



Research article

Contextual factors and performance impact of e-business use in Indonesian small and medium enterprises (SMEs)

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ABSTRACT

This study proposes an integrated framework that investigates interrelationships between contextual factors that influence e-business use and consequently its impact on enterprise performance among small and medium enterprises (SMEs). This study starts with an extensive systematic review of e-business use factors that are contextualized in the technology, organization and environment (TOE) framework and conceptualized using resource-based view (RBV). Data are obtained through a survey of 325 Indonesian SMEs. The partial least square structural equation modeling technique is used to analyze the data and test the hypotheses. The organizational context emerges as the most significant predictor of e-business use, followed by technological and environmental contexts respectively. In addition, e-business use has stronger positive influence on enterprise performance at operational level, rather than managerial and strategic levels. However, e-business use's influence on performance impact at strategic level is indirect, mediating through operational and managerial levels. While the study has attempted to explain the contextual factors that influence the use of e-business as a whole, it is deficient in explaining contextual factors that influence each of e-business applications being used. This study could help SMEs identify contextual areas that may guide them to successfully use e-business and realize its potential benefits.

1. Introduction

Small and medium enterprises (SMEs) are the cornerstone of many economies. As a group, SMEs account for 95% of the world's enterprises and absorbs 60% of employment according to recent data from the International Finance Corporation (International Finance Corporation, 2011). The economic effects are typically more notable in developing countries such as Indonesia where SMEs provide as much as 99% of the available jobs (Ministry of Cooperatives and SMEs, 2013). In the increasingly global and digital economy, SMEs are expected to employ e-business to stay relevant and more importantly ahead of the competition. While consumers in general seem to have embraced e-business to a great extent, SMEs are not necessarily so.

In the case of Indonesia, a country where the Internet penetration reaches 64,8% of country's total population and the average citizen owns more than one mobile phone (APJII, 2019; International Telecommunication Union, 2018), the adoption of e-business among SMEs was low at 9% as of the year of 2019, according to Indonesian Ministry of Communications and Informatics (Deviyana, 2019). Meanwhile, should Indonesian SMEs embrace and increase their e-business uptake, it could

potentially increase the country's annual economic growth by 2% (Deloitte Access Economics, 2015).

Existing studies portray SMEs as sluggish when it comes to using e-business compared to their large counterparts (Parker et al., 2015). This is despite the promised potentials of e-business use as well as the nature of SMEs that are smaller in size, may be receptive and adaptive to changes (Al-Qirim, 2007). This contrast begs the question what influences SMEs to behave this way. Previous studies on Indonesian SMEs are scant and have focused largely on barriers that hinder e-business use with limited attention given to other driving factors that influence e-business use (Janita and Chong, 2013; Kartiwi and MacGregor, 2007; MacGregor and Kartiwi, 2010). In addition, previous studies tend to not examine the performance impact resulted from actual e-business use when studying these influencing factors. This study seeks to investigate this phenomenon by comprehensively examining the interrelationships between contextual factors that influence e-business use and consequently business performance impact resulting from such use. This study attempts to develop a conceptual model that could later serve as a foundation in setting up possible intervention strategies in order to bolster the rate of e-business use among SMEs.

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2. Literature review

In this section, we review related research that serves as a foundation of this study, including factors that play a role in influencing the use e-business and subsequent enterprise performance among SMEs. Based on this review, we propose a conceptual model and a set of hypotheses.

2.1. Theoretical perspectives

E-business for SMEs has been studied through numerous theoretical perspectives (Parker and Castleman, 2009). The technology adoption model (TAM) is one such theory frequently used to study e-business use among SMEs. It has been used to predict SME's intention of use and actual use of e-business as influenced by factors such as e-business usefulness and ease of use. As an individual-level theory, TAM typically captures SME's owners/managers' perceptions, which is appropriate since decisions in SMEs are typically made their owners/managers (Ghobakhloo et al., 2012; Ghobakhloo and Tang, 2013).

Another theory that is often adapted in the SME-e-business literature is the Diffusion and Innovation (DOI) theory as an integrated framework used to describe how certain innovation diffuses over a period of time. This diffusion of a particular innovation i.e. e-business is influenced by its own characteristics. These characteristics include e-business relative advantage, complexity, trialability, observability, and compatibility with SMEs' business practices. These characteristics are often conceptualized as technological factors that may influence SME's owners/managers decision to use or reject use of e-business application.

Meanwhile, there are also studies that forgo the use of well-established theories such as TAM and DOI in favor of a generic and contextualizing theory such as the technological-organization-environment (TOE) framework. As the name suggests, the TOE framework is usually used to classify influencing factors into three contexts, namely technological, organizational and environmental. Though TOE framework is useful as a conceptual guidance in studying how certain contextual factors might affect e-business use, several scholars have suggested that employing the TOE framework on its own is insufficient in establishing theoretical causal relationships. Hence, TOE framework must be used in conjunction with other theories that can enable such relationships.

Taking into account the purpose of this study and addressing the aforementioned issue, we pair the TOE framework with the resource-based view (RBV) theory (Rivard et al., 2006). The RBV theory suggests that an enterprise may succeed when resources and capabilities are regarded as sources of potential competitive advantage. As a theory that has been well employed in the information systems literature, RBV explains how the use of information systems affects resources and processes that can contribute to achieving competitive advantage (Zhu and Kraemer, 2005). As suggested by previous studies, the RBV is incorporated to provide theoretical rationale in exploring how business performance impact can be achieved through utilization of resources and information systems capabilities (Bi et al., 2016). In the context of our study, the RBV can potentially explain the causal relationship between contextual factors, e-business use, and enterprise performance. As we suggested earlier, e-business can potentially be utilized to establish and sustain SME's competitive performance in the market. In this case, the RBV is concerned with SME's resources (contextual factors), e-business capabilities (e-business use) and how they affect enterprise performance.

Applying the RBV, we contend that developing these resources and capabilities may result in competitive advantage. SMEs' resources and e-business capabilities can be conceptualized as e-business use factors (Parker and Castleman, 2009) and e-business use (Bi et al., 2014) respectively. Thus, the e-business use and enterprise performance may be considered as the consequence of successfully exploiting the e-business resources (Dyerson et al., 2016).

2.2. Contextual factors and E-business use

In reviewing factors that influence e-business use, we elected to conduct a systematic review of journals in information systems (IS) (Lowry et al., 2013) and other non-IS specialized journals in SMEs as presented in Table 1 (Parker and Castleman, 2007). The search keywords are related to the context and units of analysis of this study. For IS journals, these keywords include: "SME", "small business", and "small firm". For other non-IS journals, keywords include various e-business applications such as "e-commerce", "CRM", "ERP", "SCM", and others. These broad sets of keywords allow for maximum number of search results.

The search results returned 5,970 articles during a time period of January 2005 until March 2017. These articles' titles, abstracts and keywords were reviewed to ensure that they indeed concern e-business in the context of SMEs. As a result, there are 200 articles that met the criterion, which were then fully read. Out of 200 articles that were read, 53 of them (26%) are on analysis of the factors that explain e-business use among SMEs (see Table 1). For each of the articles, we coded and grouped the factors accordingly. Our final list contains 20 factors (see Table 2).

From the list of 20 factors identified, based on groundedness or the frequency of a factor appearing in the reviewed papers, five factors seem to be most prevalent, accounting for a total of 49.7%. These five factors include perceived benefits (13.3%), e-business expertise (12.1%), competitive pressures (10.1%), management support (7.7%), and compatibility (6.5%). Concerning e-business applications being studied, many studies investigate e-business use in a single e-business application setting and rarely consider the complete spectrum of e-business applications across the value chain. Our systematic review suggests that a large number of studies focus on analyzing the use of e-commerce in a single application perspective. These studies typically examine factors that influence SMEs to use e-commerce in both business-to-consumers (16.1%) and business-to-business (5.7%) contexts.

This is understandable as many of these studies base their model on established theories such as TAM and DOI that typically confine them to one measure of e-business use of a specific e-business application. For a complete summary of e-business applications studied in the reviewed articles, see Table 3. The theoretical lenses, contextual factors and e-business application used above discussed above inform subsequent development of the proposed conceptual model.

2.3. Conceptual model

Grounded in TOE and RBV, we develop a conceptual model to measure the influence of contextual factors, e-business use, and enterprise performance experienced by SMEs. The model consists of seven constructs (i.e. technological context, organizational context, environmental context, e-business use, operational impact, managerial impact, and strategic impact).

Factors that relate to e-business application such as perceived benefits, compatibility, perceived costs, perceived risk & security, complexity, trialability, and observability can be classified as technological context. Meanwhile, factors that relate to SME's internal resources such as management support, financial resources, innovativeness, and e-business expertise can be characterized as organizational context. The e-business expertise factor is particularly essential in today's digital workforce since it provides the foundation and may influence SME's advances in e-business use (Siddoo et al., 2019).

While several scholars have suggested that contextual factors such as industry, enterprise size and market scope may serve as organizational factors (Ramdani et al., 2009; Zhu and Kraemer, 2005), others regard them as certain enterprise's demographical characteristics. Thus, some studies may consider some of these factors as control variables as part of their conceptual models (Newby et al., 2014) or may exclude them

Table 1. List of journals of factor review.

No.	Journal	Topic	
		SMEs in General	Use Factors
1.	ACM Transactions on Computer-Human Interaction	-	-
2.	Decision Support Systems	2	-
3.	European Journal of Information Systems	10	3
4.	Information and Management	10	2
5.	Information and Organization	2	-
6.	Information Systems Journal	6	-
7.	Information Systems Research	1	-
8.	Journal of the Association for Information Systems	2	1
9.	Journal of the Association for Information Sciences and Technology	-	-
10.	Journal of Information Technology	4	-
11.	Journal of Management Information Systems	-	-
12.	Journal of Strategic Information Systems	4	1
13.	MIS Quarterly	3	-
14.	Journal of Electronic Commerce Research	1	-
15.	IEEE Transactions on Engineering Management	8	2
16.	Industrial Management & Data Systems	24	10
17.	Journal of Enterprise Information Management	46	14
18.	Internet Research	7	4
19.	Information Systems Frontiers	6	1
20.	Electronic Markets	21	6
21.	Business & Information Systems Engineering	1	-
22.	Information Systems and e-Business Management	3	1
23.	Journal of Small Business and Enterprise Development	29	8
24.	Small Business Economics	10	-
Total		200	53

altogether. In this case, we choose the later and do not include industry, size and market scope in the proposed conceptual model.

At the same time, factors that count as external forces and resources to SMEs such as competitive pressures, technology infrastructure, financial

Table 2. Contextual factors of e-business use.

No.	Factors	Frequency	Percentage
1.	Perceived benefits	33	13.3
2.	E-business expertise	30	12.1
3.	Competitive pressures	25	10.1
4.	Management support	19	7.7
5.	Compatibility	16	6.5
6.	Financial resources	14	5.6
7.	Enterprise size	13	5.2
8.	Perceived cost	12	4.8
9.	Perceived risk	12	4.8
10.	Innovativeness	12	4.8
11.	Vendor support	12	4.8
12.	Government support	11	4.4
13.	Complexity	10	4.0
14.	Industry	7	2.8
15.	Triability	6	2.4
16.	Market scope	5	2.0
17.	Observability	4	1.6
18.	Technology infrastructure	4	1.6
19.	Financial support	2	0.8
20.	Process management	1	0.4
Total		248	53

Table 3. E-business applications studied.

No.	E-business Application	Frequency	Percentage
1.	E-commerce (B2C)	14	16.1
2.	E-business generally	10	11.5
3.	Enterprise Resource Planning (ERP)	9	10.3
4.	Customer Relationship Management	6	6.9
5.	E-commerce (B2B)	5	5.7
6.	Supply Chain Management (SCM)	5	5.7
7.	Website	5	5.7
8.	E-procurement	4	4.6
9.	Cloud Computing generally	3	3.4
10.	Email	3	3.4
11.	Social Media	3	3.4
12.	E-marketplace	2	2.3
13.	Integrated Enterprise Management System	2	2.3
14.	Order processing	2	2.3
15.	Product design	2	2.3
16.	Production/manufacturing & control	2	2.3
17.	Accounting & finance	1	1.1
18.	Administrative system	1	1.1
19.	Booking system	1	1.1
20.	Communication system generally	1	1.1
21.	E-banking	1	1.1
22.	Electronic data interchange (EDI)	1	1.1
23.	Electronic trading system (ETS)	1	1.1
24.	Human resource management	1	1.1
25.	Inventory/stock control & purchasing	1	1.1
26.	Online advertising	1	1.1
Total		87	53

support, government support and vendor support can be considered as environmental context. It is thus hypothesized that:

H1. Technological context positively affects e-business use.

H2. Organizational context positively affects e-business use.

H3. Environmental context positively affects e-business use.

As we previously considered, e-business use should result in enterprise performance. With regard to enterprise performance, we describe it as financial and non-financial benefits that SMEs may acquire should they fully take advantage of e-business. It is noted that there have been strong predisposition in the IS literature to classify enterprise performance in three dimensions: operational, managerial and strategic (Shang and Seddon, 2002). We also recognize that strategic impact (e.g. financial performance) of using e-business may not be direct (Sila, 2010), but rather through mediating effects of lower level impacts e.g. operational performance impact. Thus we formulate the following hypotheses.

H4. E-business use positively affects operational impact.

H5. E-business use positively affects managerial impact.

H6. E-business use positively affects strategic impact.

H7. Operational impact positively affects managerial impact.

H8. Managerial impact positively affects strategic impact.

The resulting conceptualization of these seven constructs and their accompanying hypotheses of their interrelationships are portrayed in a conceptual model as shown in Figure 1.

3. Study approach

This section explains the procedure carried out in completing this study, which consists of ten steps (see Figure 2). While first four steps have been described in the previous sections, this section deals with description of data collection method, operationalization of the constructs and development of the survey instrument, and subsequently data analysis procedure.

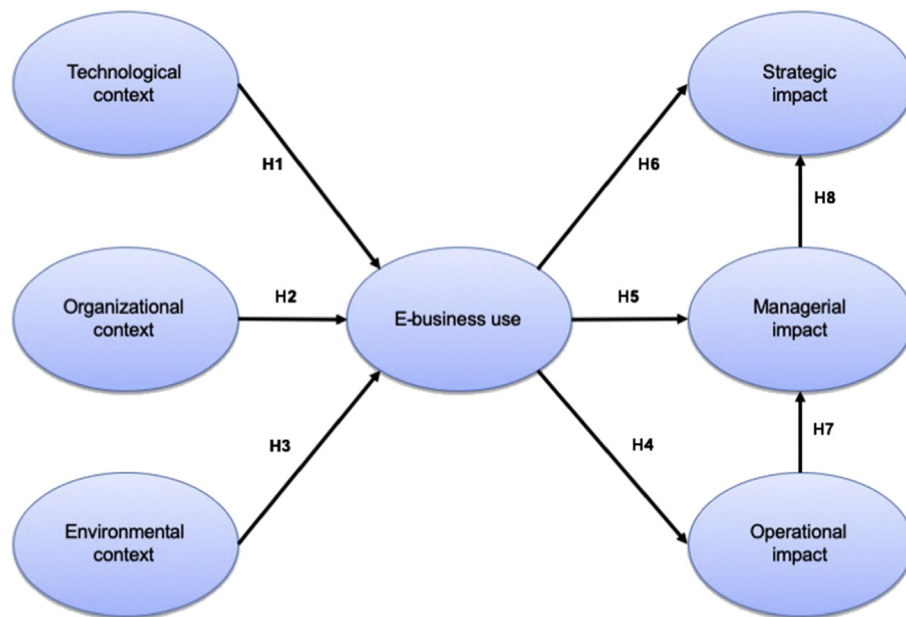


Figure 1. Conceptual model.

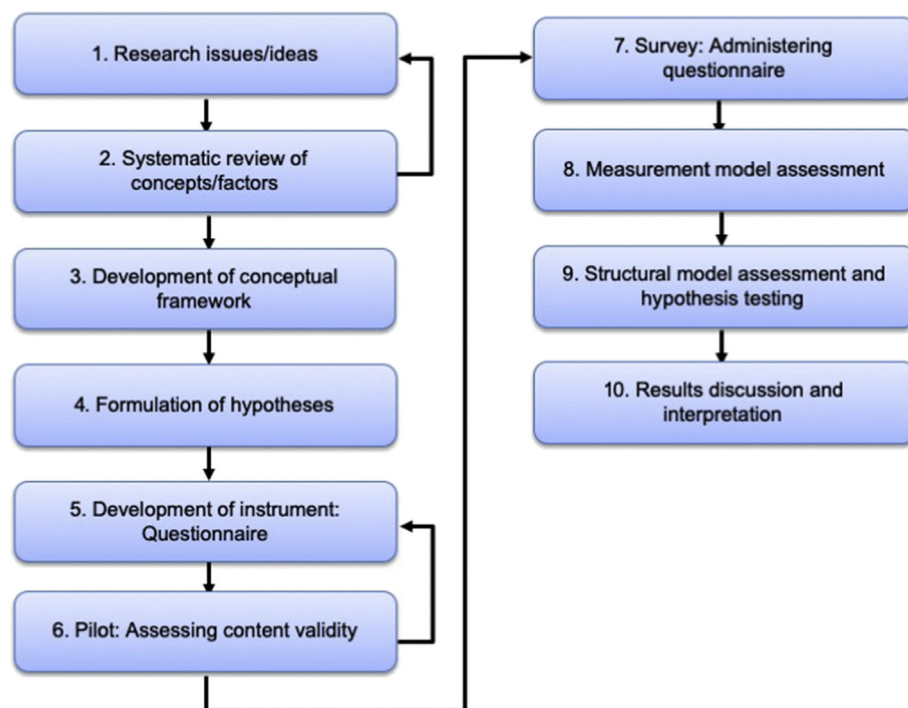


Figure 2. Methodological approach of this study.

3.1. Units of analysis and data collection

To help select and classify potential enterprises as the units of our analysis, we use the Indonesian government's definition of SMEs that is based on the number of employees. According to the government agency, the Statistics Indonesia (BPS), SMEs are primarily described as enterprises that employ less than 100 people. Small and medium enterprises are defined as enterprises that employ up to 99 employees. According to [The Ministry of Communication and Informatics \(2019\)](#), there were around 59.2 million SMEs in Indonesia as of the year of 2019, which account for 99% of the business population.

For data collection, we employed an online survey method using Google Form as questionnaire tool. As data collection agents, we conveniently selected 11 SMEs from a group of SME entrepreneurs who were enrolled in our series of e-business educational classes conducted in Tangerang city, Banten province, Indonesia. A public uniform resource locator (URL) to the online survey questionnaire was given to these 11 SMEs that were asked to broadcast survey invitation to their respective professional business networks of SME's entrepreneurs. Access to the questionnaire was managed using Bitly link management tool, which tracked the number of total clicks and referrers to the URL. This more personal approach is inspired by personally administered questionnaire

method that has been employed by other researchers to maximize response rate (Van Huy, Rowe, Truex and Huynh, 2012). Out of 558 unique accesses to the questionnaire during a week between October 28th and November 4th 2018, 325 SME's owners/managers provided usable responses.

We observe that SMEs who responded to our survey come from various industries. A large portion of SMEs come from manufacturing industry (41%) and followed by service industry (20%). In terms of firm size, most SMEs surveyed employ 1–4 people (82%) which can be categorized as micro enterprises, while others with 5–19 people and 20–99 people can be described as small and medium enterprises separately. This make-up of firm size profile allows representative comparison with actual SME population in Indonesia. Please see Table 4 for complete characteristics of the sample.

3.2. Measurement scale and data analysis procedure

The questionnaire developed for this study comprises two parts. The first part contains questions that seek to obtain characteristics of SMEs, such as business address or location, industrial sector (based on industry classification as suggested by the Statistics Indonesia), number of people currently employed (based on the Statistics Indonesia's classification of SMEs), and respondents' role in their respective SME. The respondent's role question serves as a respondent validation as expected respondents for the survey should either be SME's owners/managers who have decision-making abilities. For list of questions used in the first part of questionnaire, please see appendix A.

Table 4. Characteristics of the sample.

Characteristics	Frequency	Percentage
Industry classification		
Manufacturing	136	41.8
Other services	66	20.3
Information, communication & technology	32	9.8
Retail and trade (non-automotive)	26	8.0
Automotive-related repair, maintenance & trade	19	5.8
Accommodation, food & beverage	11	3.4
Professional, scientific and technical activities	11	3.4
Education	9	2.8
Agriculture, forestry and fishery	7	2.2
Tourism	4	1.2
Leasing	2	0.6
Art & entertainment	1	0.3
Construction	1	0.3
Total	325	100
Firm Size		
1-4 people	267	82.2
5-19 people	44	13.5
20-99 people	14	4.3
Total	325	100
Location (Province)		
Jakarta	26	8
Banten	249	76.6
West Java	29	8.9
East Java	2	0.6
Central Java	6	1.8
South Sumatra	2	0.6
West Sumatra	4	1.2
Lampung	6	1.8
Yogyakarta	1	0.3
Total	325	100

The second part of the questionnaire consists of measurement items that operationalize constructs of the conceptual model as shown in Figure 1. In developing the items, we operationalized the constructs that are adapted from both pre-validated measures and literature reviewed in section 2. As listed in appendices B, C, and D, the measures are based on a Likert scale of 1–5 ranging from “Completely disagree (1)” to “Completely agree (5)”. In developing the scales, we followed the single-item measures development technique instead of multi-item ones (Baroudi and Orlikowski, 1988; Diamantopoulos and Winklhofer, 2001). The measurement is divided into three segments, 1) contextual factors, 2) e-business use, and 3) e-business impact.

For the first segment, each of the identified factors as shown in Table 3 is represented by single-item measure. These factors are grouped accordingly into three reflective constructs, namely technological context, organizational context, and environmental context. These three reflective constructs formatively have effects on e-business use. This approach is similar the one employed by Wang and Ahmed (2009). Single-item measurement technique seems to take into account the nature of SMEs (Bernaert et al., 2014) that typically exhibit miscellaneous education levels with high practical constraints (Malhotra et al., 2012). Measurement items for the contextual factors' segment are listed in appendix B.

In the second segment, to measure the dimensions or extent of e-business use, we presented the respondents with list of statements of e-business application use across nine dimensions of e-business applications reflecting various business activities in the value chain. These nine dimensions, informed by our systematic review in section 2 and previously used e-business classification (Dyerson et al., 2016), include communication, inventory management, order processing or sales, marketing, customer management, financial management, human resource management, production and integrated enterprise management. Each dimension is represented by a single-item measure using a five-point Likert scale ranging from “Not using at all (1)” to “Using extensively (5)”. The measures for the dimensions of e-business use are expressed in appendix C.

For the third and last segment, e-business impact is measured by adapting from e-business benefits framework (Shang and Seddon, 2002) in three impact constructs, namely operational, managerial, and strategic. For operational impact construct, the measurement items include productivity improvement, cost reduction, quality improvement and customer service improvement. For managerial impact construct, measurement items contain better resource management, better decision-making and better performance control. Finally, for strategic impact construct, measurement items comprise support for current and future business growth, build business innovation, better business alliance with partners, and generate a competitive advantage. Complete measurement items used for this segment are shown in appendix D.

Before administering the questionnaire, it was checked for face and content validity with two SME's owners and managers and one information systems researcher familiar with SME-e-business research. In addition, we also pre-tested the questionnaire with 84 SME's owners/managers. Based on their feedback, the wordings of some questions were modified and the questionnaire was ready to be administered to potential respondents. After having obtained the data from the respondents, we used partial least squares structural equation modeling (PLS-SEM) technique with SmartPLS 3 software to analyze the data. PLS-SEM was chosen for mainly two reasons (Hair et al., 2011). First, our goal is identifying key “driver” constructs. Second, the structural model is complex with many interrelated constructs. As two-phase data analysis procedure in PLS-SEM, initially, we determined instrument empirical validation in order to ensure construct reliability and discriminant validity. Subsequently, we tested the proposed conceptual model to assess its predictive capacity and identify any key predictor. Apart from using PLS-SEM algorithm, we conducted a bootstrap procedure as suggested by Hair et al. (2011) with 5,000 subsamples. The results of the data analysis are discussed in the next section.

4. Results & discussion

In this section, we explain the evaluation of the data analysis results in two parts, namely measurement model and structural model assessments.

4.1. Measurement model assessment

To ensure that the construct measurements have adequate quality, measurement model assessment was conducted. The assessment includes a factor analysis, measuring indicator reliability. The results show that outer loadings of items in each construct are higher than recommended cutoff value of 0.7. In addition, each construct shows internal consistencies (Cronbach's Alpha) that meet the minimum value of 0.7. Though some studies consider items with the values of Alpha above 0.90 to be very high, we consider them to be acceptable within the range values of 0.7–0.95 as recommended by Nunnally and Bernstein (1994). Furthermore, average variance extracted (AVE) results of more than 0.5 for each construct suggest that they discriminant validity of constructs have been established. The full results regarding the assessment of the measures are shown in Table 5.

Having assessed the measurement model and evaluated its results, data analysis continues with an assessment of structural model to evaluate hypothesized relationships between constructs and predictive capacities of the conceptual model.

4.2. Structural model assessment

Having run PLS-SEM algorithms, we evaluate the hypothesized relationships as well path coefficients between constructs. The results as indicated in Figure 3 suggest positive effects of three contextual constructs, namely technological context, organizational context, environmental context on e-business use. As a whole, hypothesized relationships in *H1–H3* are supported by the data with an emphasis on both technological and organizational contexts as significant predictors of e-business use.

To be considered significant, magnitude of path coefficients should be more than 0.1 (Andreev et al., 2009). In this case, all path coefficients in contextual constructs, except for environmental context, in the structural model satisfy this criterion. Furthermore, it is noted that among the contextual constructs, the organizational context has a stronger influence than technological and environmental contexts on e-business use. This implies the importance of the contextual factors underlying the organizational context for SMEs. This further suggests the importance of developing internal organizational resources as they might influence the extent of e-business use in SMEs.

To further examine the model's hypotheses, t-statistics are evaluated. As shown in Table 6, three of the hypotheses, namely technological context towards e-business use (*H1*), environmental context towards e-business use (*H3*), and e-business use towards strategic impact (*H6*) were not as strongly supported. As for the technological context (*H1*), one may argue for diminishing relevance for some of the technological factors in SME's decision to implement e-business. For example, many e-business applications are now provided as software as a service (SaaS) at minimal cost for SMEs (Seethamraju, 2015; Trigueros-Preciado et al., 2013), hence perceived low costs of e-business might not always be a determining factor.

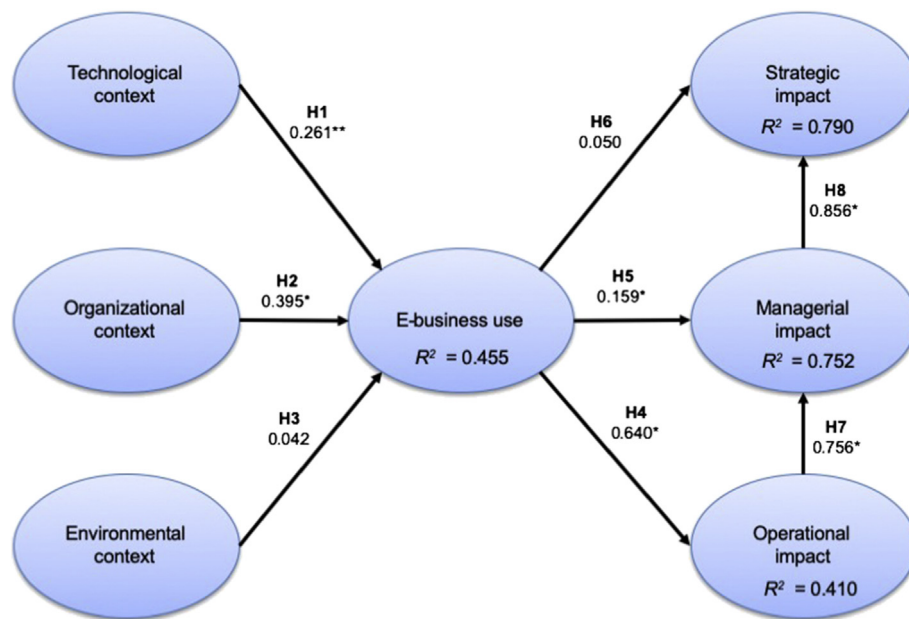
On the other hand, in terms of the environmental context (*H3*), one may assert that in developing countries such as Indonesia, with overall low rate of e-business use and undeveloped e-business ecosystem, environmental factors are not meaningful enough to drive SMEs to fully use e-business. The lack of e-business use issue in developing countries affect competitive pressures that have yet to reach the necessary critical mass and encourage SMEs to implement e-business (Molla and Licker, 2005). It could also be argued that external parties such as government do not provide enough support and pressure for SMEs to implement e-business. Likewise, with undeveloped e-business ecosystem, vendor support may

Table 5. Construct validity and reliability.

Constructs and Items	Loadings	Cronbach's Alpha	CR	AVE
Technological Context		0.937	0.949	0.727
Perceived benefits	0.796			
Compatibility	0.897			
Complexity	0.910			
Perceived costs	0.803			
Observability	0.879			
Perceived risk	0.766			
Triability	0.903			
Organizational Context		0.911	0.934	0.738
E-business expertise	0.858			
Financial resource	0.838			
Innovativeness	0.873			
Management support	0.859			
Process management	0.866			
Environmental Context		0.940	0.955	0.809
Competitive pressures	0.913			
Financial support	0.910			
Government support	0.919			
Tech. infrastructure	0.803			
Vendor support	0.945			
E-business Use		0.956	0.963	0.742
Communication	0.796			
Customer management	0.888			
Financial management	0.876			
Human resource management	0.897			
Integrated enterprise management	0.853			
Marketing management	0.877			
Order & sales	0.878			
Production	0.866			
Purchasing & inventory	0.815			
Operational impact		0.936	0.954	0.840
Productivity	0.927			
Cost reduction	0.919			
Product quality	0.906			
Customer service	0.912			
Managerial Impact		0.940	0.962	0.893
Resource mgt.	0.935			
Decision making	0.948			
Performance control	0.951			
Strategic Impact		0.934	0.953	0.835
Business growth	0.927			
Competitive advantage	0.892			
Partner synergy	0.920			
Business innovation	0.917			

also be hard to come by. In a recent SME study by Chatzoglou and Chatzoudes (2016), it is suggested that environmental contextual factors did not have significant effect on e-business use.

In terms of the predictive capacity of the model, the R^2 values are evaluated for four predicted constructs (see also Figure 3). As suggested by (Hair et al., 2011), the cutoff points used for assessing the R^2 values were at 0.25 (described as weak), 0.50 (described moderate), and 0.75 (described as substantial). Based on the PLS algorithm, the results show that the R^2 for e-business use is 0.455. This suggests that the three contextual readiness constructs explain 45% of the variance of e-business use. This suggests that the conceptual model holds an adequate predictive capacity in explaining e-business use.



Note: *Significant at $p < 0.000$; ** significant at $p < 0.016$

Figure 3. Structural model assessment results.

Table 6. Structural path estimates.

Hypotheses	Path	Coefficient	T-statistics	P-Values
H1	Technological Context → Use	0.261	2.403	0.016
H2	Organizational Context → Use	0.395	4.104	0.000
H3	Environmental Context → Use	0.042	0.578	0.563
H4	Use → Operational Impact	0.640	16.492	0.000
H5	Use → Managerial Impact	0.159	3.489	0.000
H6	Use → Strategic Impact	0.050	1.470	0.142
H7	Operational Impact → Managerial Impact	0.756	16,236	0.000
H8	Managerial Impact → Strategic Impact	0.856	27.751	0.000

It is of note that e-business use may result in financial and non-financial performance impacts as indicated by the three-level e-business impact, namely operational, managerial and strategic impacts. The R^2 values for the three e-business impact constructs are 0.410 for operational, 0.752 for managerial, and 0.790 for strategic. As indicated by results, e-business use has stronger influence on operational impact, rather than managerial and strategic impacts. We understand that such operational benefits as cost reduction and improved productivity may be a precondition for achieving higher order impact (managerial and strategic impacts). Plausibility of this proposition is supported by the indirect effect on both managerial and strategic impacts that are higher than their respective direct effects stemming from e-business use. These mediating effects help explain why e-business use does have significant effect on strategic impact (H6). This result is consistent with a study done by (Sila, 2010) who found that financial performance impact of e-business is indirect. Thus, this corroborates our model's conceptualization of e-business impact that is cascading in three levels: operational, managerial and strategic in that particular order. Furthermore, the result also shows that operational impact has direct positive influence on managerial impact (H7), while managerial impact has positive association with strategic impact (H8).

All in all, the results imply that from a managerial perspective of e-business vendors or government institutions looking to prescribe an intervention for SMEs, they are advised to consider contextual factors

that influence e-business use in order of priority. First, they might consider organizational context, followed by technological context, and subsequently the environmental context. On the other hand, from a managerial perspective of SMEs, to assist in realizing performance impact, they are suggested to develop capabilities in e-business use throughout the whole spectrum or dimensions of e-business use, with initial focus on maximizing operational impact before concentrating on managerial and strategic impacts successively. We suggest that these implications may potentially contribute to the literature in efforts of increasing the rate of e-business use and consequently reaping the benefits of such use among SMEs.

5. Conclusions

This study has theoretically proposed an integrated conceptual model to seek an understanding of how certain groups of contextual factors could influence SME's decision to use e-business and in turn help realize their enterprise performance potentials. The results suggest that SMEs looking to use e-business more extensively should pay close attention to contextual factors and develop e-business use capabilities across the spectrum. Taking into account the current debate on how to best tackle lack of e-business use among SMEs especially in developing countries, we hope that this study encourage further discussion and development of theory that could help improve our

understanding of e-business use and their relationships with enterprise performance.

This study has some methodological limitations. While the study has attempted to explain the contextual factors that influence the use of e-business as a whole, it is deficient in explaining contextual factors that influence each of e-business applications. In addition, independent variables that represented by the contextual factors are limited. Being a cross-sectional study, the data were collected at a single point in time. As enterprises are dynamic in terms of their contextual resources and e-business capability, there is an opportunity for a longitudinal study as future research. Furthermore, the use of non-probability sampling and respondent selection limit generalizability of our findings. Finally, an empirical study such as this could always benefit from having a mixed method of both quantitative and qualitative research, which could open up possibilities of conceptual ideas beyond what is present in the extant literature.

Declarations

Author contribution statement

P.O. Hadi Putra: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

H.B. Santoso: Conceived and designed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Competing interest statement

The authors declare no conflict of interest.

Additional information

Data associated with this study has been deposited at <https://data.mendeley.com/datasets/3gzhhbmmsw/1>. Supplementary content related to this article has been published online at <https://doi.org/10.1016/j.heliyon.2020.e03568>.

Appendix A. SMEs' characteristics' questions

1. Email address (optional):
2. Business address:
3. In what industrial sector is your business engaged?
 - a. Processing or manufacturing industry
 - b. Wholesale and retail trade (non-automotive)
 - c. Automotive-related repair, maintenance & trade
 - d. Tourism
 - e. Agriculture, forestry and fishery
 - f. Accommodation, food & beverage
 - g. Information, communication & technology
 - h. Construction
 - i. Finance and insurance
 - j. Real estate
 - k. Professional, scientific and technical activities
 - l. Leasing
 - m. Education
 - n. Human health activities and social activities
 - o. Art & entertainment
 - p. Other services
4. What is your role in running the business?
 - a. Staff member or operational employee
 - b. Manager or director, but not a business owner
 - c. Business owner, but not involved in daily operations
 - d. Business owner who is involved in daily operations
5. How many people does your business currently employ?
 - a. None
 - b. 1-4 employees
 - c. 5-19 employees
 - d. 20-99 employees
 - e. >99 employees

Appendix B. The constructs and measurement items for contextual factors

Please rate each response on a scale of 1 to 5, where 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly agree. There are no right or wrong responses.

Constructs	Measurement Items
<i>Technological Context</i>	
Perceived benefits	We understand that using e-business would benefit our business.
Compatibility	ICT is compatible with the way we do business.
Complexity	Overall, using e-business is easy for us.
Perceived costs	For us, the cost of using e-business is low.
Observability	We can communicate to others the consequences of using e-business.
Perceived risk	We are not worried about hackers or criminals that can steal our data if we use e-business.
Triability	We've had a great deal of opportunity to try various e-business applications.
<i>Organizational Context</i>	
E-business expertise	We have the skills needed to apply e-business.
Financial resource	We have sufficient financial resources to implement e-business in business operations.
Innovativeness	We emphasize research and development (R&D), technological leadership, and innovation.
Management support	We have a clear plan regarding the use of e-business in our business.
Process management	We have a clear standard operating procedure (SOP) in running a business.
<i>Environmental Context</i>	
Competitive pressures	Our customers and / or business competitors encourage us to implement e-business.
Financial support	Financial institutions (e.g. banks, cooperatives, etc.) provide financial assistance to SMEs who want to implement e-business.
Government support	The government is actively providing various facilities to support the application of e-business.
Tech. infrastructure	Telecommunications infrastructure (such as the Internet network or electronic payments) is reliable to support the use of e-business in business.
Vendor support	E-business providers or vendors actively promote or provide incentives to implement e-business.

Appendix C. The constructs and measurement items for e-business use

Please rate each response on a scale of 1 to 5, where 1 = Not using at all and 5 = Using extensively. There are no right or wrong responses. We use e-business applications to:

Constructs	Measurement Items
<i>E-business Use</i>	
Communication	We use e-business applications to: Communicate with customers or our business partners.
Customer management	Manage or service customers.
Financial management	Manage finances.
Human resource management	Manage human resources.
Marketing management	Manage marketing.
Order & sales	Receive/process orders or sales of goods or services.
Production	Plan or produce goods or services.
Purchasing & inventory	Facilitate purchasing/procurement and/or inventory management of goods or services.
Integrated enterprise management	Integrate several business activities, applications/other systems, including with external applications (e.g. ERP, SCM, Business Intelligence).

Appendix D. The constructs and measurement items for e-business impact

Please rate each response on a scale of 1 to 5, where 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly agree. There are no right or wrong responses.

Since using e-business, our business has benefited from:

Constructs	Measurement Items
<i>Operational impact</i>	
Productivity	Since using e-business, our business has benefited from: Increased business productivity.
Cost reduction	Reduced business costs.
Product quality	Improved quality of products (goods or services).
Customer service	Increased customer service.
<i>Managerial Impact</i>	
Resource management	Since using e-business, our business has benefited from: Better management of resources (e.g. inventory, human resources, etc.).
Decision making	Better business decision making.
Performance control	Better business performance control (finance, production, etc.).
<i>Strategic Impact</i>	
Business growth	Since using e-business, our business has benefited from: Business growth (increased transaction volume or new markets).
Competitive advantage	Business advantages that competitors do not have.
Partner synergy	A better working relationship with business partners.
Business innovation	Business innovations (new ventures, new market strategies, etc.)

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