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Disruptive Technology and SMEs Performance in Malaysia

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Abstract: The aim of this research is to examine the relationship between disruptive technology (DT) and firm performance (FP) among SMEs within the state of Selangor, Malaysia. A total of 150 firms responded for the research study. This research utilized Partial Least Squares Structural Equation Modeling (PLS-SEM) to establish validity and reliability of measurement model and test the relationships between these variables. The results indicated a significant and positive relationship between disruptive technology and the performance of SME firms. The finding equally provides a better insight for various stakeholders to further understand the effects of disruptive technology on SMEs performance and also adds to knowledge on the importance of adoption of disruptive technologies in predicting firm performance. Entrepreneurs of SME firms should position and emphasize adoption of disruptive technologies to ensure enhanced overall firm performances.

Keywords: Disruptive Technology, Adoption, SMES, Firm Performance, Malaysia

Introduction

Based on considerable contributions by the SMEs to the development of a country, many countries including Malaysian government had put in place various types of schemes, incentives, campaigns, assistance, and programs to further encourage more people to get involved into entrepreneurship particularly in SME sectors and enterprises. The impact of these efforts had positively resulted, in an increase of establishment of enterprises (micro, small and medium). Although high number of establishments, fact remains that their failure rates are equally alarming and high. In his research, Praag (2003) stressed, whilst the number of establishments is high, the survival of these firms is questionable. These findings are similar to many past surveys done the world over and mortality of these SME firms is high especially within the initial five (5) years of business operation (EIM, 2010 & US SBA, 2014).

Malaysian's SMEs contribute about 36.3% of the country's gross-domestic-product (GDP) and employs 65.5% share of total employment (SME Annual Report, 2015/16). Aside from generating income and employment, SMEs equally has a crucial role in gender and youth empowerment, addressing urban and rural poor through entrepreneurship promotion, therefore member states depend significantly on SMEs for their economic growth and development. Due to the significance of SMEs in the growth of the nation's economy, the performance of SMEs are continuously at the center and attract interest among the academicians, investors, trade organization, researchers, universities, entrepreneurs, and government agencies. Gartner & Shane (1995) and Thornton (1999) discovered that, entrepreneurship is an upward trend. Sathe (2003) further reveals that, the economy of the new world is entrepreneur oriented with the creation and rise of new businesses, thus hailing entrepreneurs as the new supporter of economic development and competitive enterprises. Kamyabi & Devi (2011) maintained that, contribution by the SMEs towards the development and growth of any economy is undeniable, both, in the developed and developing countries. Despite positive contributions, SMEs are often hampered by various challenges such as, low level of innovativeness, inadequate capacity to adhere to standards and certifications, limitation towards access to finances, and minimal technology adoptions.

As stated by Bernard (2018), industrial revolution known as industry 4.0 is driven by digital transformation in vertical and horizontal value chains and product and service offerings of the companies. Therefore, SMEs embarking on an innovative mind-set has to be complemented by further embracement of newer technologies, known as disruptive technology (DT). Oke *et. al.*, (2003) asserts that, encouraging creativity and innovation in entrepreneurship is also the agenda of governments in the member countries of the 'Organization for Economic Co-operation and Development (OECD) and transitional, emerging and developing economies, as entrepreneurs are the means of growth, pooling capital for funding investment, innovativeness, along with, necessary skill-sets.

This research explores causal effects of and adoption of disruptive technology on SMEs performance and that it is an important decisive factor that is deemed as an important criterion revelation, for the survival, sustainability and successes of Malaysian SMEs hence further reduce firms' failure rates.

Problem Statement

As shown in Table 1.1, the Company Commission of Malaysia (SME census 2011), in its five (5) yearly census publication year 2015 reported that 97.3% of the firms were SMEs totaling up to 645,136 registered companies in Malaysia.

Table 1.1

SME: By Sector in Numbers.

Sector	Total Establishments (a)	Total SMEs (b)	Percentage (%) of SMEs over Total	
			Establishments (b)/(a)*100	Total Employment by SMEs
Overall Total	662,939	645,136	97.3	3,669,259
Services	591,883	580,985	98.1	2,610,373
Manufacturing	39,669	37,861	95.4	698,713
Agriculture	8,829	6,708	76.0	78,777
Construction	22,140	19,283	87.1	275,631
Mining & Quarrying	418	299	71.5	5,765

Source: SMECorp, 2015.

SMEs in Malaysia face many challenges, particularly in the light of changing global markets, including the ability to compete globally and move up the value chain (UNDP, 2007). Finding by Morgan *et. al.*, (2003) reveals that, innovation is important for small firms as they need to constantly introduce new products, develop new processes, make changes in organizational structure and explore new markets. Although there are big number of SMEs in various sectors and industries, mortality rate of these firms is extremely high too. Figures of year 2015 reported that the numbers of companies wound-up increased by 35.5% to 2,363 companies compared to 1,744 in 2014. A total of 2,107 companies were affected through voluntary action by members and creditors, whilst the rest were wound-up by court order. Based on Table 1.2, a total number of 2,851 companies (2012: 2,419 companies) were wound-up in 2013.

The number of companies dissolved through the “striking-off” process increased from, 29,180 in 2014 to 30,643 in 2015, representing an increase of 28.5%, (SSM, 2015). A total of 8,996 applications for striking-off were submitted voluntarily while the rest were initiated by the Registrar to remove dormant companies.

Table 1.2

Winding-up and Striking-off of companies.

Years	<u>2015</u>	<u>2014</u>	<u>2013</u>
Companies wound up & Struck-Off (Total)	33,006	30,924	26,700

Source: SMECorp, 2016.

As shown in Table 1.3, the ‘Companies Commission of Malaysia’ (CCM) records shows that, on an average, the number of businesses terminated per year over the last three years (2013

- 2015) stands at 26,859, which shows an 23.2% increase in the number of small businesses that were terminated (SSM annual report, 2016).

Table 1.3

Termination of Business.

Year	No of Companies
2012	20,380
2013	18,161
2014	29,966
2015	35,450 (increased 31.5%)

Source: SMECorp, annual report 2016.

These failure rates drastically and directly and or indirectly affects the contribution towards Malaysian economy in terms of GDP, job employment opportunities, productivity and value-added offerings in the country. The unfortunate and poor performance of SMEs further adds woe to economic and social issues in regards to job unemployment, inflation, retrenchment and consequently, bankruptcy of businesses, which may and could result in social illness and unrest.

Siringoringo *et. al.*, (2009) found that, some of the reasons for terminations of firms as well as, shutting-down problems experienced by the SMEs are due to challenges and factors related with either the followings concerns;- difficulties in obtaining external financing, sales and marketing problems with general management and internal financial management. Additionally, Ali & Ndibisi (2006); Hashim (2007) stated that the shortage of resources affects the firm's performance. Lucky & Olusegun (2012) draws attention to, low productivity, lack of managerial capabilities, access to credit, difficulty in accessing technology and heavy regulatory burden against SMEs. Gilmore *et. al.* (2006) bring to light similar findings, that is, resource constraints and resource limitation being key factors. Recent findings by SMECorp (2014/2015) highlights weaknesses such as; - management and technology capability constraints, limited e-commerce and internet marketing, low value-add and not being competitive, limited research & development (R&D) and technology adoption, to name a few. Chong (2012) further stated that, while having various governments' assistance and programs targeting new entrant in SME sectors, yet the mortality rate is growing higher. Findings furthermore suggest that reason for SME closure is equally due to the fact that SME owners are not aware of the business challenges for SMEs in digital era (Thestar, 2017), and industry revolution known as industry 4.0 (New Straits Times, 2017).

The gaps observed from various studies are, the lack of investigations in Southeast Asia and particularly in Malaysia on, adoption of disruptive technologies and its effect on SMEs performance.

Literature Review

The word performance is not new, despite the frequency of usage yet, its meaning is relative. Moullin (2007) states that, SMEs' performance is seen and viewed as, how firm delivers value to its stakeholders, as well as, their customers. Similarly, Neely *et. al.*, (1995) states that, firm performance is a concept often discussed in studies, yet has no single definition. Firm

performance may be defined as the process of quantifying activity and action of firm which leads to achievement of its goals and objectives, through satisfying its customers and stakeholders. These achievements are through an efficient and effective performance of business operation as compared to its competitors (Neely, 2005). Firm's performance can be defined as the measurement of how well its goals and objectives are achieved (Penrose, 1959). According to Alenka (2014) on 'Determinants of SMEs performance' at the 7th, international scientific conference, New York, argues that attitude of owner-manager of firms is an important factor as well, and goes to suggest that, entrepreneurs who are open to ideas and views, are individuals with positive mental strength that has three (3) dimensions;- i) engages in learning, ii) in search of and for novelty, and iii) constantly seeking feed-backs.

Therefore, this study defines SMEs firm performance as the ability of firm to effectively and efficiently exploit available resources to ensure survival and further its growth, yet fulfill customer satisfaction and contribute towards creation of employment.

Disruptive Technology

According to Christensen (1997), disruptive technology (DT) is termed for, an emerging technology out of a specific and niche market that, becomes dominant thus disrupts the stable-state of a market and often affect and force-out, existing leading and incumbent firms out of the market. Disruptive technology (DT) is a term coined and introduced by Joseph L. Bower and Clayton M. Christensen in year 1995, and that DT has since been popular item of research, (Paap & Katz, 2004; Daneels, 2004; Sood & Tellis, 2005; Carayannopoulos, 2009) mainly for the risk DT pose towards established and market leading companies.

Disruptive technology equally refers to a selection and or, an adoption of technologies or up-to-date technology that significantly alters the way that businesses operate. A disruptive technology may force companies to alter the way that they approach their business or risk losing market share or risk becoming irrelevant. Recent examples of disruptive technologies includes but not limited to, smart phones and the e-commerce retailing. Clayton Christensen popularized the idea of disruptive technologies in his book titled, '*The Innovator's Dilemma*' in 1997. Technopedia.com defines disruptive technology as an enhanced or completely new technology that replaces and disrupts an existing technology, rendering it obsolete. It is designed to succeed similar technology that is already in use and that disruptive technology applies to hardware, software, networks and combined technologies. Features and benefits of newer emerging technologies according to Adner (2002), are often valued by the customers, generally for its most critical performance significance or value. Table 1.4 below shows a few examples of disruptive technologies of the past 30 years.

Table 1.4

Few examples of Disruptive Technologies.

<u>Dominant Technology (Incumbent)</u>	<u>Disruptive Technology (New entrant)</u>	<u>Disruptive Attribute</u>	<u>Period of Disruption</u>
ARPANET / Facsimile / Telegraph	Internet	Scale-free networks, Fast, Cheap	1980's
Workstation/Typewriter /Television	Window Operating System/Personal Computer (PCs) /Laptops	Cheap, for everyone, Weight	1980's
5.25-inch disk drive	3.5-inch disk drive/Thumb-Drive	Size, Weight (laptops), Mobility	1980's
Chemical Photography	Digital Photography	Capacity, Development	2000's
Compact Cassette	Compact Disc	Sound quality, Capacity	1990's
Discman	Mp3 players	Portability, Capacity	2000-2005
Internet	Mobile Internet /WiFi	Real-time, Seamless connection, Inexpensive	1998 onwards (3G network)
Public-Phone/Telecoms /Cell or Hand Phone/Pocket camera/Calculators	Smart Phone	Integration of video, Camera, Voice and Communication.	1980's- 1990-2000's

Source: Data comes from various sources- in magazines, books and online (2017).

From the table 1.4 above, disruptive technologies are constantly evolving and that, these technologies are altering the way businesses are conducted at home and across borders, further adding value to firm's existing offerings resulting in better efficient and effective business operations, lowering cost and enhancing performance and profits. As pointed-out by Dominic & Wilhelmina (2012), the Internet is one of the technologies that, consumers and businesses are aware of and are making use of. The internet may not be broadly recognized, but in today's modern world, the Internet is the key to successful business operations. More risk-taking companies may realize the potential of a disruptive technology and try to find ways to incorporate and adopt these technologies into their business processes. Companies that fail to account for the effects of a new disruptive technology may find themselves losing market share to companies that have found ways to integrate the technology into the way that they manage labor, capital and overall business operation.

A disruptive technology does not have to be better than those currently offered by the market, and may damage the overall market to some extent by existing technology. It could, for example, be significantly cheaper and still provide the desired features. The advent of e-commerce retailing has led consumers to buy products online rather than from their stores, with online options often carrying lower prices. This has benefited consumers but made it much more difficult for producers and brick-and-mortar stores to maintain profitability.

Therefore, it is imperative that many business owners should utilize the Internet instead of using conventional and traditional methods. SME owner need to be aware of the up-to-date technologies available for consumption for their businesses, which provide varied benefits, such as, utilization of these technology lowers cost, increase efficiency, and ultimately enhance quality of products and services. Despite the glaring facts and figures, most people are ignorant of recent technologies that could be used in their businesses. Based on challenges faced by SMEs, it can be concluded that business failures are subjected to varying factors, such as innovative capability, and technology adoption (SMEcorp, 2014/15) due to the advent of information technology and significant technological advancements contributed by industry trend and revolution known as industry 4.0, evolution in the digitization and automation of processes.

The literature presented above leads to the development of the following research question:

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***RQ:** Is there any positive relationships between Disruptive Technology and SME's Performance? - (Disruptive Technology – SMEs Performance).*

Methodology

The aim of the research is to analyze the impact of disruptive technology on firm performance and to answer the research question, a questionnaire-based survey was conducted in the year 2017. The empirical data of this study were collected from owner-managers or senior management staff of firms within the state of Selangor, Malaysia. The effective response rate is about 20%.

Descriptive as well as, inferential statistics methodology for data analysis was used for the research. Inferential statistics utilized to infer about the population from which the data is obtained from (Singh, 2007), explaining and summarizing given set of data, whereas descriptive analysis to further describe and explain the related data. On collection of the raw data, the respondent's questionnaire was coded and subsequently computed into the Statistical Package software for Social Science (SPSSv22 and SmartPLSv3) for data analysis.

Total of 150 SMEs firms within the state of Selangor participated in this research. Multiple approach of data collection through survey questionnaire were utilized, which are as follows; postal mail, whatsapp smartphone's application, participation in events organized by SMECorp Malaysia and an online survey via emails. The researcher investigated the effects and effects of disruptive technology on SME's performance, as depicted on figure 1.1 below.

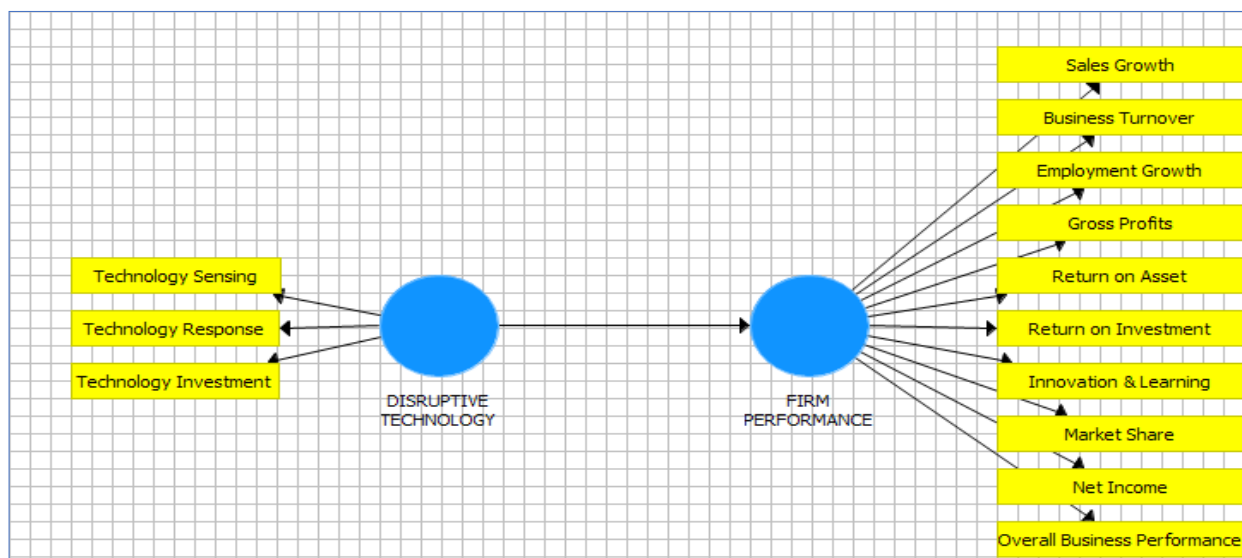


Figure 1.1

Conceptual Model

Results and Discussion

As reflected in Table 1.5, positive relationship is indicated and is supported with beta 0.309, T-value 3.328, P-value 0.001, and effect size 0.070 and the predictive relevancy indicated that the value of Q² for SMEs’ performance is 0.279. Therefore, it is confirmed that SMEs firms that routinely practice and adopts disruptive technology significantly improve SMEs performance in Malaysia.

The results equally indicated the value of R² for SMEs’ performance as 0.439. The analysis results have proven that the conceptual model is sound and a reliable source to measure the SMEs’ performance through disruptive technology.

Table 1.5

Direct Relationships Results

Path Coefficient Direct Relationship

Research Q	Construct Path	Std Beta	Std Error	T-Test	P-Values	R ²	f ²	Q ²	Decision
RQ1	DT--FP	0.309	0.115	3.328	0.001	0.439	0.07	0.279	Supported

Findings obtained from this empirical study and along with several past studies established that, disruptive technology (DT) generally contributes positively to firm’s performance. The analysis shows that there is a significant relationship between DT and SMEs Performance. It is hereby acknowledged that SMEs firm which adopt newer or latest technologies or technology oriented SMEs, will have a better performance as compared to SMEs that do not embrace or adopt these technologies for effective and efficient business performance enhancement. This finding is also in accordance with what Adner (2002) states, that features and benefits of newer emerging technologies are often valued by the customers, generally for its most critical performance significance or value. In the same vein, Gao *at. el.*, (2007) stated that, technology oriented firms appear to possess the ability and will to acquire better

technologies to achieve superior performance. Similar findings are also supported by following researchers (Anthony, 2014; Covin & Slevin, 1989; Timothy & James, 2007). More risk-taking companies may realize the potential of a disruptive technology and try to find ways to incorporate and adopt these technologies into their business processes. Companies that fail to account for the effects of newer technologies may find themselves losing market share to companies that have found ways to integrate the technology into the way that they manage labor, capital and overall business operation

Conclusion

It is imperative that SME entrepreneurs and or owners-managers acknowledges' the importance of disruptive technologies in enhancing firm performance. Finding of this research clearly indicated that disruptive technologies are an effective influencing factor for firm performance. It is recommended that, SMEs need to recognize the importance and benefits of disruptive technologies as higher and better firm performance depends on the SMEs abilities for strategic choice of appropriate strategies enacted with proper resources and capabilities present within the firm.

As the findings shows, significant impact on firm performance can be achieved by embracing and managing disruptive technologies. With disruptive technology, SMEs can embark on product, process, marketing and organizational innovativeness to produce better quality products, better quality services, better quality and creative marketing approach for wider reach and an improved organizational quality skills to serve customers better. This in turn can lead to higher customer satisfaction, resulting is superior firm performance. Therefore, SME owners-managers must recognized the importance of disruptive technology and that, newer or up-to-date technology's features and benefits that may be beneficial hence are vital for firm's sustenance and further growth.

In conclusion, SMEs need to recognize the importance of disruptive technologies as better performance is dependent on SMEs ability to embrace and adopt disruptive technologies to enhance business operation, lower cost, and produce better quality products and or services. In other words, the performance of SMEs that are technology oriented that adopts disruptive technologies is different and performance are better. It can be argued that SMEs with and those adopts disruptive technologies are more likely to have larger market share, higher sales revenues and larger profits.

On a final note, entrepreneur or owner-managers has to have the ability to identify opportunities or mismatches in the market, thus a focus on niches, a personal passion for their business or industry with the ability to communicate firm's vision. Additionally, owner-managers must ensure that firm produces an innovative product or service, along with a business that makes a positive impact in the community, beyond pure profits, along with the desire to engage with policy makers to shape agendas related to creation of jobs, financing and matters concerning challenges faced by SMEs.

Theoretical and Contextual Contribution

The study provides' theoretical implication and practical implication. Finding supports the research framework and contributes to the Resource-Based-View (RBV) theory by showing empirical evidence obtained, as RBV put forward, that the performance of firm is influenced by the firm's bundle of intangible and tangible resources and hierarchies of activities governed by routines and rules and that technological innovation and creative destruction is the basis of competitive advantage. Creative destruction as Schumpeter's theory best applies to firm that wishes to reinvent and remain competitive by being constantly innovative at churning out great products, services, way of marketing and or organizational approaches adopted thereby enhancing and acquires competitive-advantage.

Besides, finding equally support the fact that, it is imperative for the government as well as, policy makers to reveal and publicize their actions and programs to assist and improve the performance and sustainability of SMEs in Malaysia. These programs must be well coordinated to guide the SMEs, hence are patronized and that, SMEs can benefit from these offerings. Therefore, there is a definite need and it is important that an improvement on coordination among various institutions and enhancement of publicity for wider reach is necessary to further assist SMEs. Government should equally introduce a policy that would encourage SMEs to pursue innovative business activities and adoption of disruptive technology by luring these firms through the payment of special incentives, granting grants, tax-exemption and other form of rebates to facilitate ease of embracement and boost acceptance or adopters.

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