to e-business adoption, thus contributing to the existing e-business literature and allowing for comparisons and future replication. Additionally, the study focuses on the empirical investigation of the e-business determinants within SMEs by integrating and improving the well-known TOE theory. The study in total identified nine factors as influencing the e-business adoption within SMEs of Saudi Arabia. However, only four of them have been proved as significant. Earlier studies had missed a comprehensive examination of such factors especially in the context of Saudi Arabian SMEs. The identified factors are thoroughly mapped in the previous studies which examine the e-business adoption within SMEs using the TOE framework. Further, the application of both quantitative and qualitative approaches is the distinctive approach of this study which can be replicated in future research. Similarly, future studies can examine the role of government support in greater depth, as the current study failed to confirm its relationship with e-business adoption. Additionally, more meta-analytical approaches can be adopted to further investigate the identified factors in different contexts and countries.

4.2. Implications for Practice. The results obtained from the proposed framework are relevant for both SMEs and the government of Saudi Arabia (or any other similar country). The entrepreneurs, owners, managers, and other practitioners can concentrate on the factors characterizing their individual, organizational, and environmental context to develop efficient strategies and plans for e-business adoption. Specifically, the practitioners may be paying attention to the main drivers of e-business adoption including

owner's/entrepreneur's innovativeness and IT savviness, competitive pressure from the supply chain, and the firm size. This may be intriguing for practitioners to introspect the items which can improve the e-business knowledge, skills, and abilities of SME owners/entrepreneurs, while paying thorough attention to the competitive demands from customers, competitors, and other supply chain partners. Similarly, the significance of the firm size implies that managers of SMEs must be encouraged to take initiatives in diverse business activities.

The factors of relative advantages, firm scope, perceived financial cost, IT resources, and government support yielded insignificant results. The relative advantages, IT resources, and financial cost may be appealing to SME owners/managers who believe that e-business adoption is not simply an unjustified expense, but rather a requirement in today's pursuits of competitive advantages. Nonetheless, depending on managerial perceptions, these factors may be perceived as latent inhibitors. Meanwhile, while the government's support is found to be insignificant in the current study, this still requires further investigation. This could be interesting for policymakers in developing countries to provide regulatory and resource support to facilitate e-business within their countries.

4.3. Limitations and Future Research. Even though the study outcomes have important managerial and academic implications, they are not devoid of limitations. Firstly, due to relatively small sample size, the outcomes should be generalized with caution. Secondly, while the study included SMEs from various socioeconomic sectors in Saudi Arabia, it did not represent all sectors and could not elicit an equal proportion of responses within included sectors. Thus, on account of disproportional representation, the application of results is limited. Accordingly, the current study's replication can be tested in larger and more representative samples within Saudi Arabia or any other developing country. The results can be further tested for greater reliability and validity employing more rigorous quantitative approaches like confirmatory factor analysis and structure equation modelling. Finally, but certainly not least, the project was partially implemented during the COVID-19 pandemic. We acknowledge that the corona pandemic, as well as the individual and social restrictions that followed, may have influenced people's attitudes, perceptions, and behaviours toward business and entrepreneurship and technology in general. This might have favourably or unfavourably influenced the managerial/entrepreneurial perceptions towards e-business implementation.

Data Availability

Data is available on request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

The authors extend their appreciation to the Deputyship for Research & Innovation, Ministry of Education in Saudi Arabia for funding this research work through the project number 7997.

References

- [1] M. Neykova, "A perception of an overall concept for e-business systems in the organizations," *Икономика и управление*, vol. 16, no. 2, pp. 104–111, 2019.
- [2] N. F. Ledwaba, G. P. Pelsler, and O. Fatoki, "The use and benefits of e-technology business applications," in *IPADA Conference Proceedings*, pp. 16–22, 2019.
- [3] P. O. H. Putra and H. B. Santoso, "Contextual factors and performance impact of e-business use in Indonesian small and medium enterprises (SMEs)," *Heliyon*, vol. 6, no. 3, article e03568, 2020.
- [4] European Commission, *Digital Economy and Society Index (DESI) 2020-Integration of*, 2020.
- [5] F. Arslan, K. K. Bagchi, and P. Kirs, "Factors implicated with firm-level ICT use in developing economies," *Journal of Global Information Technology Management*, vol. 22, no. 3, pp. 179–207, 2019.
- [6] Smea, *About Us*, 2017, January 2021, <https://smea.gov.sa/en/about>.
- [7] S. S. Abed, "Social commerce adoption using TOE framework: an empirical investigation of Saudi Arabian SMEs," *International Journal of Information Management*, vol. 53, no. 102118, 2020.
- [8] J. Alzahrani, "The impact of e-commerce adoption on business strategy in Saudi Arabian small and medium enterprises (SMEs)," *Review of Economics and Political Science*, vol. 4, no. 1, pp. 73–88, 2019.
- [9] R. S. D. Al-Tayyar, A. R. B. Abdullah, A. A. Rahman, and M. H. Ali, "Challenges and obstacles facing SMEs in the adoption of e-commerce in developing countries; a case of Saudi Arabia," *Studies of Applied Economics*, vol. 39, no. 4, 2021.
- [10] M. Taylor and A. Murphy, "SMEs and E-business," *Journal of Small Business and Enterprise Development*, vol. 11, no. 3, pp. 280–289, 2004.
- [11] E. M. Rogers, *Diffusion of Innovations*, Simon and Schuster, New York, 5th ed edition, 1995.
- [12] L. Tornatzky and M. Fleischer, *The Process of Technology Innovation*, Lexington Books, Lexington, MA, 1990.
- [13] P. F. Hsu, K. L. Kraemer, and D. Dunkle, "Determinants of e-business use in U.S. firms," *International Journal of Electronic Commerce*, vol. 10, no. 4, pp. 9–45, 2006.
- [14] T. Oliveira and M. F. Martins, "Understanding e-business adoption across industries in European countries," *Industrial Management & Data Systems*, vol. 110, no. 9, pp. 1337–1354, 2010.
- [15] K. Zhu, K. L. Kraemer, and S. Xu, "The process of innovation assimilation by firms in different countries: a technology diffusion perspective on e-business," *Management Science*, vol. 52, no. 10, pp. 1557–1576, 2006.
- [16] R. Darioshi and E. Lahav, "The impact of technology on the human decision-making process," *Human Behavior and Emerging Technologies*, vol. 3, no. 3, pp. 391–400, 2021.
- [17] H. Ongori, "Role of information communication technologies adoption in SMEs: evidence from Botswana," *Research Journal of Information Technology*, vol. 1, no. 2, pp. 79–85, 2009.
- [18] M. Ghobakhloo and S. H. Tang, "The role of owner/manager in adoption of electronic commerce in small businesses," *Journal of Small Business and Enterprise Development*, vol. 20, no. 4, pp. 754–787, 2013.
- [19] T. Levitt, "The globalization of markets," *Readings in International Business: A Decision Approach*, vol. 249, no. 2, pp. 249–252, 1993.
- [20] N. R. Moşteanu, "International financial markets face to face with artificial intelligence and digital era," *Theoretical and Applied Economics*, vol. 26, no. 3, pp. 341–354, 2019.
- [21] J. P. Shetty and R. Panda, "An overview of cloud computing in SMEs," *Journal of Global Entrepreneurship Research*, pp. 1–14, 2021.
- [22] K. S. Tan, S. C. Chong, B. Lin, and U. C. Eze, "Internet-based ICT adoption among SMEs," *Journal of Enterprise Information Management*, vol. 23, no. 1, pp. 27–55, 2010.
- [23] Wieland KMOECD (Organisation for Economic Cooperation and Development), "Key issues for digital transformation in the G20," in *Report Prepared for a Joint G20 German Presidency/OECD Conference*, Berlin, 2017 <https://www.oecd.org/g20/key-issues-for-digital-transformation-in-the-g20.Pdf>.
- [24] C. de Villiers, S. Kuruppu, and D. Dissanayake, "A (new) role for business – promoting the United Nations' sustainable development goals through the internet-of-things and blockchain technology," *Journal of business research*, vol. 131, pp. 598–609, 2021.
- [25] World Bank, *The Changing Nature of Work*, World Development Report, 2019, <http://www.worldbank.org/en/publication/>.
- [26] T. Haaker, P. T. M. Ly, N. Nguyen-Thanh, and H. T. H. Nguyen, "Business model innovation through the application of the internet-of-things: a comparative analysis," *Journal of Business Research*, vol. 126, no. 6, pp. 126–136, 2021.
- [27] A. Paul and R. Jeyaraj, "Internet of things: a primer," *Human Behavior and Emerging Technologies*, vol. 1, no. 1, pp. 37–47, 2019.
- [28] M. S. Satar, G. Alarifi, M. Asad, and B. Bahrain, "Gaining Performance among Tobacco Sector Small and Medium Enterprises through Market," *Tobacco Regulatory Science (TRS)*, vol. 7, no. 6-1, pp. 6879–6887, 2021.
- [29] A. Molla and P. S. Licker, "Ecommerce adoption in developing countries: a model and instrument," *Information and Management*, vol. 42, no. 6, pp. 877–899, 2005.
- [30] D. Radcliffe and P. Bruni, *State of social media, Middle East: 2018*, Middle East, 2018.
- [31] A. Alkalid, *The value of retail sector across the internet in Saudi Arabia*, Alriyadh Newspaper, 2010, October 2010, <http://www.alriyadh.com/2010/07/07/article541503>.
- [32] A. A. Bahaddad, R. AlGhamdi, and S. Alkhalaf, "Adoption factors for E-malls in the SME sector in Saudi Arabia," 2015, <https://arxiv.org/abs/1504.01112>.
- [33] B. Mbuyisa and A. Leonard, "The role of ICT use in SMEs towards poverty reduction: a systematic literature review," *Journal of International Development*, vol. 29, no. 2, pp. 159–197, 2017.

- [34] S. Z. Ahmad, A. R. Abu Bakar, T. M. Faziharudean, and K. A. Mohamad Zaki, "An empirical study of factors affecting e-commerce adoption among small- and medium-sized enterprises in a developing country: evidence from Malaysia," *Information Technology for Development*, vol. 21, no. 4, pp. 555–572, 2015.
- [35] A. M. AlBar and M. R. Hoque, "Factors affecting the adoption of information and communication technology in small and medium enterprises: a perspective from rural Saudi Arabia," *Information Technology for Development*, vol. 25, no. 4, pp. 715–738, 2019.
- [36] B. Ramdani, S. Raja, and M. Kayumova, "Digital innovation in SMEs: a systematic review, synthesis and research agenda," *Information Technology for Development*, pp. 1–25, 2022.
- [37] I. M. Alharbi, S. Zyngier, and C. Hodkinson, "Privacy by design and customers' perceived privacy and security concerns in the success of e-commerce," *Journal of Enterprise Information Management*, vol. 26, no. 6, pp. 702–718, 2013.
- [38] A. M. Aljefri, *Impact of Electronic Commerce on the Community in the Kingdom of Saudi Arabia*, 2003, May 2021, <http://www.minshawi.com/other/e-commerce-in-sa.htm>.
- [39] S. H. Kim, S. Y. Jang, and K. H. Yang, "Analysis of the determinants of software-as-a-service adoption in small businesses: risks, benefits, and organizational and environmental factors," *Journal of Small Business Management*, vol. 55, no. 2, pp. 303–325, 2017.
- [40] D. Al-Jumeily, A. Hussain, and S. Crate, "The impact of cultural factors on technology acceptance, students point of view," in *Proceedings of the International Conference on Frontiers in Education: Computer Science and Computer Engineering (FECS) (p. 1). The Steering Committee of The World Congress in Computer Science, Computer Engineering and Applied Computing (WorldComp)*, 2014.
- [41] V. Ilin, J. Ivetić, and D. Simić, "Understanding the determinants of e-business adoption in ERP-enabled firms and non-ERP-enabled firms: a case study of the Western Balkan Peninsula," *Technological Forecasting and Social Change*, vol. 125, pp. 206–223, 2017.
- [42] A. Ahani, N. Z. A. Rahim, and M. Nilashi, "Forecasting social CRM adoption in SMEs: a combined SEM-neural network method," *Computers in Human Behavior*, vol. 75, no. 1, pp. 560–578, 2017.
- [43] J. Y. Thong, "An integrated model of information systems adoption in small businesses," *Journal of Management Information Systems*, vol. 15, no. 4, pp. 187–214, 1999.
- [44] D. A. Almajali, R. Masa'deh, and A. Tarhini, "Antecedents of ERP systems implementation success: a study on Jordanian healthcare sector," *Journal of Enterprise Information Management*, vol. 29, no. 4, pp. 549–565, 2016.
- [45] H. L. Chang, "A roadmap to adopting emerging technology in e-business: an empirical study," *Information Systems and e-Business Management*, vol. 8, no. 2, pp. 103–130, 2010.
- [46] T. S. C. Davies, A. Burns, P. Hodges et al., *Trading Electronically – An Ecommerce Premier for Small Businesses, Ecommerce Innovation Centre*, 2001, December 2020, <http://www.ecommerce.ac.uk/pdf/trading.PDF>.
- [47] I. Fillis, U. Johansson, and B. Wagner, "Factors impacting on e-business adoption and development in the smaller firm," *International Journal of Entrepreneurial Behaviour and Research*, vol. 10, no. 3, pp. 178–191, 2004.
- [48] K. K. Kuan and P. Y. Chau, "A perception-based model for EDI adoption in small businesses using a technology–organization–environment framework," *Information & management*, vol. 38, no. 8, pp. 507–521, 2001.
- [49] Citc, *E-commerce in Saudi Arabia*, 2017, November 2020, http://www.citc.gov.sa/ar/reportsandstudies/reports/documents/CITC_ECOMMERCE_2017_ARABIC.PDF.
- [50] V. K. Durbhakula and D. J. Kim, "E-business for nations: a study of national level E-business adoption factors using country characteristics-business-technology-government framework," *Journal of Theoretical and Applied Electronic Commerce Research*, vol. 6, no. 3, pp. 3–4, 2011.
- [51] K. Zhu, K. Kraemer, and S. Xu, "Electronic business adoption by European firms: a cross-country assessment of the facilitators and inhibitors," *European Journal of Information Systems*, vol. 12, no. 4, pp. 251–268, 2003.
- [52] W. Olatokun and B. Bankole, "Factors influencing electronic business technologies adoption and use by small and medium scale enterprises (SMEs) in a Nigerian municipality," *The Journal of Internet Banking and Commerce*, vol. 16, no. 3, pp. 1–26, 1970.
- [53] T. AboZaid, "The current situation of electronic commerce (EC) and its local and Arabic challenges," *Tishreen University Journal for Studies and Scientific Research-Economic and Legal Science Series*, vol. 27, no. 4, pp. 74–88, 2005.
- [54] S. Alfuraih, "E-commerce and e-commerce fraud in Saudi Arabia: a case study," in *2008 International Conference on Information Security and Assurance (ISA 2008)*, pp. 176–180, Busan, Korea (South), 2008.
- [55] R. M. Cyert and J. G. March, *A Behavioural Theory of the Firm*, Blackwell, Oxford, 2nd edition, 2002.
- [56] A. Jeyaraj, J. W. Rottman, and M. C. Lacity, "A review of the predictors, linkages, and biases in IT innovation adoption research," *Journal of Information Technology*, vol. 21, no. 1, pp. 1–23, 2006.
- [57] P. Chatzoglou and D. Chatzoudes, "Factors affecting e-business adoption in SMEs: an empirical research," *Journal of Enterprise Information Management*, vol. 29, no. 3, pp. 327–358, 2016.
- [58] C. L. Lacovou, I. Benbasat, and A. A. Dexter, "Electric data inter-change and small organization: adoption and impact of technology," *MIS Quarterly*, vol. 19, no. 4, pp. 465–485, 2005.
- [59] H. F. Lin, "Understanding the determinants of electronic supply chain management system adoption: Using the technology–organization–environment framework," *Technological Forecasting and Social Change*, vol. 86, pp. 80–92, 2014.
- [60] B. N. Jeon, K. S. Han, and M. J. Lee, "Determining factors for the adoption of e-business: the case of SMEs in Korea," *Applied Economics*, vol. 38, no. 16, pp. 1905–1916, 2006.
- [61] R. Weiber and T. Kollmann, "Competitive advantages in virtual markets-perspectives of 'information-based marketing' in cyberspace," *European Journal of Marketing*, vol. 32, no. 7/8, pp. 603–615, 1998.
- [62] J. Akkeren and A. L. Cavaye, "Factors affecting entry-level internet technology adoption by small business in Australia: an empirical study," in *Proceedings 10th Australasian Conference on Information Systems*, pp. 1–3, 2000.
- [63] P. Ifinedo, "Internet/e-business technologies acceptance in Canada's SMEs: an exploratory investigation," *Internet Research*, vol. 21, no. 3, pp. 255–281, 2011.

- [64] M. Jehangir, P. D. D. Dominic, N. Langove, and A. Khan, "Managerial expertise, top management support and learning capacity impact on e-commerce capability and business performance," *International Journal of Business Innovation and Research*, vol. 6, no. 4, pp. 379–390, 2012.
- [65] V. Bordonaba-Juste, L. Lucia-Palacios, and Y. Polo-Redondo, "Antecedents and consequences of e-business adoption for European retailers," *Internet Research*, vol. 22, no. 5, pp. 532–550, 2012.
- [66] B. Densmore, *EDI Vs. the New Kids, Computerworld Emmerce*, 1998, <http://www.computerworld.com/home/emmerce.nsf/all/980406edi>.
- [67] C. Boone, B. De Brabander, and J. Hellemans, "Research note: CEO locus of control and small firm performance," *Organization Studies*, vol. 21, no. 3, pp. 641–646, 2000.
- [68] C. Shapiro and H. R. Varian, *Information Rules: A Strategic Guide to the Network Economy*, Harvard Business Press, MA, Boston, USA, 2013.
- [69] Y. Al-Saggaf, "The effect of online community on offline community in Saudi Arabia," *The Electronic Journal of Information Systems in Developing Countries*, vol. 16, no. 1, pp. 1–16, 2004.
- [70] M. Yunis, A. N. El-Kassar, and A. Tarhini, "Impact of ICT-based innovations on organizational performance," *Journal of Enterprise Information Management*, vol. 30, no. 1, pp. 122–141, 2017.
- [71] M. Levy, P. Powell, and P. Yetton, "The dynamics of SME information systems," *Small Business Economics*, vol. 19, no. 4, pp. 341–354, 2002.
- [72] J. Child, L. Chung, and H. Davies, "The performance of cross-border units in China: a test of natural selection, strategic choice and contingency theories," *Journal of International Business Studies*, vol. 34, no. 3, pp. 242–254, 2003.
- [73] A. Y. L. Chong, K. B. Ooi, B. Lin, and S. Y. Tang, "Influence of interorganizational relationships on SMEs' e-business adoption," *Internet Research*, vol. 19, no. 3, pp. 313–331, 2009.
- [74] T. H. Nguyen and T. S. Waring, "The adoption of customer relationship management (CRM) technology in SMEs," *Journal of Small Business and Enterprise Development*, vol. 20, no. 4, pp. 824–848, 2013.
- [75] A. Marcati, G. Guido, and A. M. Peluso, "The role of SME entrepreneurs' innovativeness and personality in the adoption of innovations," *Research Policy*, vol. 37, no. 9, pp. 1579–1590, 2008.
- [76] M. Johnson, "Industrial e-market adoption: an exploratory study of organisational change issues," *International Journal of Business Innovation and Research*, vol. 4, no. 6, pp. 535–559, 2010.
- [77] R. AlGhamdi, S. Drew, and W. Al-Ghaith, "Factors influencing e-commerce adoption by retailers in Saudi Arabia: a qualitative analysis," *The Electronic Journal of Information Systems in Developing Countries*, vol. 47, no. 1, pp. 1–23, 2011.
- [78] M. Ghobakhloo, D. Arias-Aranda, and J. Benitez-Amado, "Adoption of e-commerce applications in SMEs," *Industrial Management & Data Systems*, vol. 111, no. 8, pp. 1238–1269, 2011.
- [79] S. Al-Hudhaif and A. Alkubeyyer, "E-commerce adoption factors in Saudi Arabia," *International Journal of Business and Management*, vol. 6, no. 9, 2011.
- [80] P. Liamputtong, *Focus Group Methodology: Principle and Practice*, Sage Publications, London, UK, 2011.
- [81] B. L. Berg, H. Lune, and H. Lune, *Qualitative Research Methods for the Social Sciences*, Pearson, MA: Boston, USA, 2004.
- [82] M. A. Hameed, S. Counsell, and S. Swift, "A meta-analysis of relationships between organizational characteristics and IT innovation adoption in organizations," *Information & Management*, vol. 49, no. 5, pp. 218–232, 2012.
- [83] R. Zhao, "Technology and economic behavior: a theoretical framework," *Human Behavior and Emerging Technologies*, vol. 2, no. 4, pp. 336–342, 2020.
- [84] C. Carmichael, C. Turgoose, M. O. Gray, C. Todd, and S. Nadin, "Innovation and SMEs," *Industry and Higher Education*, vol. 14, no. 4, pp. 244–248, 2000.
- [85] P. McDonagh and A. Prothero, "Euroclicking and the Irish SME: prepared for ecommerce and the single currency," *Irish Marketing Review*, vol. 13, no. 1, pp. 21–33, 2000.
- [86] M. J. Pan and W. Y. Jang, "Determinants of the adoption of enterprise resource planning within the technology-organization-environment framework: Taiwan's communications industry," *Journal of Computer Information Systems*, vol. 48, no. 3, pp. 94–102, 2008.
- [87] S. N. Bhuian, O. C. Richard, and H. M. Shamma, "Entrepreneurial orientation and organisational performance: the role of managerial traits," *Journal for International Business and Entrepreneurship Development*, vol. 6, no. 3/4, pp. 203–223, 2012.
- [88] M. S. Satar and S. Natasha, "Individual social entrepreneurship orientation: towards development of a measurement scale," *Asia Pacific Journal of Innovation and Entrepreneurship*, vol. 13, no. 1, pp. 49–72, 2019.
- [89] M. L. Harris and S. G. Gibson, "Examining the entrepreneurial attitudes of US business students," *Education & Training*, vol. 50, no. 7, pp. 568–581, 2008.
- [90] Z. Yan, R. Gaspar, and T. Zhu, "Emerging technologies, human behavior, and human behavior and emerging technologies," *Human Behavior and Emerging Technologies*, vol. 1, no. 1, pp. 4–6, 2019.
- [91] G. Morteza, A.-A. Daniel, and B.-A. Jose, "Adoption of e-commerce applications in SMEs," *Industrial Management & Data Systems*, vol. 111, no. 8, pp. 1238–1269, 2011.
- [92] J. Y. Thong and C. S. Yap, "CEO characteristics, organizational characteristics and information technology adoption in small businesses," *Omega*, vol. 23, no. 4, pp. 429–442, 1995.
- [93] P. F. Hsu, S. Ray, and Y. Y. Li-Hsieh, "Examining cloud computing adoption intention, pricing mechanism, and deployment model," *International Journal of Information Management*, vol. 34, no. 4, pp. 474–488, 2014.
- [94] V. Weerakkody, Y. K. Dwivedi, and A. Kurunananda, "Implementing e-government in Sri Lanka: lessons from the UK," *Information Technology for Development*, vol. 15, no. 3, pp. 171–192, 2009.
- [95] J. F. Hair, W. C. Black, B. J. Babin, and R. E. Anderson, *Multivariate Data Analysis: Pearson New International Edition*, Drexel University, Pearson Higher Ed, 2013.
- [96] C. M. Fleming and M. Bowden, "Web-based surveys as an alternative to traditional mail methods," *Journal of Environmental Management*, vol. 90, no. 1, pp. 284–292, 2009.
- [97] C. Steinfield, T. Adelaar, and Y. J. Lai, "Integrating Brick and Mortar Locations with e-Commerce: Understanding Synergy

- Opportunities,” in *Proceedings of the 35th Annual Hawaii international conference on system sciences*, pp. 2920–2929, Big Island, HI, USA, 2002.
- [98] J. L. Gibbs and K. L. Kraemer, “A cross-country investigation of the determinants of scope of e-commerce use: an institutional approach,” *Electronic Markets*, vol. 14, no. 2, pp. 124–137, 2004.
- [99] J. Agerström, F. Björklund, C. M. Allwood, L. S. Aiken, and S. G. West, “Multiple regression: testing and interpreting interactions. London: sage,” *Journal of Applied Psychology*, vol. 73, pp. 305–307, 1991.
- [100] S. A. Glantz and B. K. Slinker, *Primer of Applied Regression & Analysis of Variance*, McGraw-Hill, Inc., New York, 2001.
- [101] D. G. Kleinbaum, L. L. Kupper, K. E. Muller, and A. Nizam, *Applied Regression Analysis and Multivariable Methods*, Duxbury Press, Boston, Mass, 3rd edition, 1997.
- [102] J. Pallant, *SPSS Survival Manual: A Step by Step Guide to Data Analysis Using IBM SPSS*, Routledge, 2020.
- [103] P. Cohen, S. G. West, and L. S. Aiken, *Applied multiple regression/correlation analysis for the behavioral sciences*, Wiley & Sons, Incorporated, John, Hillsdale, 1975.
- [104] J. Cohen, P. Cohen, S. G. West, and L. S. Aiken, *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences*, Routledge, 3rd edition, 2002.
- [105] H. L. Roediger, J. M. Watson, K. B. McDermott, and D. A. Gallo, “Factors that determine false recall: a multiple regression analysis,” *Psychonomic Bulletin & Review*, vol. 8, no. 3, pp. 385–407, 2001.
- [106] B. K. Slinker and S. A. Glantz, “Multiple linear regression,” *Circulation*, vol. 117, no. 13, pp. 1732–1737, 2008.
- [107] M. J. Norusis, *Guide to Data Analysis*, Prentice Hall, New Jersey, 1999.
- [108] United Nations, *Voluntary National Review 2018*, 2018, https://sustainabledevelopment.un.org/content/documents/20230SDGs_English_Report972018_FINAL.pdf.
- [109] P. Palvia, D. B. Means Jr., and W. M. Jackson, “Determinants of computing in very small businesses,” *Information & Management*, vol. 27, no. 3, pp. 161–174, 1994.
- [110] Vision-2030, *National Transformation Program*, 2016, <http://vision2030.gov.sa/en/ntpwr2019>.