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The operational impact of e-business on SMEs performance in Saudi Arabia

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A B S T R A C T

The study aimed at investigating the impact of e-business on small and medium enterprises (SMEs) operational performance in terms of business flexibility, business quality, and business costs. Research data was harvested via an online questionnaire developed based on previous related works and administered to a sample consisting of 500 owners and managers of industrial and commercial SMEs in Saudi Arabia. Using SmartPLS software, the results pointed out that e-business exerts a significant positive impact on the overall SMEs operational performance. Particularly, the results revealed that e-business results in positive effects on business flexibility, business quality, and business costs. It was observed that the greater impact of e-business was on business flexibility while the impact of e-business on business quality and business costs is roughly similar. These findings suggest that the current SMEs are highly concerned with customer-oriented issues such as marketing channels, customer needs and communications, and on-time delivery. Based on these results, it was concluded that SMEs can use e-business solutions to boost their business operational capabilities with reference to flexibility, quality, and cost.

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1. Introduction

Small and medium enterprises (SMEs) are anticipated to use electronic business (e-business) due to numerous advantages such as gaining a competitive advantage (Zhu et al., 2020; Wu et al., 2003; Putra & Santoso, 2020; Yeong et al., 2022), enhancing business and operational performance (Putra & Santoso, 2020; Andonov et al., 2021; Ukaj et al., 2020), and then business continuity (Himki et al., 2022). Despite the importance of e-business impact on SMEs performance, little research is carried out to examine the operational impact of e-business for SMEs in Saudi Arabia. Benefits of e-business are well documented in the literature. Scholars underlined many specific positive values of e-business on business productivity, business cost, customer service, business quality (Putra & Santoso, 2020), enterprises' managerial work, decision-making process, customer attraction, as well as enterprise-partners' collaboration (Ukaj et al., 2020), information internal and external flow (Zhu et al., 2020), business flexibility and accessibility (Himki et al., 2022; Aljoghaiman & Bhatti, 2022), customer efficient services (Halkiopoulos et al. 2020), real-time services in payment and delivery (Ukko et al., 2023), business responsiveness, and reliability (Alsheyadi, 2022), business quality (Andonov et al., 2021), business processes (Dumčius & Skersys, 2019), quality of products and services (Selaković et al., 2023), business cost (Cherian & Kumaran, 2016; Nordin & Samsudin, 2023), business communications (Saleh, 2012) and market penetration (Oyekunle & Tiamiyu, 2022).

Basically, a research gap was depicted in the literature. It relates to the operational impact of e-business on SMEs performance as a whole construct as well as an endogenous variable consisting of three variables, which were chosen based on prior related works, i.e., business flexibility, business quality, and business costs. Consequently, the current study contributes to the literature of e-business through exploring specific effects of e-business use on SMEs operational performance. Principally, the study aims at investigating the impact of e-business as an exogenous variable on SMEs operational performance as measured by flexibility, quality, and cost.

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The remaining part of this paper is structured as follows. Section 2 shows literature review and hypotheses development, in which e-business was defined, its operational impacts were determined, and research hypotheses were theoretically developed. Section 3 focuses on research methodology in terms of research sample and data collection, research model, research measures, reliability, and validity indices. Section 4 exhibited research hypotheses showing model fit and research structural model. Section 5 contains results discussion, research implications and conclusion. Finally, section 6 signifies research limitations and future research directions.

2. Literature review and hypotheses development

2.1 Definition of e-business

Definitions of e-business have a common feature, which is carrying out business operations using the Internet or computer-mediated network (Ukaj et al., 2020; Putra & Santoso, 2020; Aljoghaiman & Bhatti, 2022). Examples of these definitions include: e-business is a system of business process in which information is flow through organizational boundaries based via the Internet (Zhu et al., 2020), e-business is achieving business transactions based on information technology applications (El Rassi, 2020), and e-business refers to utilizing Internet-based technologies to conduct business activities (Oliveira & Martins, 2010) such as customer communication, human resources marketing, orders processing, and purchasing facilitating (Putra & Santoso, 2020). These operations can be steered to meet marketing and sales purposes as in electronic marketing, mobile marketing, electronic commerce, mobile commerce (Ukaj et al., 2020; Šimić et al., 2019). For the current research, e-business refers to using information and Internet-based technologies to enhance business operations with customers and suppliers through ensuring business flexibility, business quality, and costs reduction.

2.2 Impacts of e-business

It can be said that enterprises all around the world are aimed at enhancing their overall business performance using different methods such as electronic business solutions (Andonov et al., 2021). This statement comes with a line of resource-based view (RBV) in which enterprises' technology capabilities are deemed as a good source of competitive advantage (Putra & Santoso, 2020; Yeong et al., 2022). Many positive impacts of using e-business have been cited in the literature. Generally, e-business results in significant advantages such as increasing business performance (Ukaj et al., 2020), particularly, enterprises operational performance through increasing business productivity, decreasing business costs, improving customer services, and advancing business quality (Putra & Santoso, 2020). Examples of e-business specific impacts encompass reducing enterprise's costs, speeding up enterprise's managerial work, inspiring business decision making processes, improving enterprise's services to attract remote customers, strengthening enterprise's competitiveness, increasing enterprise's productivity, and supporting enterprise's collaboration with its business partners such as suppliers (Ukaj et al., 2020), support digital business operations, information flow across organizational boundaries, linking enterprises with their supply chain partners, which in turn lead to leveraged competitive performance (Zhu et al., 2020) and improving enterprise's e-procurement (Singh & Byrne, 2005).

2.3 Research hypotheses

2.3.1 E-business and business flexibility

Generally, e-business applications showed a significant effect on business operational performance (Putra & Santoso, 2020). Furthermore, enterprises who utilize e-business applications have a propensity for lasting longer in the marketplace since digital solutions make business more flexible and accessible to all customers (Himki et al., 2022). In this regard, business flexibility means business ability to consolidate changes in product and service offers (Aljoghaiman & Bhatti, 2022) to react better and faster to customer needs along with secured and updated services (Halkiopoulos et al. 2020). In the literature, there are some signals on the positive impact of e-business on an enterprise's operational performance. For example, collecting data from Finnish e-retailers using a survey, Ukko et al. (2023) found a significant positive impact of customer orientation as a sub-dimension of e-business on enterprises' financial and operational performance. For Ukko et al., customer orientation refers to offering customers real-time online services, options to choose delivery and payment methods, and on time services. Alsheyadi (2022) examined the relationship between e-business practices and performance as measured by business performance and operational performance. Alsheyadi conceptualized operational performance in terms of business flexibility, responsiveness, and reliability. Hamwi et al. (2021) indicated that flexibility is one of the most pivotal elements of demand response business models. Based on these studies, it was expected that e-business is positively related to an enterprise's operational performance in terms of business flexibility. Hence, the following hypothesis was introduced:

H_1: *E-business exerts a significant effect on business flexibility.*

2.3.2 E-business and business quality

One of the most important dimensions of an enterprise's operational performance is business quality (Andonov et al., 2021). Such an exogenous variable comprises a critical part of the whole business process management, which means improving enterprise's performance by focusing on business process (Dumčius & Skersys, 2019). It was elaborated in the literature that quality improvement is a key dimension in the operational impact of e-business use (Putra & Santoso, 2020). Some aspects of quality improvement include communication quality that exerts a significant effect on an enterprise's decision making process (Ukaj et al., 2020). Referring to the benefits of e-business in the literature showed that such a construct enables enterprises to increase quality of products and services (Selaković et al., 2023), expanding enterprises' markets, reducing their

costs, entering new markets, and catching up with major online competitors (Nordin & Samsudin, 2023), meeting customers' expectations, developing products and services through customers' information, gaining profitable sales, attracting new customers, leveraging SMEs service quality, as well as increasing transactions speed and making communication much better (Saleh, 2012). Furthermore, e-business impact includes time saving, better productivity, improved customer service, wider market reach, and enhanced financial performance (Oyekunle & Tiamiyu, 2022). Based on these findings, it was expected to have a significant impact on the enterprise's operational performance in terms of business quality. Therefore, the following hypothesis was postulated:

H_2: *E-business exerts a significant effect on business quality.*

2.3.3 E-business and business costs

The impact of e-business use on cost reduction is well documented in the literature. Oyekunle and Tiamiyu (2022) investigated the interrelationship between e-business strategies with e-business impact in Nigeria and highlighted a key benefit of e-business which is cost saving. Putra and Santoso (2020) examined the operational impact of e-business use and emphasized the importance of e-business in cost reduction. Early, Saleh (2012) studied barriers and benefits in one country of the gulf region, which is the Sultanate of Oman and mentioned reduction of business transactions cost as one key benefit of e-business in SMEs. In their study on Malaysian SMEs to explore factors affecting e-business use, Nordin and Samsudin (2023) deemed cost reduction as a major perceived benefit of e-business use. Studying e-business in the Indian construction industry, Cherian and Kumaran (2016) indicated the effective implementation of e-business is positively related to reduction in business process cost. In a study on Australian SMEs, Bi et al. (2017) pointed out a significant effect of e-business capability on enterprises' operational efficiency as measured by coordination cost with business partners, production and transactions costs, and marketing cost. Using a sample of micro, small, and medium enterprises from Kosovo, Ukaj et al. (2020) revealed a significant impact of e-business on enterprises' performance. Ukaj et al. indicate that e-business solutions diminish operating costs and eliminate the role of intermediaries. To investigate the impact of e-business on business costs using the current data, the following hypothesis was introduced:

H_3: *E-business exerts a significant effect on business costs.*

3. Research methodology

3.1 Research sample and data collection

Small and medium enterprises (SMEs) have been defined as enterprises with staff up to 250 employees (Dumčius & Skersys, 2019). According to the Saudi Arabia Small and Medium Enterprises Authority (SMEA), SMEs refers to enterprises with less than 249 employees and less than SAR 200 million as revenue (Alzahrani, 2019: 75). Alzahrani indicates that a representative sample of SMEs in Saudi Arabia should be no less than 384 individuals. Following Alzahrani, a sample consisting of 500 employees was selected from industrial and commercial SMEs in the kingdom. The required data was collected using an online questionnaire directed through Google Form. The final usable number of collected responses was 283 individuals with a response rate of 56.6%.

3.2 Research model

Fig. 1 shows the conceptual research model of the current study. It highlights three hypotheses related to the impact of e-business (EBS) as an independent variable on business operational performance as measured by three dependent variables: business flexibility (FLX) (Hypothesis 1: impact of EBS on FLX), business quality (QUL) (Hypothesis 2: impact of EBS on QUL), and cost reduction (CST) (Hypothesis 3: impact of EBS on CST).

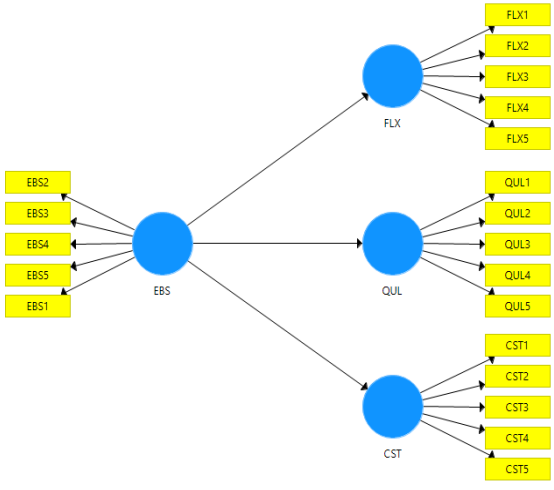

Fig. 1. Research conceptual model

3.3 Research measures

E-business as an independent variable was measured based on previous works (e.g., Prabowo & Yuniarty, 2021; Bi et al., 2017; Himki et al., 2022; Ukaj et al., 2020; Šimić et al., 2019; Putra & Santoso, 2020; Aljoghaiman & Bhatti, 2022) using 5 items related to enterprises' competitiveness, online customized choices, online orders, online potential suppliers, and enterprise-supplier coordination. On the other hand, enterprises' operational performance was assessed by 15 items distributed on three dimensions, which are business flexibility (5 items), business quality (5 items), and business costs (5 items), based on previous related studies (Putra & Santoso, 2020; Alsheyadi, 2022; Himki et al., 2022; Halkiopoulos et al. 2020; Pilinkiene et al., 2013; Aljoghaiman & Bhatti, 2022; Jin & Oriaku, 2013). All items were measured by five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Research variables and their items can be seen in Table 1.

Table 1
Research measures

Variables	Code	Items
E-business	EBS1	E-business strengths enterprise's competitiveness.
	EBS2	Customers have online customized choices through e-business applications.
	EBS3	E-business helps customers tracking their online orders.
	EBS4	Enterprises are enabled to search for online suppliers via e-business.
	EBS5	E-business develops enterprise-supplier coordination.
Flexibility	FLX1	E-business provides new marketing channels.
	FLX2	E-business enables enterprises to meet customer demands.
	FLX3	E-business allows enterprises to cultivate new capabilities more rapidly.
	FLX4	E-business permits the spread of information to customers much quicker.
	FLX5	E-business helping enterprises delivering on time services.
Quality	QUL1	E-business enhances business processes automation.
	QUL2	E-business qualifies enterprises to come across customer specifications.
	QUL3	Employees are well communicated to perform business operations.
	QUL4	E-business inspires our enterprise to make good business decisions.
	QUL5	E-business enriches enterprises' ideas to attract remote customers.
Cost	CST1	E-business allows enterprises to minimize business transactions costs.
	CST2	E-business reduces supplier-related costs.
	CST3	Costs of input materials are reduced due to e-business capabilities.
	CST4	E-business improves inventory control and hence reducing inventory costs.
	CST5	E-business applications result in lowered production costs.

3.4 Reliability and validity

Composite reliability (CR) and Cronbach's alpha coefficient (α) were used as indicators of reliability. Cut-off values of these two indicators should be higher than 0.70 (Hair et al., 2017; Al-Tit, 2016). On the other hand, factor loadings and the average variance extracted (AVE) were used as indicators of convergent and discriminant validity.

Table 2
Reliability and validity results

Constructs	Items	Factor 1	Factor 2	Factor 3	Factor 4	AVE	CR	α
EBS	EBS1	0.775				0.613	0.887	0.841
	EBS2	0.729						
	EBS3	0.816						
	EBS4	0.743						
	EBS5	0.845						
FLX	FLX1		0.721			0.586	0.876	0.822
	FLX2		0.789					
	FLX3		0.756					
	FLX4		0.845					
	FLX5		0.709					
QUL	QUL1			0.775		0.717	0.927	0.903
	QUL2			0.834				
	QUL3			0.887				
	QUL4			0.871				
	QUL5			0.862				
CST	CST1				0.844	0.69	0.917	0.888
	CST2				0.865			
	CST3				0.855			
	CST4				0.84			
	CST5				0.743			

Threshold values of these two indicators should be greater than 0.50 (Hair et al., 2006; Almohaimmeed, 2019; Aljoghaiman & Bhatti, 2022). The results in Table 2 indicated that both reliability and validity were ensured. CR and alpha coefficients were greater than 0.70 for e-business (CR = 0.887, α = 0.841), business flexibility (CR = 0.876, α = 0.822), business quality (CR = 0.927, α = 0.903) and business cost (CR = 0.917, α = 0.888). In terms of validity indicators, the results showed that the research items were loaded on four factors with loading scores higher than 0.50 with AVE values more than 0.50, i.e., e-

business (Factor loadings: 0.729 to 0. 845, AVE = 0. 613), business flexibility (Factor loadings: 0.709 to 0.845, AVE = 0. 586), business quality (Factor loadings: 0.775 to 0.887, AVE = 0.717), business cost (Factor loadings: 0.743 to 0.865, AVE = 0.690). Hence, the current questionnaire items are reliable and valid to collect research data.

4. Hypotheses testing

4.1 Model fit

Stone-Geiser's (Q^2) and the determination coefficient (R^2) were used to check the current model fit. The value of the predictive power of the model (Q^2) should be higher than zero (Ringle & Sarstedt, 2011; Aljoghaiman & Bhatti, 2022) and the explaining power of the independent variable (R^2) have three values: weak ($R^2 = 0.25$), moderate ($R^2 = 0.50$), and strong ($R^2 = 0.75$) (Putra & Santoso, 2020). The results of the current data analysis using SmartPLS 3.0 software revealed good values of the predictive power for business flexibility ($Q^2 = 0.343$), business quality ($Q^2 = 0.103$), and business cost ($Q^2 = 0.097$) as well as a strong explaining power of business flexibility ($R^2 = 0.598$) and weak explaining power of both business quality ($R^2 = 0.155$) and business cost ($R^2 = 0.148$). Therefore, the model fits the current data well and will be employed to test research hypotheses.

4.2 Research structural model

Results of hypotheses testing as painted in Fig. 2 show that the independent variable (EBS) is related to business flexibility (FLX), business quality (QUL) and business cost (CST) as three dimensions of enterprises' operational performance as a dependent variable. An additional analysis as shown in Fig. 3 was carried out to determine the impact of e-business on enterprises' operational performance (EOP) as a whole construct.

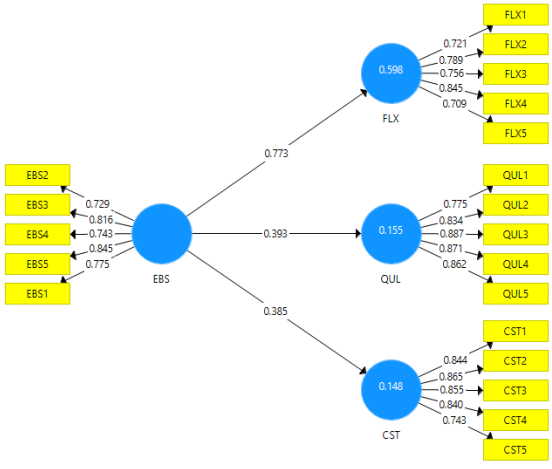

Fig. 2. Research structural model

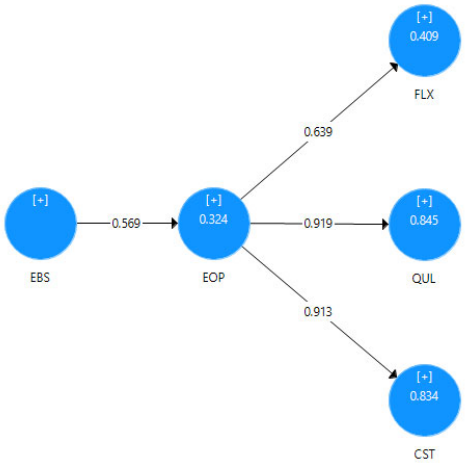

Fig. 3. Structural model of e-business impact on EOP

It can be observed from Table 3 that the three key hypotheses of the current research were all supported. E-business exerted a significant impact on business flexibility (β = 0.773, t-value = 25.114, p-value = 0.000), on business quality (β = 0.393, t-value = 8.868, p-value = 0.000), and business cost (β = 0. 385, t-value = 8.723, p-value = 0.000). These results illustrate that the larger impact of e-business was on business flexibility, followed by its impact on business quality, then business cost. In terms of the overall impact of e-business on enterprises' operational performance, the results in Table 3 indicate that e-business exerts a significant positive impact on EOP (β = 0. 569, t-value = 13.277, p-value = 0.000). This result was shown in Fig. 3 in which three dimensions of EOP were deemed as indicators of this construct.

Table 3
Results of hypotheses testing

IV	Path	DVs	β	T-value	P-value	Result
EBS	→	FLX	0.773	25.114	0.000	Supported
EBS	→	QUL	0.393	8.868	0.000	Supported
EBS	→	CST	0.385	8.723	0.000	Supported
EBS	→	EOP	0.569	13.277	0.000	Supported

5. Results discussion, implications, and conclusion

This study aimed at exploring the impact of e-business on enterprises' operational performance of SMEs in Saudi Arabia. The results pointed out e-business exerts a significant positive impact on EOP. Particularly, it was found that e-business had significant positive effects on business flexibility, business quality, and business costs as three dimensions of EOP. The impact of e-business impact on EOP as elucidated in the current study was revealed in some previous studies (Oyekunle & Tiamiyu,

2022; Dumčius & Skersys, 2019; Alsheyadi, 2022); Zhu et al., 2020; Andonov et al., 2021; Ukko et al., 2023; Ukaj et al., 2020; Putra & Santoso, 2020). Specifically, e-business plays a significant role in boosting business flexibility (Alsheyadi, 2022; Hamwi et al., 2021; Aljoghaiman & Bhatti, 2022), business quality (Saleh, 2012; Selaković et al., 2023; Ukaj et al., 2020; Andonov et al., 2021; Putra & Santoso, 2020), and reducing business costs (Nordin and Samsudin, 2023; Putra and Santoso, 2020; Oyekunle and Tiamiyu, 2022; Ukaj et al., 2020). These results revealed that enterprises focus on competitiveness, customers, and suppliers' coordination through introduction of digital solutions like e-business leads to new opportunities to boost operational performance through cultivating new capabilities, establishing new marketing channels, attracting new customers, provide high quality products and service, as well as reducing business transaction, production, service, processes, and coordination costs.

In fact, such results encompass theoretical and practical implications. In terms of its theoretical implications, the study highlights the importance of the operational impact of e-business use by SMEs. It expands the results that previous works found in this regard, showing that e-business not only leverage business flexibility and business quality but also lessen business costs. The study categorized the operational impact of e-business in three categories, which are business flexibility as a key pillar of e-business use, business quality and business costs. It can be noted that the effect of e-business on the latter two constructs is similar due to the interconnections between quality and cost measures. For example, improving business process automation will result in enhancing inventory control and costs, and gaining e-business capabilities induces reduced costs, improved customer services, and making good decisions. In practical terms, the study emphasized that SMEs owners and managers can utilize e-business to explore new marketing channels, meet customer demands, deliver on-time services, automate business processes, make good business decisions, reach remote customers, minimize cost of business transactions, inventory cost, as well as production cost. Basically, the study concludes that e-business use is an antecedent pivotal factor that enterprises can employ to pull their operational advantages to the next level in respect of business flexibility, quality, and costs. Explicitly, e-business in the first-place prompts business flexibility in such a manner as ensuring business orientation and customer orientation.

6. Limitations and future research directions

The current study is limited to examining the impact of e-business on SMEs operational performance in terms of business flexibility, business quality, and business costs using a sample consisting of owners and managers of industrial and commercial SMEs in Saudi Arabia with a staff of less than 250 employees. Hence, future studies are required to examine the impact of e-business on other dimensions of operational performance such as customer orientation, as well as using a sample from other industries such as service, construction, and healthcare.

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