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**KNOWLEDGE ACCUMULATION ABSORPTION MEDIATION  
ON RELATIONSHIP BETWEEN E-BUSINESS ADOPTION TO  
BUSINESS PERFORMANCE**

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*Abstract*

E-business opens up opportunities that lead to higher business performance among its adopters. However, e-business adoption is not the sole driver of higher business performance. E-business adopters who are successful in improving their business performance are those that possessed knowledge absorption capacity. Therefore, it is hypothesized that capacity to absorb new knowledge mediates the effect of e-business on performance. Based on theory of innovation diffusion by Rogers (1995) the causal relationships between adoption, absorption and business performance are explained. The empirical research on testing the mediation relationships collected 212 survey questionnaire data from Malaysian SMEs. The data was analyzed using PLS-SEM to test the mediating effect of knowledge absorption on the relationship between e-business adoptions to business performance. The research found significant mediating effect of knowledge absorption in the proposed model. The findings revealed the consequence and significance of this two important factors and suggestion for SMEs and authoritative training providers was put-forth.

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**Keywords:** SMEs, e-business adoption, knowledge absorption, mediation.



## 1. Introduction

Electronic business (e-business), also known as online business or e-commerce, is the activity of sourcing for supplies, buying and selling of goods or services through online channel. In Malaysia, e-business activity, the commonly used online trade medium beside the social network platform; has gained increased attention since the introduction of internet, cheaper prices of mobile electronic devices such as laptop and smart-phone; and cheaper prices of internet connectivity services. Together with these improvements, the infrastructure development of high-speed internet has significantly increased the numbers of gross-merchandise-volume of online business in Malaysia. SMEs could enhance their business performance through capitalizing on e-business facilities as it brings benefit in term of lowering cost specifically in marketing, logistics and also overhead costs. However, the SMEs leveraging on e-business is not exploited to its full potential. Many SMEs have started to use e-business to access to market information and data (Sin Tan et al., 2009) and for general information searches (Adham & Ahmad, 2005).

For SMEs, knowledge accumulation and absorption are insulator of their business from being stagnant. Before the era of Web 3.0, social network platform utilizing Web 2.0 technologies were successfully leveraged for social media marketing sub-activities such as news feeds, customer rating poll, customer testimonial, social advertisement and forums (Turban, Bolloju, & Liang, 2010). However, without updated knowledge on contemporary technology available such as Web 3.0 e-business applications, many SMEs presumed relying solely on social network platform still works well for their business. Although social network presents much opportunity for business, it is not equipped with the function to cater for seamless operation for business hence its implementation may involve some potential risk due to limitations such as separate system for placement of orders, payment transaction and delivery service (Steinhart, 2009; Chui, Miller, & Roberts, 2009; Dupre-Barnes and Barnes, 2009). Moreover, manually handled systems integration and management, not only leads to high cost but the process also becomes riskier and insecured (Chui et al., 2009).

Studies have also been conducted to examine the viability of doing online business using social network platform (see Duffett, 2015; Shih, 2010). The findings of these research have shown that social network platform can be a means of e-advertising because it capitalized on the number of followers and friends who subscribe to ones' social network account, i.e. Facebook, Instagram to name a few (Duffett, 2015). But, the limitation of social network platform is due to its functionality as it is design for socializing and the possibility fraud in business transactions. Studies which investigated cases of fraudulent business transactions due to irresponsible individual at social network platform (Vascellaro and Worthen, 2009) has highlighted difficulty in resolving the issues as design of security in social network platform is not as stringent as in the e-business platform. Moreover, public social network runs on unprotected Internet and weak data protection attract phishing and identity theft due to the user account of social network owner is not being validated, unlike the e-business user account.

Currently, among the popular e-business platforms in Malaysia are Grab and Uber (for e-hailing); Lelong.my, e-bay, Mudah.com, Lazada, Amazon, Shopee, Blee, Alibaba.com and #MYCYBER sale (for goods and products). The success of Lazada.com, an e-business platform established in Malaysia, has demonstrated the acceptance of e-business among Malaysian consumers. However, e-business adoption

among Malaysian SMEs remains unknown. With the widespread availability of e-business platform, it is anticipated that SMEs will leverage in using the platform to enhance their performance. Business-to-business or B2B model benefits SMEs in term of sourcing product and supplying product in bulk through increasing the volume of gross-merchandise-sales and profited SME from economic of scale. Moreover, e-businesses that employ online shopping for retail sales direct to consumers or B2C model not only benefited the SMEs but also the consumers, in term of easy and smarter access to buying. However, the fast developing e-business platform and internet infrastructure in Malaysia is a double-edge sword for unprepared SMEs. For instance, SMEs whose knowledge absorption is higher are more likely to perform better because they are leveraging on advance facilities available in e-business such as data analytics and database to strategize their business direction. However, lower knowledge absorption among SMEs may result in an increased in risk of pre-mature business closure due to inability to cope-up with new technology and advancement in running e-business. For example, automated and semi-automated advertising facilities such as Pay-per-click (PPC) marketing strategy might generate huge traffic-leads to online shop, but in order to get the most profitable investment on PPC marketing campaign, SME must acquire and replicate relevant knowledge into their business.

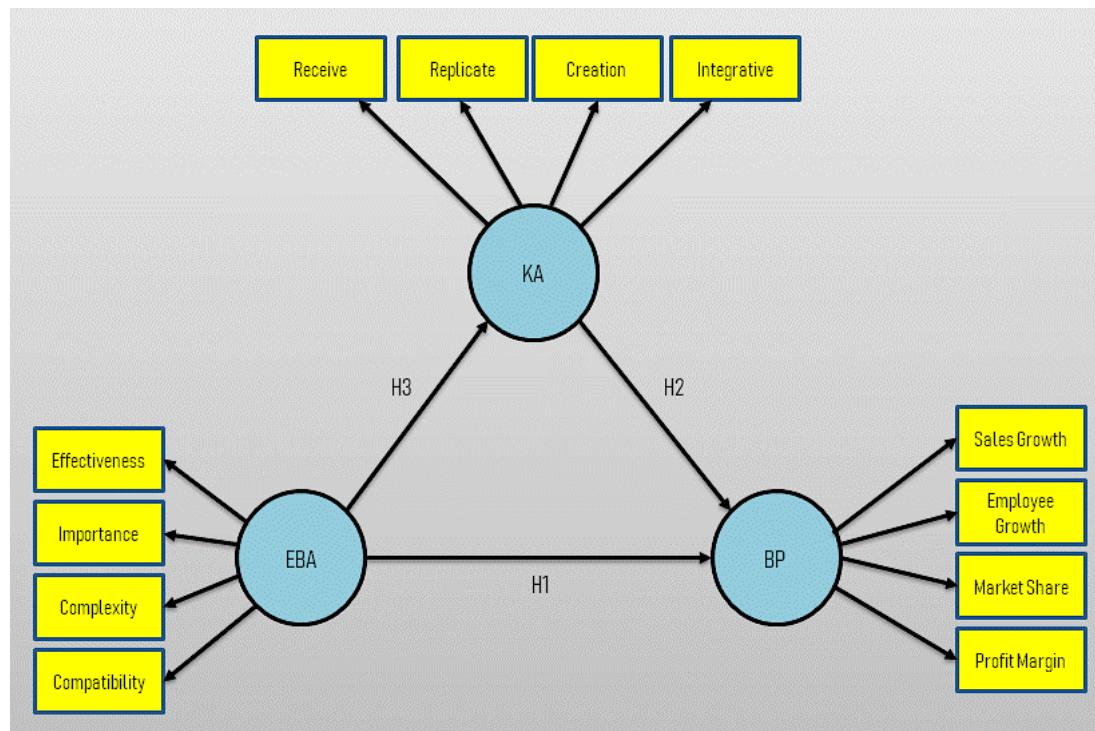
Given the lack of empirical research on online SMEs in Malaysia, understanding of the causal relationship between these factors such as e-business adoption and knowledge absorption capacity on business performance among SME will provide the entrepreneurs' training providers with richer information for improving their training design and content. As such, there is a need to examine the Malaysian SMEs e-business adoption and knowledge absorption. Thus, it is proposed that knowledge absorption mediates the relationship between e-business adoption and business performance. Therefore, this research aims to uncover the mediation effect of knowledge absorption in the relationship between e-business adoptions to business performance in the case of the Malaysian SMEs.

### **1.1. Conceptual Framework**

Despite the growing interest in e-business, theoretically rigorous explanation and focus in empirical research are limited. This research aims to investigate about the driving forces behind e-business performance, particularly factors such as e-business adoption and knowledge absorption. The antecedents of users' adoption for new technological innovation, refers to e-business are explained based on Innovation Diffusion Theory by Rogers (1995). Based on the theory, an entity that is successfully adopting e-business depends on user acceptance of the system (Hsiu-Fen Lin, 2008). User acceptance is explained by the following measures: perceived effectiveness, importance, complexity and compatibility of the technology. In Malaysia, the effect of SMEs perception on these dimensions of e-business adoption need to be understood in view of the escalating the number of e-business users.

E-business is a complex and continuously emerging technology. Effective diffusion of e-business differs from one business entity to another due to knowledge absorption. Researchers studying the e-business adoption need to consider the knowledge absorption antecedents of SME as a factor to business performance (Cohen & Levinthal, 1990; Jantunen, 2005; Martin & Matlay, 2003). This study hypothesized that the effect of e-business adoption on business performance is better exert if the SME possess knowledge absorption capability. Knowledge absorption is explained by the following measures:

capacity to receive, replication culture, creation and integrative capability. Therefore, the following conceptual framework is proposed as illustrated in Figure 1.



**Figure 01.** Conceptual Framework

## 1.2. Research hypothesis

Based on the conceptual framework, the following hypotheses are proposed:

*H1.* E-business adoption positively influences business performance among Malaysian SMEs.

*H2.* Knowledge absorption positively influences business performance among Malaysian SMEs.

*H3.* There is a significant mediating effect of knowledge absorption in the relationship between e-business adoption and business performance among Malaysian SMEs.

Based on the framework, there are three important variables of research – a dependent variable, independent variable and mediator variable. The dependent variable is SMEs business performance, measured by four items i.e. employee growth, sales growth, profit margin and market share. The independent variable is e-business adoption, measured by effectiveness, importance, complexity and compatibility. The mediating variable is knowledge absorption, measured by capacity to receive, replication culture, creation and integrative capability. The hypothesized relationship is supported by knowledge based theory. Based on the theory, knowledge absorption is the basis to explain differences in SMEs business performance. The overall research hypotheses explain what and why there are differences in business performance driven by deductive empirical insights approach.

## **2. Problem Statement**

For Malaysian SMEs, besides digital divide, knowledge absorption is an apparent barrier to the success of e-business adopters. Since an e-business operates 365 days in a year, this unique characteristic brings not only advantages but also challenges to those SMEs that are lacking contemporary e-business knowledge. Examples of challenge faced by SMEs are not only due to disparate of business culture, but also languages acumen. This means that both businesses-oriented and soft-skills oriented acumen are challenged. Hence, their knowledge absorption is required to transform and gain competitive performance.

Other than revolutionising the business trend, e-business adoption among Malaysian SMEs has transformed the back-end processes for example in operation support, modes of communication with partners and stakeholders, marketing techniques, records management methods and knowledge sharing among co-workers. Failure to leverage on knowledge-based advantage, e-business SMEs is prone to premature closure. This problem can be mitigated by understanding the gap and role of knowledge absorption from the lenses of SMEs itself. Therefore, this research finding is timely for Malaysian authoritative body (i.e. INSKEN, TEKUN and MDEC) to formulate better training content for e-business SMEs.

## **3. Research Questions**

To address these knowledge gaps, this paper posits four research questions: a) does e-business adoption and entrepreneurial knowledge absorption matters to business performance enhancement? Here, this research used innovation diffusion theory by Rogers (1995) to explain the relationship between variables and Wu, Mahajan and Balasubramanian (2003) as the basis to include business performance into the hypothesised research framework; b) what are the permeated features of e-business adoption that conceptualized the Malaysian SMEs e-business adoption? Here, this study adopted four-dimensional conceptualization of e-business from Wu et al. (2003) to be tested; c) what are the permeated features of knowledge absorption that conceptualized the Malaysian SMEs knowledge absorption? Here, this study adopted four-dimensional conceptualization of absorptive capacity from Cohen and Levinthal (1990); and finally, d) do entrepreneurial knowledge absorption mediates the relationship between e-business adoption and business performance among Malaysian SMEs? This mediation hypothesis is derived from research gap proposed in Hsiu-Fen Lin (2008) and Knowledge Based View (KBV) theory that assumed SME performance is limited by their bounded rationality (Conner & Prahalad, 1996; March & Simon, 1958).

## **4. Purpose of the Study**

This study provides baseline understanding of the position of Malaysian SMEs in e-business. To serve the purpose of this study, the study was operationalized by testing the mediation effect of knowledge absorption in the relationship between e-business adoption and business performance in the context of Malaysian SMEs. The size of SMEs involved in this research is controlled since larger business units could derive greater business performance.

## 5. Research Methods

### 5.1. Data collection

SME business entity is the unit of analysis in this research. A random sample of 500 Malaysian SMEs was drawn from the Facebook page of Malaysian National Institute of Entrepreneurs (INSKEN). The survey questionnaires were sent to the respondents. At the rate of 35% responses, 212 usable responses received and analyzed.

### 5.2. Measures

Questionnaire is designed around each latent construct of interest. SMEs were asked to provide feedback in areas that reflect the latent construct in the model. All items were measured using five-point Likert-type scale (ranging from 1=strongly disagree to 5=strongly agree). Measurement items used in this study were adapted from previous validated measure and were developed on the basis of a literature review as follows.

*E-business Adoption* refers to the characteristics that affect adoption decisions (Rogers, 1995) that includes effectiveness of the technology, importance, complexity and compatibility.

*Knowledge Absorption* refers to the characteristics that enables the use of knowledge and realize their potential that includes capacity to receive, replication culture, creation and integrative capability.

*Business Performance* refers to business owners' perception on his/her sales growth, employee growth, market share, and the profit margin once adopting e-business.

### 5.3. Data analysis

Prior to data analysis, the data cleaning process was carried out to eliminate issues related to missing value and responses bias using SPSS software descriptive data analysis. The descriptive analysis provides the overview of the Malaysian SME who responded the questionnaire. Then data was analysed by using PLS-SEM analysis by using SmartPLS software to estimate path models with latent variables using the algorithm, to compute standard results assessment criteria and to support additional statistical analyses. The PLS-SEM analysis test and identify the strength of the mediation effect in the relationships between e-business adoption and knowledge absorption capacity.

## 6. Findings

The assessment of the structural model and hypotheses are carried out after assessing the measurement model. The details of the measurement properties of e-business adoption, knowledge absorption and business performance are established. From the measurement model, the inner variance inflation factor (VIF) values of the latent variables are lower than 5 indicted that there is no issue of multicollinearity among the variables. Main loading for each item is above the cut-off point of 0.500 and convergent validity to explain the indicators' variance provided by AVE. The AVE for the latent construct BP, EBA and KA are 0.834, 0.685 and 0.645 are well above required minimum level of 0.50 (Table 1).

**Table 01.** Outer Loading

<b>Constructs/ Indicators</b>	<b>Outer Loadings</b>	<b>AVE</b>
<b>Business Performance</b>		<b>0.834</b>
Employee Growth	0.742	
Sales Growth	0.727	
Profit Margin	0.792	
Market Share	0.837	
<b>E-Business Adoption</b>		0.685
Effectiveness	0.676	
Importance	0.911	
Complexity	0.921	
Compatibility	0.849	
<b>Knowledge Absorption</b>		0.645
Receive	0.900	
Replication	0.743	
Creation	0.787	
Integrative	0.765	

Composite reliability to evaluate the measurement model internal consistency for the constructs Business Performance (BP), E-Business Adoption (EBA) and Knowledge Adoption (KA) are shown to be 0.845, 0.777 and 0.865 respectively indicating high level and satisfactory composite reliability (Bagozzi & Yi, 1988). Knowledge absorption found to be a significant mediating variable that transmits the effect of e-business adoption variable on business performance variable.

From the PLS path model the overall  $R^2$  equals to 0.68 and it is found to be moderate. This suggested that both constructs EBA and KA jointly explain 68% of the variance of the endogenous construct BP. Direct effect from EBA to BP is significant, hence Hypothesis 1 is accepted. Direct effect from KA to BP is also significant, hence Hypothesis 2 is accepted. Indirect effect from EBA to BP, with KA as mediator is significant, hence Hypothesis 3 is accepted. Magnitude of mediation that indicates the strength of mediator is 25.5% leads to conclude that the effect of EBA on BP can be explained via the KA mediator and the magnitude is considered full.

### **6.1. Managerial Implications**

This research has provided several insights: a) business performance is influenced by factors, including but not limited to e-business adoption and knowledge absorption. Therefore, it implies that training for SMEs has to be focused in e-business adoption and knowledge absorption areas in general; b) out of these two factors, knowledge absorption is the most important, hence SMEs should make the knowledge absorption a priority characteristics in their human resource selection; c) knowledge absorption is not a single dimension factor. Instead, knowledge absorption is mostly affected by capacity to receive information and creation of solutions for business problems. Creation refers to capacity to combine knowledge with other knowledge or resources to produce output for business to perform; and d) knowledge absorption significantly mediates the strength between e-business adoption and business performance. This means that if SMEs are unable to absorb knowledge, they may not successful even if they adopted e-business technology. As a result, SME should not simply focus on adopting e-business

technology for escalating business performance; it would be more important for SMEs to improve their knowledge absorption.

## 6.2. Discussion

E-business technology has had a noticeable impact on business and entrepreneurship. The ICT investment in Malaysia has increased at a rate of 9.2 percent per annum from RM3.8 billion in 1995 to RM5.9 billion in 2000 (Economic Planning Unit, 2001). However, the majority of the companies in Malaysia have websites that leverage on Web 2.0 technology which are just for informational purposes and only few of them are using the websites with e-business technology that enabled business transactions (Adham & Ahmad, 2005). Likewise, Kogilah, Santhapparaj, and Eze, (2008) stated that low knowledge absorption capacity had becomes a factor which leads towards the lower rate of adoption of e-business technology.

Malaysian SME still face some challenges even if they want to adopt new ways or strategies for business performance improvement such as adopting Web 3.0 technology. Antlová (2009) stated that the challenges to adopting e-business includes the lack of expertise and technical skills, financial capacity as well as employees' internet literacy. Ongori & Migiyo (2011) also explained that the challenges are linked directly and indirectly to the human capital, environment and the structure of the organizations. Other than that, some factors which caused SMEs to have less successful business performance even after adoption of e-business include lack of knowledge, short vision of its benefits, lack of skilled workers, insecurities and reluctant to make a change, underdeveloped infrastructures network and incomplete standard operating procedures.

In addition, in Malaysian context, a study by Monahan et al. (2011) confirms a significant relationship between knowledge accumulation and business success, saying that the more knowledgeable the business owner, the more successful the business. Since SME, particularly small and micro business start-ups, tend to be smaller and younger, it can search for growth through product strategies and market development as highlighted from the findings in this research. Therefore, higher knowledge absorption capacity can help business owners to understand and utilize e-business technology successfully. Business owners with more knowledge absorption capacity have potential to see the broader picture of revenue sources coming from internal operations instead of relying on external capital requirements. Thus, it can be said that the absorption of knowledge would have a significant mediation effect on the relationship between e-business adoption and SME business performance.

## 7. Conclusion

It is evidenced that e-business adoption effect on business performance is facilitated by knowledge absorption. E-business technology must be adopted with adequate knowledge to ensure progress of business performance (e.g. employee growth, sales growth, profit margin and market share). SMEs are advise to make more efforts in adopting new e-business technology in order to continuously upgrade themselves as well as to move forward by learning, retraining and skills upgrading to achieve their business objectives of improving product quality and increasing their market share (Hashim, 2015). Many



Malaysian SMEs have realized that e-business adoption is vital in helping them to improve business efficiency in dealing with their customers as well as stakeholders (Sin Tan, Choy Chong, Lin, & Cyril Eze 2009). Education and knowledge absorption capability does help in understanding and utilize e-business technology. Monahan et al. (2011) emphasizes that business owners with better education and more knowledge, and adopted e-business, are potentially more successful. These two are important factors – e-business adoption and knowledge absorption contributed to business competitiveness. As such, this paper concluded that the relationship between e-business adoptions with business performance has a significant mediating effect from SMEs knowledge absorption.

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