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Business-To-Business E-Commerce Adoption Amongst the Malaysian Manufacturing Small and Medium-Sized Enterprises: Strategic Agility as Moderator

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ABSTRACT: Research on e-commerce in Malaysia is developing, especially amongst the manufacturing small and medium-sized enterprises (SMEs), as it includes questions about the adoption of business-to business (B2B)e-commerce. Manufacturing SMEs accounted a large portion of gross domestic product (GDP) and SMEs exports. Previous scholars from the developed countries had conducted several research on these issues compared to the developing countries, especially Malaysia. The Balanced Scorecard (BSC) was used to measure the company's performance from four different perspectives. Strategic agility as a moderator should be attributed to the adoption of B2B e-commerce to improve business performance. Strategic agility plays a vital role in technological change, which can improve business performance. The study obtained detailed information on the respondents through the 49th edition of the Federation of Malaysian Manufacturers (FMM) Industry Directory. Three hundred and eighty-one Malaysian manufacturing SMEs participated in this study. The collected data used the online survey methods and Smart Partial Least Squares Analysis (Smart PLS) under the Structural Equation Modeling (SEM). The BSC's point of views include that financial, customers, internal processes, and learning and growth had a significant impact on the adoption of B2Be-commerce.The results showed that strategic agility governed the relationship between B2B e-commerce and internal processes.

Keywords: B2B e-Commerce Adoption, Balanced Scorecard, Strategic Agility, Manufacturing SMEs

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INTRODUCTION

Small and medium-sized enterprises (SMEs) are vital to the country's economic development and the gross domestic product (GDP), in developing countries such as Malaysia, Singapore, Indonesia, Vietnam, Thailand and Myanmar. The World Bank (2015) estimated that it required 600 million jobs in the next 15 years to meet the growing global labour demand. Generally, SMEs will expand to more vacancies in Asia and sub-Saharan Africa to fill these positions. The global workforces are available obligations to benefit. However, 90% of organisations aimed at SMEs to provide more than half of the international business opportunities. Additionally, SMEs occupied four out of the five new positions in the developing business sector for formal functions. Many registrants of business entities belonged to the SMEs category that include countless vacancies in the Organisation for Economic Co-operation and Development (OECD) countries. Since SMEs provided most of the jobs, promoting insurance and supervision of SMEs should minimise the country's unemployment rate. Additionally, SMEs are essential professional units contributing to the country's GDP (Department of Statistics Malaysia, 2020). The Malaysian SMEs are the backbone of the country's economy and the total registered companies comprised 98.5% (Hassan and Almubarak, 2016).

Therefore, the Malaysian SMEs contributed 37.8% of the country's GDP, 57.5% of the country's employment and 19% of the country's exports (SME Annual Report, 2018/2019). However, the 2018 GDP commitment reached 38.3%. Despite this, the actual implementation of SMEs was still in an insecure zone and the annual growth rate of small retail companies in 2017 dropped from 3.7% to 2.2% (The Star, 2018). The main problem encountered by private companies in 2017 was that labour costs continued to rise, but purchasing power was shrinking (The Star, 2018). The importance of SMEs'commitment to GDP is as important as that of large companies. The Malaysian government began to consider SMEs during the 10th and 11th Malaysian Economic Plans. The National Small and Medium-sized Enterprise Development Council (NSDC) foundation is the adventure stone to assist in organising SMEs through interconnected services and organisations. In the 10th Malaysian Economic Plan, the authorities intended to cultivate SMEs to promote progress, improve business performance and transparency.

Overall, the manufacturing organisations are increasing Malaysia's GDP. The total revenue value expanded to RM1,275.8 billion compared to just RM1,142 billion in 2015 (Malaysia Statistics, 2019). In 2017, the value of the manufacturing business also increased to RM294 billion compared to around RM257.1 billion in 2015.According to the Annual Economic Survey 2018, it confirmed that contributions from the three main subsectors brought huge total revenues. These subsectors were electrical, electronic and optical projects worth RM361.8 billion, followed by oil, chemicals and plastics worth RM340.4 billion. The last item was vegetable and non-vegetable oil and processed foods, valued at RM214 billion. This information also included the manufacturing SMEs.

The Federation of Malaysian Manufacturers (FMM)scrutinises all manufacturing organisations and provides functional capabilities and skills to

companies to enhance their human resources. FMM leadership indicates that the Malaysian manufacturing organisations' development depends on speculation in the private sector and their purchasing powers. Due to the improvement of external factors, such as the political situation and the trade war between the United States (US) and China, most of the manufacturing industries in Malaysia are not prepared to face the challenges of investing in resources for their businesses (Malay Mail, 2019).FMM also stated that the COVID-19 pandemic is another major challenge faced by the manufacturing industry and this dilemma continued until September 2020 (The Edge, 2020). Accordingly, the supply chain might have been affected. The manufacturing business encountered basic sourcing materials, especially goods imported from the US and China. Although the Malaysian government has provided wage subsidies to all private-sector workers, manufacturing operations can face considerable costs. The FMM president said most manufacturing industries encountered negative revenue and reduced spending to stay on the sidelines. The Malaysian SMEs are overwhelmed by the service and manufacturing sectors.

Therefore, this research focused on the Malaysian manufacturing SMEs. The development of manufacturing SMEs expanded between4.8% and 6.8% between 2016and 2017. Manufacturing SMEs are equally important for exports, accounting for 48.3% of absolute exporting SMEs in 2018, including beverages and tobacco, synthetic materials, manufactured products and miscellaneous manufacturing raw materials. In 2017, there were three countries, whereby manufacturing SMEs exported goods, namely Singapore (18.6%), China (8.9%) and the United States (7.9%) (Statistics Department, 2019).

Business-to-Business E-Commerce

The characteristics of business-to-business (B2B) e-commerce, such as the internet, have enhanced the ability of companies to use B2B technology to purchase, direct selling and exchange of information with partners in the production network (Sila, 2013; 2015). Generally, the B2B e-commerce market is more practical than the business-to-consumer (B2C) e-commerce because the transaction volume of B2B e-commerce is larger than B2Ce-commerce (Unctad, 2015). According to data from the US Census Bureau (2015), B2B e-commerce technology in the US estimated to be as high as USD5.8 trillion, which covered 91% of the e-commerce values. In South Korea, the ratio of B2Be-commerce was similar to that of the US, accounting for 91% of the total e-commerce value and 58% in the Russian Federation (Unctad, 2015).

Sila (2013) further showed that China and India are emerging economies and their prospects for B2B e-commerce in the future are encouraging. This information summarises that B2B e-commerce has its roots and benefits from the developed countries, but not from the developing countries. For example, only 2.5% of total B2B e-commerce occurred in the Middle East and Africa. UNCTAD (2015) emphasised once again that more than three-quarters of basic online B2B e-commerce transactions ascended in the developed countries, such as the United States (36%), United Kingdom (18%), Japan (14%) and China. (10%).

Information Technology (IT) and Information Systems (IS) documents determine that B2B e-commerce is essential to the resilience of businesses. Those organisations practising to work in actual business premises might not be able to opt-in later at this time. Additionally, standard organisations that effectively associated with e-commerce encountered difficulties from large companies, such as Lazada, Amazon and Alibaba, especially for B2B e-commerce. Compared to the developed countries that appreciate and expand their B2B e-commerce, many developing countries remain lax (Alsaad et al., 2018). The World Trade Organisation (WTO) stated that developed countries embraced B2B e-commerce rather than developing countries (Alsaad et al., 2015; Gibbs et al., 2003; Kshetri and Dholakia, 2002).

Outcome of Business-to-Business E-Commerce Adoption on the SMEs Performance

Traditionally, company performance is measured using financial and non-financial indicators (Kotane, 2015; Harif et al., 2013; Nelly, 2002; Luther et al., 2005; Matsumoto et al., 1995; Sun and Li, 2006). Chen, Jaw and Wu (2016) believed that only relying on financial and non-financial indicators to measure company performance would render the decision-making process ineffective. Therefore, organisations should implement complex performance measurement standards, such as the Balanced Scorecard (BSC) (Mohammad, Rashid and Tahir, 2013). Kaplan and Norton (1996) proposed BSC and it is considered as a complete performance measurement tool. Most large organisations refer to BSC to measure their business performance. Using BSC can discover financial and non-financial indicators and other indicators to be added to the organisation.

There are four BSC components to measure company performance. They are the financial perspective, the customer perspective, the internal process perspective and the learning and growth perspective (Kaplan and Norton, 1996). The financial perspective measures the company's profitability and strengthens its financial instruments to maintain its position in the industry. The customer perspective helps managers understand their customers' needs and the marketing departments. The internal process perspective explains how to provide good business value and meet the shareholders' needs, and the learning and growth perspective refers to improving its facilities, strengthening human capital through training and updating IT infrastructure.

According to Wu and Lu (2012), BSC meets the requirements of financial measurement rather than financial measurement. Financial measurement using a financial perspective in BSC is known as tangible measurement. However, for non-financial personnel who used the customer perspective, the internal process perspective and the learning growth perspective are intangible assets or intelligence measures (Wu and Lu, 2012). By implementing the different measurement perspectives, BSC indirectly meets the needs of the company's stakeholders (Behn, 2003). According to a research by Sainaghi, Phillips and Corti (2013), the application of BSC would encourage owners or managers to make informed decisions when considering the financial and non-financial perspectives of BSC. Zigan and Zeglat (2010) supported this theory, and they revealed that BSC was an effective measurement tool for managers and owners to improve business performances. Therefore, BSC in SMEs brings a general

vision of improving business performance and reasonable control procedures for strategic planning.

Strategic Agility as Moderator

Hinklet et al. (2011) defined strategic agility as the company's response speed to rapid technological changes (such as the internal environment) supported by dynamic capability theory. The company should be agile enough to accept any necessary adjustments, gather existing resources and achieve the organisation's strategy and goals. Hinkler et al. (2011) conducted a study to investigate the importance of agility to organisational performance, measured as organisational agility and strategic agility. However, the research results showed that strategic agility played a more critical role and was more important for organisational performance. There are four criteria used to measure a technology or system's agility (Benaben and Vernadat, 2017). Adaptability means that the system decides to change the structure. It means any new systems the organisation is trying to adopt and the techniques that can adapt to changes in the new design. If it is not assumed, the approach is not agile enough.

Strategic agility should also be flexible in responding to structural changes. The system to be adopted should be adaptable to the organisation's goals. It is because some designs may not compromise and will stick to the original settings. Moreover, the applied system should again respond to the organisation's goals. If they can reactivate the system, the system will make the necessary changes. The approach is not agile enough if there is no feedback from the system.

On the other hand, Sakthivel and Vinod (2014) measured the contribution of strategic agility to manufacturing agility. Researchers found that strategic agility could improve the company's current position. Most companies have implemented an information system, but they should understand whether the implemented system is really in the company's best interests. Therefore, it is necessary to check the agility of the system. Failure to do so will result in a waste of resources, and in the long run, companies will face defeat. The main reason is that the organisation believes that the system can bring success, but the implied fact is not. Additionally, cost, quality, reliability and flexibility are combined with the agility to ensure the success of business organisations (Seethamraju and Krishna, 2013). According to Shin, Lee, Kim and Rhim (2015), there were two views on agility: corporate capabilities and scalability.

Company capability refers to how fast a company can accept any changes in the industry and meet customer's needs (Braunscheidel and Suresh, 2009). If the company is not agile, it may lose customers and cannot compete in the industry. Secondly, scalability agility is more potent than business capabilities. Companies that can flexibly change their business methods in response to changes will also change their business strategies. In several previous studies, strategic agility played a moderating role.

According to a study by Sangari and Razmi (2015), agility partially mediated the relationship between business intelligence and supply chain

performance. At the same time, agility also regulates the relationship between information system capabilities and strategic supply chains (Tarafdar and Qrunfleh, 2016). In another study, agility moderated the relationship between its IT capabilities and some external factors (Chen, Wang, Nevo, Jin, Wang and Chow, 2013). Therefore, strategic agility played a flexible intermediary and moderator role to test the relationship between IT capabilities and competitive performance. The study on strategic agility is recently acknowledged, as a moderator or mediator in B2B e-commerce and SMEs performance.

THEORETICAL REVIEW

After consulting previous literature, this study found that research related to the adoption of B2B e-commerce is still lacking (Sila, 2015; Alsaad et al., 2017; Ocloo et al., 2019; Quaddus and Hofmeyer, 2017). Most of the aforesaid studies only focused on the adoption of e-commerce rather than the types of e-commerce. Due to the introduction of the Industrial Revolution (IR)4.0,it is necessary to conduct research based on this process. As mentioned above, IR 4.0 features an essential role in business performance. IR4.0 is the latest technology-based update.B2B e-commerce and IT are two different types of adoption because B2B e-commerce involves the support of the internet. There were a few studies conducted on the acceptance of B2B e-commerce amongst the manufacturing SMEs, especially in Malaysia (Rayahu and Day, 2017; AlSomali, Ghomali and Clegg, 2011; Elbeltagi et al., 2016; Bentley, Burgess and Hunter, 2012).

Additionally, research on manufacturing SMEs after adopting B2B e-commerce is limited (Quaddus and Hofmeyer, 2017). Secondly, there is no research to examine the impact of agility on B2B e-commerce adoption and the performance of manufacturing SMEs. Most of the previous studies used financial and non-financial indicators to measure the performance of SMEs (Kotane, 2015; Harif et al., 2013; Nelly et al., 2002; Luther et al., 2005; Matsumoto et al., 1995; Sun Y Li, 2006). However, there is a lack of research using the BSC system to evaluate the performance of the manufacturing SMEs, especially in the use of B2B e-commerce. It turns out that very few empirical studies have revealed all the aforesaid problems of the Malaysian manufacturing SMEs. Therefore, this study proposed to narrow these gaps by examining the use of B2B e-commerce as the background, with the performance of manufacturing SMEs, using the BSC method as the result of adoption. This also influences the moderator and is strategically agile. The results of this research will add value and complement the existing knowledge system. In this research framework, strategic agility was incorporated and tested as a moderator to strengthen the relationship between the adoption of B2B e-commerce and the performance of SMEs. The SME's performance was measured using a financial perspective, a customer perspective, an internal process perspective, and a learning and growth perspective. Figure 1 shows the study's research framework.

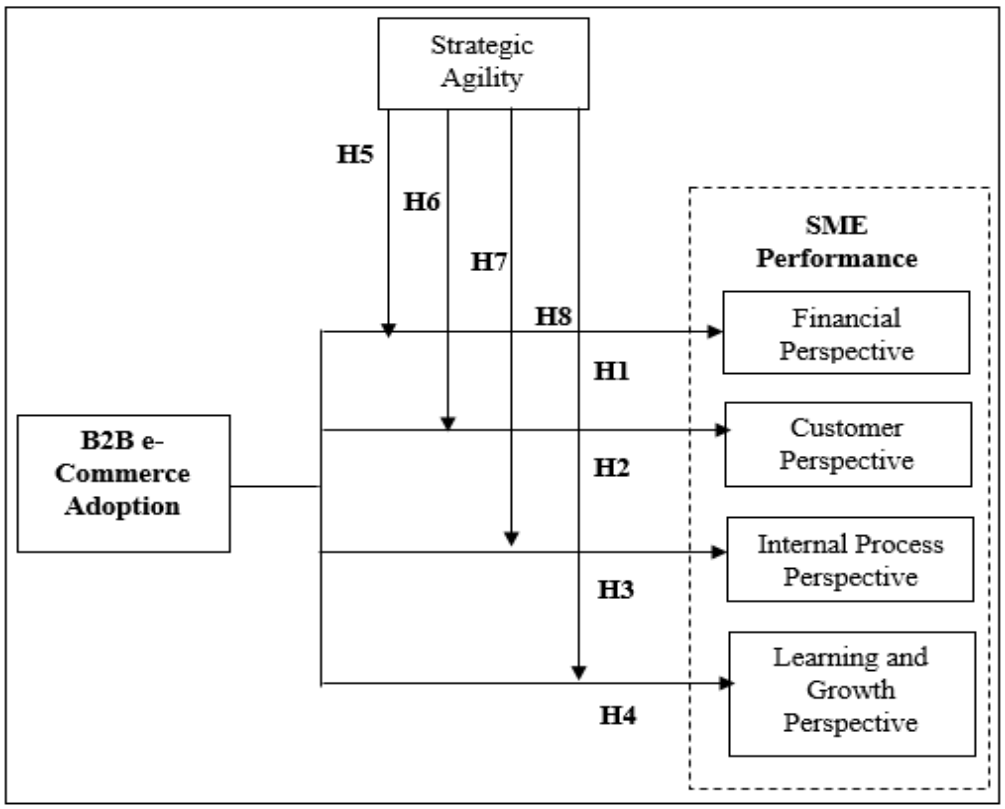

Figure 1: Research Framework

Generally, most IT-related research gains a competitive advantage using all of the organisation's IT facilities to apply for resource based view (RBV) (Bharadwaj, 2000; Bhatt and Grover, 2005). Any organisation that invests resources (especially financial resources) in IT can generate profits in return (Mithas, Tafti, Bardhan and Gof, 2012). It turns out that the adoption of information technologies by SMEs will show significant and positive relationships (Setiowati et al., 2012; Awa et al., 2016; 2017). According to Tan et al. (2008) and Ghobakhloo and Tang (2015), Malaysian SMEs had improved their business performance by adopting technologies, such as e-commerce. Mohtaramzadeh et al. (2017) mentioned that B2B e-commerce is fundamentally crucial for SMEs and could maintain the relative competitiveness of their businesses. Furthermore, Ocloo et al. (2018) stated that adopting B2B e-commerce could allow SMEs to benefit from various competitive advantages, such as cost savings and improved operational activities. BSC is the best tool to measure the company's performance. It has four components, which cover the financial and non-financial aspects: the financial perspective, the customer perspective, the internal process perspective, and the learning and growth perspective (Kaplan and Norton, 1996).

According to Sainaghi et al. (2013), BSC could help managers make effective decisions and that BSC is always a practical option for measuring business performance (Zigan and Zeglat, 2010). According to Sainaghi et al. (2013), when applying BSC, the owner or manager would make wise decisions when considering financial and non-financial perspectives in the BSC. Zigan and Zeglat (2010) supported this, emphasising that BSC is an effective

measurement tool for managers and owners to improve business performance. A component of BSC is a single variable aspect that included financial perspective, customer perspective, internal process perspective, learning and growth perspective (Mohammed et al., 2014; Wu and Lu, 2012; Anuforo, Ayoup, Mustapha and Abubakar, 2019; Ratnaningrum, Aryani and Setiawan, 2020). Therefore, this research proposed the following hypotheses:

H1: B2B e-commerce adoption positively affects the financial perspective aspect of SME's performance.

H2: B2B e-commerce adoption positively affects the customer perspective aspect of SME's performance.

H3: B2B e-commerce adoption positively affects the internal process perspective aspect of SME's performance.

H4: B2B e-commerce adoption positively affects the learning and growth perspective aspect of SMEs performance.

Bharadwaj (2000) pointed out that the IT structure of a company had a positive impact on the company's performance. He also discussed the positive correlation between IT capabilities and company's performance (Bhatt and Grover, 2005; Lin and Wu, 2014; Mithas et al.,2011; Parida, Oghaziand Cedergren, 2016). However, when IT becomes an expensive tool, it no longer provides a competitive advantage because it is financially unaffordable to accumulate (Chae et al., 2014). These findings were almost similar to those of Masa'deh (2013), Popovic, Puklavec and Oliveira (2018) and Wu and Lu (2015). Pezeshkan, Fainshmidt, Nair, Lance Frazier and Markowshi (2015) pointed out that the relationship between technology adoption and company performance no longer exists. Therefore, moderators such as strategic agility are crucial, as the moderator improves these relationships.

Shin et al. (2015) explained that strategic agility collaborates with other organisational strategies(such as business strategies) to improve organisational performance. This kind of cooperation will help the company gain a competitive advantage (Bharadwaj, 2000). In B2B e-commerce, SMEs should be flexible enough to adapt and help accelerate the adoption process. Additionally, the agility of the B2B e-commerce strategy and the agility of SMEs have improved the company's performance. Chen et al., (2013), Liu, Yang, Qu and Liu (2016), Sangari and Razmi (2015), Lungu and Miruna (2020) and Claub, Abebe, Tangpong and Hock Dopgen (2019) strongly supported this argument. Therefore, the study hypotheses were as follows:

H5: The relationship between B2B e-commerce adoption and the financial aspect of SME's performance is moderated by strategic agility, whereby the relationship between B2B e-commerce adoption and the financial part of SME's performance is more robust when there is solid strategic agility.

H6: The relationship between B2B e-commerce adoption and the customer aspect of SME's performance is moderated by strategic agility, whereby the relationship between B2B e-commerce adoption and the customer aspect of SME's performance is stronger with solid strategic agility.

H7: The relationship between B2B e-commerce adoption and the internal process aspect of SME's performance is moderated by strategic agility. The relationship between B2B e-commerce adoption and the internal process aspect of SME's performance is more potent when vital strategic agility occurs.

H8: The relationship between B2B e-commerce adoption and the learning and growth aspect of SME's performance is moderated by strategic agility, whereby the relationship between B2B e-commerce adoption and the learning and growth aspect of SME's performance is more potent when there is solid strategic agility.

METHODOLOGY

Sample and Data Collection

The target respondents for this study covered all Malaysian manufacturing SMEs. The number of SMEs that joined SME Corp in 2018/2019 was 907,065,covering various fields such as services, manufacturing, development, agriculture, mining and quarrying. Amongst them, the manufacturing SMEs registered as 5.3% with approximately 48,074 organisations. Due to the large number of organisations, this study adopted the sampling method of Krejcie and Morgan (1970). Amongst the 48,074 manufacturing SMEs, which was close to 50,000, the smallest sample to be selected was 381 organisations. Since this study used online survey methods for data collection, it distributed the online data to sample sizes, adding four times to confirm a sufficient sample size (Nulty, 2008).

As per the a fore mentioned, the number of 381 manufacturing SMEs increased by four times, which should be 1,524. Next, the unit of analysis for this study was an organisation, which referred to the Malaysian manufacturing SMEs. The target interviewees described were owners, managers and senior managers of manufacturing SMEs. To choose these people, they could be anyone in a management/dynamic positions, strategy developers, investment planners in the organisation and its IT participants.

Manufacturing SMEs have made more notable contributions to the absolute number of B2Be-commerce, and therefore, this research was conducted. Manufacturing SMEs are effectively associated with adopting B2B e-commerce (Ocloo et al., 2018; Mohtaramzadeh et al., 2018). Purposeful sampling methods determine the samples that meet the criteria and fall into this category (Singh, 2006). Only respondents who embraced B2B e-commerce could consider a more detailed analysis. Respondents were selected based on the number of employees and turnover. The data in the FMM catalogue represents general manufacturing organisations contracted in Malaysia and small to large organisations. SMEs have characteristics, such as the number of employees and turnover, which have become the selection criteria for those surveyed. A purposeful sampling strategy is reasonable because such inspections are mandatory and emphasise control and sampling of survey samples (Singh, 2006).

Measurement Development

There were 11 questions that best depicted the background of their organisations. The respondents were asked a question on timeline-based adoption. Next, the respondents answered the level of B2B e-commerce adoption phase presently engaged with their organisations. The respondents were required to address an inquiry on the number of years their organisations have adopted B2B e-commerce.

There were seven questions on B2B e-commerce adoption. The degree of adoption of B2B e-commerce estimated these questions. The questions used a five-point Likert scale with classifications: (1) not at all, (2) to some extent, (3) to a moderate extent, (4) to a great extent and (5) to a very great extent. Table 2 shows the summary of the measurement items. The BSC has four perspectives that evaluated SMEs' performance: financial, customer, internal process, and learning and growth. The respondents were requested to provide a comparative assessment of their competitive performance based on a five-point Likert scale by benchmarking the previous study by Wu and Lu (2012) on customer relationship management (CRM). The scale was anchored from "not at all" (1) to "to a great extent" (5). Table xx shows the measurements for SMEs performance. The study used a five-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5) for evaluating constructs measuring strategic agility. The respondents were requested to respond based on their perception of their organisations. Table 1 lists all the measurement constructs and the sources.

Table 1: Summary of Measurement Items

Constructs	No/ Items	Source
B2B E-Commerce Adoption	7	Gibbs and Kraemer (2003); Popa et al., (2016)
Financial Perspective	5	Wu and Lu (2012)
Customer Perspective	4	Wu and Lu (2012)
Internal Process Perspective	3	Wu and Lu (2012)
Learning and Growth Perspective	3	Wu and Lu (2012)
Strategic Agility	8	Tallont and Pinsonneault, 2009

Survey Administration

Key respondents sent online links to the questionnaire by email. The study obtained the respondents' email addresses from the FMM Industry Directory of Malaysia, 49th Edition. Follow-up on respondents, who did not response to the online survey invitations were conducted through emails and phone calls. Filtered questions were used to determine the B2B e-commerce adoption status. Respondents should indicate their level of adoption of B2B e-commerce and could be more involved in this research. However, respondents who did not use B2B e-commerce were considered non-adopters and excluded from this study.

Data Analysis Method

The Social Science Statistical Package (SPSS) and Smart Partial Lease Squares (Smart PLS) packages were used to analyse the collected data. Most of the studies on IT adoption, e-commerce and B2B e-commerce use structural models and statistical software, such as Smart PLS (Alraujo and Zilber, 2016; Ahmed et al., 2016; Ramana than and Krishnan, 2015; Ramdani et al., 2013; Chandra and Kumar, 2018; Mohtaramzadeh et al., 2018; Quaddus and Hofmeyer, 2017; Alsaad et al., 2018; Hu et al., 2019). There are two elements in data analysis, namely descriptive statistics and inferential statistics. All items went through the convergence validity and discriminant validity requirements. These measures belonged to the confirmatory factor analysis (CFA) to verify the validity and reliability of the items indicated by the structure. The validity of the convergence demonstrated the factor load and the average variance extracted (AVE). At the same time, the study used the Fornell-Larckercriteria, cross-loading and the Heterotrait Monotrait (HTMT)correlation relationship for discriminant validity. Basedon the evaluation of structura lmodels, the study tested the hypotheses.

RESULTS

Demographic

The SPSS and Smart PLS were used to analyse the collected data. The survey data collection lasted about two and a half months. The collection process started in December 2019 and ended in February 2020. The researchers collected 268 responses for this study and the confirmed response rate was 17.6%. At the same time, out of 268 responses, only 193 were considered valid responses because more than 71 respondents did not use any B2B e-commerce. Therefore, the respondents' adoption rate of B2B e-commerce was 72%, as shown in Table 2. Table 3 indicates the demographic information, while Table 4 shows the adoption stage of B2B e-commerce.

Table 2: Summary of Respondents

Questionnaire distributed	Responded	Questionnaire Response Rate
1,524	268	17.6%

B2B e-Commerce Adopter	B2B e-Commerce Adoption Rate
193	72%

Table 3: Demographic Information

Demographic Items	Categories	Frequency	Percentage (%)	Mean	Standard Deviation
Nature of Business	Chemical and Petrochemical Products	11	5.7		
	Electrical & Electronics Inc. Telecommunications	17	8.8		
	Food & Beverages	52	26.9		
	Machinery Engineering	14	7.3		
	Manufacturing Related Services	18	9.3		
	Pharmaceutical Products	16	8.3		
	Supporting Products & Activities	15	7.8		
	Logistics	17	8.8		
	Manufacturing Professionals, Medical, Scientific and Measuring Device/ Part	12	6.2		
	Metal Products	12	6.2		
	Non-Metallic Mineral Products	9	4.7		
Business Tenure				4.9	2.1
Number Employee				24.3	12.7
Sales Turnover	RM300,000 to RM1 million	24	12.4		
	RM2 million – RM10 million	50	25.9		
	RM11 million – RM20 million	65	33.7		
	RM21 million – RM30 million	34	17.6		
	RM31 million – RM40 million	15	7.8		
	RM41 million – RM50 million	5	2.6		

Business Branch	1	120	62.2
	2	54	28.0
	3	19	9.8
Information Technology Department / Function	In –House	148	76.7
	Outsource	45	23.3

Demographic Variables	Description	Count	Percentage
Gender	Male	95	49.2
	Female	98	50.8
Age	21 – 30	58	30.1
	31 – 40	76	39.4
	41 – 50	34	17.6
	51 – 60	16	8.3
	> 60 above	9	4.6
Year in Business	1	29	15.0
	2	80	41.5
	3	49	25.4
	4	25	13.0
	5	10	5.2
Your Position	Owner	67	34.7
	Senior Manager	84	43.5
	Manager	42	21.8
Education Level	High School and Below	46	23.8
	Certificate / Diploma	126	65.3
	Bachelor Degree	21	10.9

Table 4: B2B E-Commerce Adoption Stages

Variables	Description	Count	Percentage
Stage of B2B e-Commerce adoption	*Adoption in progress (e.g. in pilot study)*	19	9.8%
	Just adopted	76	39.4%
	Partially adopted	77	39.9%
	Have already adopted	21	10.9%
Years using B2B e-Commerce	< 1 year	22	11.4%
	1 - 2 years	75	38.9%
	3 - 5 years	96	49.7%

Measurement Model

Reliability and validity are essential parts of the structural model. Validity refers to test results that simulate the actual situation (Saunders et al., 2009). Additionally, the collected data should meet the convergence validity

requirements to evaluate the measurement model. Amin et al. (2016) pointed out that convergent validity implied more than a similar structure related to each other.

There are some components to measure convergence validity. The details include the external load, composite reliability (CR) and extracted average variance (AVE) (Hair et al., 2014). Hair et al. (2014) pointed out that the rule of thumb for external loading was higher than 0.708. The CR value should be above 0.7 to confirm the scale and the AVE value should be above 0.5 to prove the convergent validity value (Hair et al., 2014). The variance inflation factor (VIF) showed the constructed multi collinearity, which was less than 5.0 (Hair et al., 2017), as described in Table 5.

Table 5: Convergent Validity

Constructs	No/ Items	CR	AVE
B2B E-Commerce Adoption	7	0.961	0.803
Financial Perspective	5	0.901	0.695
Customer Perspective	4	0.875	0.700
Internal Process Perspective	3	0.957	0.917
Learning and Growth Perspective	3	0.961	0.925
Strategic Agility	8	0.909	0.625

Sometimes the Fornell-Larcker measurement might not be able to distinguish the lack of discriminative validity. Therefore, Hensler et al. (2015) proposed the heterogeneous relationship (HTMT) of related methods. The matrix of multiple ways and portraits is based on HTMT to assess the effectiveness of discrimination. The maximum value of HTMT should be less than 0.85 (Kline, 2014) and 0.90 (Gold et al., 2001). Table 6 shows that all the structures' discriminatory validity values using the HTMT rule were less than 0.90.Therefore, this also satisfied the requirement of judging validity.

Table 6: Heterotrait-Monotrait Validity

	B2B	CP	FP	IP	LP	SA
Business to Business e-commerce adoption (B2B)						
Customer Perspective (CP)	0.696					
Financial Perspective (FP)	0.782	0.870				
Internal Process Perspective (IP)	0.883	0.671	0.811			
Learning and Growth Perspective (LP)	0.878	0.624	0.719	0.895		
Strategic Agility (SA)	0.718	0.568	0.676	0.755	0.679	

Structural Model: Hypotheses Testing

After testing the model's strength, thet-value and significance level of the model should be solved. Hair et al. (2014) pointed out that the general criterion oft-value was 1.65 at the 10% significance level, 1.96 at the 5% significance level and 2.58 at the 1% significance level. This level of significance applies to the two-tailed tests. The study was testing the one-way hypothesis, whereby the significance value was divided by two and the t-value remained the same. Figure 2 shows the results of the Smart PLS algorithm and the path coefficient (standard beta). The hypotheses were supported by Hair et al. (2014) when the t-values were more significant than 1.65. Table 7 summarises the hypotheses tests.

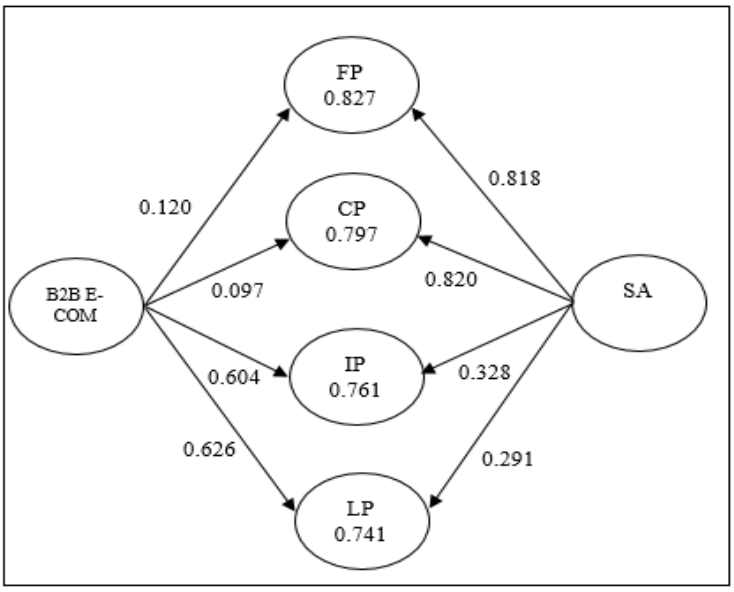

Figure 2: PLS Algorithm Value

Table 7: Hypotheses Testing

Hypothesis	Relationship	Path Coff. (β)	Std Error	t-value	p-value	Decision
H1	B2B e-Commerce Adoption -> Financial Perspective	0.620	0.083	7.440	0.000	Supported
H2	B2B e-Commerce Adoption -> Customer Perspective	0.656	0.101	6.474	0.000	Supported
H3	B2B e-Commerce Adoption -> Internal Process	0.565	0.102	5.544	0.000	Supported

	Perspective					
H4	B2B e-Commerce Adoption -> Learning and Growth Perspective	0.647	0.108	6.010	0.000	Supported
H5	SA_FP -> Financial Perspective	-0.115	0.091	1.261	0.104	Not Supported
H6	SA_CUP -> Customer Perspective	-0.249	0.097	2.573	0.005	Not Supported
H7	SA_IP -> Internal Process Perspective	0.136	0.081	1.675	0.047	Supported
H8	SA_LG -> Learning and Growth Perspective	0.126	0.085	1.476	0.070	Not Supported

Based on the results of adopting B2Be-commerce, all the assumptions of financial perspective (H1), customer perspective (H2), internal process perspective (H3), and learning and growth perspective (H4) were supported. It is found that the use of B2B e-commerce had a financial perspective ($\beta = 0.620$, $p < 0.000$),a customer perspective ($\beta = 0.656$, $p < 0.01$), internal processes ($\beta = 0.565$, $p < 0.00$), and a learning and growth perspective ($\beta = 0.647$, $p < 0.00$).The four different aspects of encouraging BSC (financial perspective, customer perspective, internal processes perspective, and learning and growth perspective) included the financial and non-financial measures and were measured separately. Next, strategic agility could regulate the relationship between B2B e-commerce and the internal process perspective (H7) of the manufacturing SMEs performance. The greater the impact of strategic agility, the stronger the relationship between the internal process perspective of B2B e-commerce and the manufacturing SMEs performance. Therefore, H7 was supported, as shown in Figure 3. The study did not support H5,H6 and H8 on strategic agility for they did not support B2B e-commerce adoption and the relationship between financial perspective, customer perspective, and learning and growth perspective.

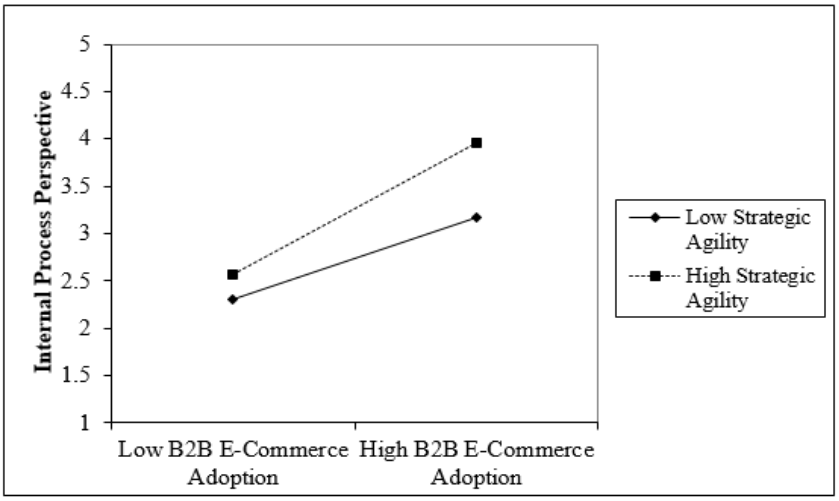

Figure 3: The Moderating Effect of Strategic Agility on the Relationship Between B2B e-commerce adoption and Internal Process Perspective of Manufacturing SMEs Performance

DISCUSSION

There are four perspectives on the BSC to measure the performance of SMEs. The four perspectives are the financial perspective, the customer perspective, the internal process perspective, and the learning and growth perspective. Research showed that all BSC metrics had a significant impact on SMEs performance. Assuming that B2B e-commerce has a significant effect on the financial outlook of manufacturing SME's performance (β= 0.620, p <0.000), H1was supported. The adoption of B2B e-commerce had a significant positive impact on the financial aspects of SME's performance. Previous studies had shown that the financial perspective increased the organisation's net profit margin and improved organisational performance. After adopting B2B e-commerce, the increase in sales growth return was the highest score amongst the respondents. In this study, most respondents (78.2%) served as senior managers, and they were the best candidates for obtaining an excellent financial return for their businesses. In this study, nearly72% of the manufacturing SMEs had adopted B2B e-commerce, mainly for economic benefits. Since the financial perspective only measures implicit information, non-financial measurements need to be considered. Manufacturing SMEs embraced B2B e-commerce to improve financial performance and improve operations to simplify business processes. This is consistent with the view of Chae et al. (2014), whereby IT capabilities contributed to the company's financial and non-financial performance.

It supported the assumption that B2B e-commerce had a significant impact on customers' perceptions on the manufacturing SMEs performance(β = 0.656, p<0.000), that was, H2. In B2B e-commerce, business transactions focus on suppliers, also known as customers. Most SMEs used B2B e-commerce to improve their performance from the perspective of business partners or suppliers. Ocloo et al. (2018) stated that the adoption of B2B e-commerce had improved the relationship between companies and business partners. The study showed that most manufacturing SMEs customers preferred e-commerce and

no longer used traditional business transactions. For example, suppliers for food manufacturing SMEs were more willing to order supplies from suppliers through e-commerce. A linkage between business operation and departmental systems was made fast in this model. Since the transaction is electronic-based, it will be connected with the accounting department to generate an invoice and notify the warehouse automatically. In the manufacturing SMEs, raw materials are an essential part that companies need to buy in large quantities. As most of the major trading partners migrated to e-commerce, SMEs should do the same. Therefore, the customer's perspective was essential and the adoption of B2B e-commerce could improve the business performance of business partners or suppliers.

The B2B e-commerce hypotheses had a significant impact on the internal process of the manufacturing SMEs performance ($\beta = 0.565$, $p<0.000$), H3 was compatible. In the manufacturing SMEs, internal processes are more critical for B2B e-commerce. For example, the production process, department and warehouse processes are essential. Manufacturing SMEs need to organise their production process, which is related to the B2Be-commerce system. For service-based organisations, e-commerce is relatively crucial to internal processes. Cost plays a vital role in the manufacturing SMEs and companies should invest in the best resources. SMEs are always trying to reduce resources and increase production. Therefore, manufacturing SMEs should adopt the best method to increase output with the least resources. Manufacturing SMEs prefer labour-intensive rather than machine-intensive. In this study, nearly 44% of the interviewees were senior managers and they always used B2B e-commerce to handle daily business operations, which involved several internal processes. Better functions provide customers or suppliers with quality services. Therefore, the adoption of B2B e-commerce had improved the internal processes of SMEs.

B2B e-commerce hypotheses had a significant impact on the learning and growth perspective of the manufacturing SMEs performance ($\beta = 0.647$, $p<0.000$) and was supported by H4. In this study, most respondents were in the senior management category and the adoption of B2B e-commerce had improved the learning and growth prospects of SMEs performance. The study also showed that the adoption of B2B e-commerce supported corporate culture, enhanced employees' job satisfaction and reduced employees' turnover. B2B e-commerce had improved the learning and growth of individuals and businesses. SME owners or managers could use their laptops, smart phones and tablets to conducte-commerce transactions, and they do not require commercial facilities wherever they are. Jeong, Lee and Nagesvaran (2016) believed that mobile devices were essential tools used by entrepreneurs and the devices assisted in promoting personal growth and improve business performance. Almost 76.7% of SMEs in this study had their own internal IT department. In summary, the IT department is solely responsible for managing the maintenance and update of B2B e-commerce. Therefore, the IT department could create values to define the IT strategy to achieve business objectives.

According to Kaplan and Norton (1996), skills, knowledge and systems were part of learning and growth. Adopting B2Be-commerce assisted the employees to master IT skills and knowledge. By adoptingB2B e-commerce, IT staff and employees have the opportunity to learn and grow. Therefore, the adoption of B2B e-commerce had a positive and significant impact on the learning and growth perspective of SMEs performance.

The study found that the adoption of B2B e-commerce had a significant impact on the financial perspective, customer perspective, internal process perspective, and learning and growth perspective of SMEs manufacturing performance.

Strategic agility plays a moderator role in the relationship between the B2B e-commerce and the performance of SMEs in four perspectives, which include the financial perspective, customer perspective, internal process perspective, and learning and growth perspective. Strategic agility could regulate the relationship between the internal process perspective (H7) of SMEs performance. When the impact of strategic agility was more significant, the adoption of B2B e-commerce had a more substantial positive impact on the internal process perspective of SME performance, and H7 was supported. Strategic agility did not ease the relationship between the adoption of B2B e-commerce and the financial perspective (H5), customer perspective (H6), and learning and growth perspective (H8) of the manufacturing SMEs performance. The impact of the adoption of B2B e-commerce on the financial prospects and the learning and growth prospects of SMEs performance were not affected by strategic agility. Therefore, H5, H6 and H8 were not supported.

The research results on the impact of strategic agility on the performance of B2B e-commerce and SMEs were consistent with previous studies (Chen et al., 2013; Liu et al., 2016; Sangari and Razmi, 2015). The findings of improving the agility of business performance were consistent with this research. B2B e-commerce adopts a flexible business strategy, which assists people and provides insights to the company's internal processes. The IT department has its own IT strategy and strategic integration with the business strategy (Shin et al., 2015), formulated by the owner or manager to improve organisational performance. Therefore, strategic agility contributed to the growth of IT staff and SME owners and managers.

When IT becomes an important product, it no longer provides organisations with a competitive advantage because it is neither non-economic nor economical for organisations to acquire it (Chae, Koh and Pry butok, 2014). It may be a possible reason why strategic agility does not mediate the relationship between financial outlook and SMEs performance in adopting B2Be-commerce. As SMEs businesses increase their investment in B2B e-commerce, it will affect their profitability and financial performance. Additionally,46.1% of respondents indicated that they had adopted B2B e-commerce in the past two or three years and it had declined between 2017 and 2019 due to the transition period from goods and services tax (GST) to sales and services tax (SST). These changes are the attack factors for most companies to adapt and modify the system while affecting costs. The research results showed

that many respondents indicated that the company promoted strategic agility, interdisciplinary training and team activities. The study revealed the views that learning and growth are not to improve organisational performance. Wu and Lu (2012) said that learning and growth perspectives affected organisational performance and are important in the early stages of any technology adoption. This finding supported that most respondents had adopted B2B e-commerce without considering the learning or growth factors.

Manufacturing SMEs do not need to maintain good relationships with suppliers or vendors to obtain the lowest value resources and maximise production. Therefore, the adoption of B2Be-commercewould increase the organisation's attractiveness for vendors. Consequently, this might be a possible explanation why the impact of strategic agility on the adoption of B2B e-commerce and customer's perspective on SMEs performance was insignificant. Secondly, the manufacturing SMEs have several internal processes linked to other departments, such as accounting departments and warehouses. For example, the adoption could integrate the warehouse system with the production system and the accounting department. Hence, strategic agility regulated the general relationship between internal processes to improve the organisational performance of SMEs.

Strategic agility governs the relationship between the adoption of B2B e-commerce and the SMEs performance. However, it only facilitates the relationship between SMEs manufacturing performance and internal process perspective, and not others. With strategic agility, from an internal process perspective, the relationship between the adoption of B2B e-commerce and the SMEs performance is closer. This relationship becomes even more critical when the influence of strategic agility is strong.

CONCLUSIONS AND RECOMMENDATIONS

Strategic agility plays a moderator role in the adoption of B2B e-commerce and the performance of manufacturing SMEs through an internal process perspective. There has been no previous research on measuring strategic agility as a moderator or mediator between B2B e-commerce adoption and SMEs performance.

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