An Investigation of Factors that Influence Innovation-Adoption among SMEs

Noor Fazira Hamid[1], Eta Wahab[2], Nor Hazana Abdullah[3]

Noor Fazira binti Hamid
Faculty of Technology Management and Business
University of Tun Hussein Onn Malaysia (UTHM)
86400, Parit Raja, Batu Pahat, Johor
noorfazirahamid@gmail.com

Eta Wahab
Faculty of Technology Management and Business
University of Tun Hussein Onn Malaysia (UTHM)
86400, Parit Raja, Batu Pahat, Johor
eta@uthm.edu.my

Nor Hazana Abdullah
Faculty of Technology Management and Business
University of Tun Hussein Onn Malaysia (UTHM)
86400, Parit Raja, Batu Pahat, Johor
hazana@uthm.edu.my

***Abstract*— In today's global economy, innovation helps organizations to grow. Innovation is important as the production or adoption of useful ideas and idea implementation in the organization. It can be applied to products, processes, or services and in any organization. Generally, organizational growth is measured in turnover and profit. Application of innovation in an organization has become an important factor to ensure the management of an organization run by smoothly. This process is affected by multiple factors, identification of the factors that significantly affect innovation adoption would provide insight on how to increase innovation adoption among SMEs. This is a particularly pertinent issue for SMEs have been recognized as the economic impetus in both developed and developing countries. Furthermore, the level of innovation in Malaysia is still low. Thus, this paper aim to investigate the factors that influence innovation adoption among SMEs. The significance of this research to SMEs firm can enjoy substantial economies of scale and the SMEs firm can achieve better competitive strategies and performance.This paper based on literature review over a 13 year period from 2000 until 2013. This review is based on 50 journals relating to innovation adoption. The findings are reviewed 13 factors that influence innovation adoption.**

Keywords*— Innovation; Adoption; Innovation Adoption; SMEs; Organizational Innovation;

I. Introduction

Innovation is the process of managing to something established by introducing something new. It can be applied to products, processes, or services and in any organization [1]. According to Smith [2] stated that innovation is a something new. It is derived from the Latin word "nova" meaning new. At the organizational level, innovation generally defined as the development (generation) or use (adoption) of new ideas or behaviors [3, 4, 5]. The behavior or idea may be pertain to product, service, technology, system, process or practice. It is the introduction into the marketplace, either by utilization or by commercialization.

Innovation is a complex construct. Organizations generate innovation for their own use or for use in other organizations. It has been conceptualized in many different ways of analysis by scholars from a variety of academic disciplines. Based on Damanpour and Wischnevsky [3], stated that the generation of innovation is a process that results in an outcome as a product, service, technology, or practice that is at least new to an organizational population. The adoption of innovation results in the assimilation of a product, service, technology, or practice new to the adopting organization [3, 4].

Generally, innovation is considered to be one of the key success in organization. It is because all organizations need to generate ideas and change in order to sustain their current activities and develop growth and lead to increased efficiency. Thus, the factors influence innovation adoption is important for the organization. Hence, this paper reviews the literature on innovation adoption at the organizational level. Thus, this paper would discuss the factors that influence innovation adoption among SMEs.

II. Literature Review

A. Innovation Adoption

According to Rogers [6] adoption is the decision which refers to an individual or organization to make full use of an innovation as the best course of action or reject an existing innovation, and passes through a sequence of stages before acceptance of a new product. Innovation adoption is the process where an individual or other decision making unit passes knowledge of an innovation. It's to forming an

This research was supported by the grant scheme Exploratory Research Grant Scheme (ERGS), Ministry of Education (MOE). Grant vote number (E013).

attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision [6, 7, 8]. Within an organization the adoption is considered as problem solving in which identified problems could be addressed based on an existing idea and adapted to deal with recognized needs [3].

Based on Moghavvemi et al., [9] two main stages of organizational adoption are the initiation and implementation. The adoption decision occurs between the initiation and the implementation stage. In the implementation stage, the organization decides to purchase and make use of the innovation while in the initiation stage, the organization becomes aware of the innovation, forms an attitude towards it, and evaluates the new product. It encompasses awareness, consideration, and intention sub-stages. However, this organizational adoption decision is only the beginning of implementation. The acceptance or assimilation within the organization now becomes important. This is consistent with Rogers [6], who defines adoption as the decision to make full use of an innovation as the best course of action available. Adoption of innovations in an organization implies that adoption also occurs within the organizational level.

However, the innovation process includes identifying the needs of the market, strategy formulation as a reference for innovation, developing or acquiring solutions, prototyping, testing, production and availability of products and new or improved services to the market [10]. In fact, Tidd et al. [10] highlight that an important point is the fact that the market, consuming these products and services, generate new information and feeds the whole process.

B. Organizational Innovation

Organizational innovation has been widely defined as the creation of new ideas and new behaviors in the organization [11]. The dimensions of organizational innovation are extremely complex and multiple; it can be reviewed from two aspects: (1) breadth of innovation, which includes policies, system, administrative, processes, products, services, and others; (2) depth of innovation, which includes the importance, the degree of influence, effect on long term profitability, and others [12].

Fundamentally, there are two distinctive types of organizational innovation been classified in most literature, namely technological innovation, and administrative innovation [11, 12, 13]. Chuang et al. [12] has further categorized technological innovation into secondary dimensions: product innovation and process innovation; while administrative innovation remains distinct from the other two. Under Salim & Sulaiman [14] and Mavondo et al., [15] research, organizational innovation was distinctively classified into three dimensions, namely product innovation, process innovation and administrative innovation.

C. Innovation Among SMEs

In the 10th Malaysia Plan, Malaysia is expected to be based by Innovation-led Economy. It is to fulfil the entire five National Missions such as to move the economy up the value chain and to raise the country's capacity for knowledge, creativity and innovation and nurture 'first class mentality'. Innovation is needed to achieve 8% growth par annum for Malaysia and it is widely accepted that, the SMEs are the key source of innovation in most developed and developing countries [16]. Various policies and incentives have been formulated in the New Economic Model (NEM) for Malaysia to intensify efforts in technology upgrading and developing indigenous factors are complex, rooted in local constraints and behaviors technological capabilities among SMEs. The abilities of SMEs innovate would render them global competitiveness and sustainability [17].

Although the SME Corporation has introduced the Innovation Rating Certification for Enterprise Rating and Transformation (InnoCERT) as a recognized means for 'innovative SMEs' yet, the current state of innovation-adoption among SMEs in Malaysia is not well understood as the role, influence and interrelationships of adoption and not deeply understood due to lack of research in these areas. Among the scholars, there is no specific consensus regarding the factors that significantly affect innovation adoption. This is mainly because the versatility of conceptualization of innovation itself and still depends on the researchers context [18].

Generally, the level of innovation in Malaysia is still low. In fact, the ranking of selected countries in the Global Innovation Index (GII) for the year 2009-2013, Malaysia was categorized as an upper-middle income country based on its current Gross Domestic Product (GDP) per capital value. In 2013, Malaysia's ranking was unchanged at 32th position, which is similar to 2012 ranking. Nevertheless, Malaysia scores increased from 45.90 in 2012 to 46.92 in 2013. Overall, Malaysia was ranked at 32nd out of 142 economic countries. In the efficiency index which measures innovation performance based on average of the innovation output index and innovation input index, Malaysia was ranked 52nd. On the hand, Malaysia was ranked 30th and 32nd in the innovation output index and innovation input index, respectively [19].

According to a national survey of innovation (2005-2008) in Malaysia showed that larger firms tend to carry out innovating activities compared to SMEs [20]. In addition, the aim of this paper to investigate the factors that influence of innovation-adoption among SMEs and what is the new innovation-adoption model among SMEs. Based on the work situation and the development of ever-changing technology, many factors can influence organizations to apply their knowledge and gain skills acquired technology to work

III. Research Methodology

In this research, the concentration is given to fifty journals that have been selected from several international databases in order to ensure that the purpose of the study could be met. The major sources of data articles relate to innovation.

Thus, this paper investigates articles over a 13 year period from 2000 until 2013. In addition, to ensure the data does not misses of the purpose research in which aspect keyword selection is very important. The journals that have been selected according to keyword in which includes innovation, adoption, innovation-adoption, innovation in SMEs and organizational innovation. Relevancy of articles was determined first through the title of the article Next, read the abstract in detail and analyzed. Abstract search only based on the keywords of the research. The databases were accessed online through the website of the Tunku Tun Aminah Library (Universiti Tun Hussein Onn Malaysia). Lastly, classification of the results was presented and discussed.

In addition, to ensure the data does not misses of the purpose research in which aspect keyword selection is very important. This keyword selection can help to ensure that data can be collected based on the research objectives.

IV. Result

The first part of this analysis involved the factors that influence innovation adoption was identified. Table I showed fifty articles related to innovation adoption. A total of fifty articles has been published between the year 2000 until 2013. It also shows the name of the authors and year of articles that relate to innovation. Overall, from the articles, researcher have listed out the factors that influence innovation adoption. Analysis of this article shows that there are 13 factors that influence innovation in the organization of which are the relative advantage, compatibility, complexity, trial-ability, observability, ease of use, management support, technological expertise, knowledge management, business expertise, competitive pressure, customer pressure, and industry pressure.

TABLE I. SUMMARY OF THE REVIEWED ARTICLES RELATED TO INNOVATION ADOPTION (SOURCES: OWN COMPILATION)

No.	Authors / Year	Factors													
		Management Support	Technological Expertise	Knowledge Management	Business Expertise	Relative Advantage	Compatibility	Complexity	Trialability	Observability	Ease of Use	Competitive Pressure	Customer Pressure	Industry Pressure
1	Aboelmaged, M. G. (2000).				√									
2	Alkraiji, A., Jackson, T., & Murray, I. (2011)	√			√									
3	Ally, M. a., & Toleman, M. (2004)										√			
4	Arroyo, P. E., Ramirez, J. a., & Erosa, V. E. (2007)											√	√	√
5	Beatty, R. C., Shim, J. P., & Jones, M. C. (2001)	√					√	√						
6	Brand, M. J., & Huizingh, E. K. R. E. (2008)			√										
7	Carter, L., & Belanger, F. (2004)					√	√	√	√	√				
8	Chiaroni, D., Chiesa, V., & Frattini, F. (2009)	√		√										
9	Chong, S. (2008)	√				√	√	√	√	√				
10	Citurs, A. (2007)	√												
11	Damanpour, F., & Schneider, M. (2008)	√						√						
12	Frambach, R. T., & Schillewaert, N. (2002)	√									√	√	√	√
13	Gopalakrishnan, S., & Bierly, P. (2001)							√						
14	Gopalakrishnan, S., & Damanpour, F. (2000)	√			√									
15	Gopalakrishnan, S., Wischnevsky, J. D., & Damanpour, F. (2003)	√										√	√	
16	Hashim, J. (2007)					√	√	√	√	√				
17	Häggman, S. K. (2009)					√	√	√	√	√				
18	Hester, A. J. (2010)					√			√		√			
19	Hinnant, C. C., & O'Looney, J. a. (2003)				√									
20	Hossain, M. a, & Quaddus, M. (2009)			√										
21	Hu, H. (2011)											√	√	
22	Hussein, R., Mohamed, N., Ahlan, A. R., & Mahmud, M. (2011)							√	√					
23	Kamal, M. M. (2006)			√										
24	Kargin, B., & Basoglu, N. (2006)										√			
25	Khairuzzaman, W., & Ismail, W. (2007)					√					√			
26	Köbler, F., Leimeister, J. M., & Lugmayr, A. (2006)							√						
27	Kostopoulos, K. C., Brachos, D. A., & Prastacos, G. P. (2004)	√												
28	Krause, D. E. (2004)			√	√									
29	Lee, B. C. Y. (2012)										√			
30	Lee, D., Son, I., & Lee, J. (2011)					√	√	√	√					
31	Lijuan, W., & Selection, A. I. (2011)										√	√	√	√
32	Lin, C. (2007)		√											
33	Lin, C.-Y., & Ho, Y.-H. (2009)	√	√	√								√	√	√
34	Mantzana, V. (2006)	√												
35	Mostafa, M. (2005)	√												
36	Nan, Z., Xunhua, G. U. O., & Guoqing, C. (2008)											√	√	
37	Palmer, D. W., Ellinger, A. E., Allaway, A., & D'Souza, G. (2012)					√	√	√						
38	Plewa, C., Troshani, I., Francis, A., & Rampersad, G. (2012)										√			
39	Power, D. (2009)				√									
40	Pun, K. F. (2005)		√											
41	Rampersad, G. (2012)	√		√										
42	Scott, S. D., Plotnikoff, R. C., Karunamuni, N., Bize, R., & Rodgers, W. (2008)					√	√	√	√	√				
43	Slyke, C. Van, & Comunale, C. L. (2005)					√	√	√	√	√				
44	Sophonthummapharn, K. (2009)											√	√	√
45	Tohidi, H., & Jabbari, M. M. (2012)	√												
46	Tseng, F.-M., Kuo, S.-C., & Lo, H. (2011)										√			√
47	Valley, K. (2011)					√	√	√	√	√				
48	Wei, O. J., & Ismail, H. Bin. (2009).					√	√		√	√	√			
49	Zdunczyk, K., & Blenkinsopp, J. (2007)											√	√	√
50	Zhai, C. (2011)					√	√	√	√	√				

Based on the result of 13 factors that influence innovation, one research framework have been proposed. This framework can be viewed as the framework to allow the researcher and manager to organize the complex set of factors that influence innovation adoption in organizations. Figure 1 below shows the proposed innovation adoption framework.

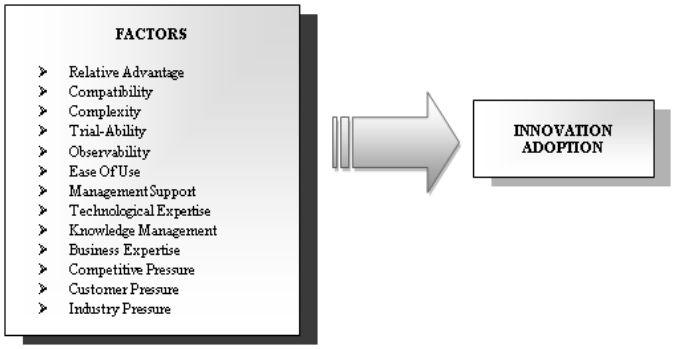

Fig. 1. The Proposed Innovation Adoption Framework (Sources: Own Compilation)

Figure 1 (see above) shows the proposed framework to study innovation adoption among SMEs in Malaysia. Thus, for the antecedent of decision to innovation adoption, this study enriches the thirteen main factors that influence innovation adoption namely relative advantage, compatibility, complexity, trial-ability, observability, ease of use, management support, technological expertise,

knowledge management, business expertise, competitive pressure, customer pressure, and industry pressure. Therefore, it is important to consider all factors above as important factors that lead to intention to adopt or reject the innovation. Researcher expects that if SME owners have a positive attitude toward innovation, that to adopt and use innovation in their organization. The expectation of the researcher that owner managers of SMEs would have a positive response.

v. Findings

In summary, this research comprehensively reviews the thirteen factors that influence innovation adoption. It was analyzed based from fifty articles related to innovation adoption which published between the year 2000 until 2013. This findings meets the purpose of this research that to investigate the factors that influence innovation adoption among SMEs. Innovation involves the desire to adopt new ideas. Thus, an organization needs to be committed in to learn to understand about innovation in organizations. Besides, managers should create or encourage the learning process among their employees. This means that employees will enhance their skills or develop new skills and share existing knowledge. Therefore, the adoption of innovation can be considered if any of the factors was analyzed could influence innovation in organizations.

In today's global economy, SMEs in Malaysia need to be competitive in the rapidly growing environment. To be competitive, they need to adopt new innovation adoption and making use of platforms to improve quality, efficiency, creates new products or services to market and expand their business. In order to increase their competitiveness, SMEs should invest in market research, R&D, and innovation and at the same time they will be better able to understand the needs and wants in the marketplace.

In addition, the importance of innovation is not limited to large firms only but also to SMEs firm can enjoy substantial economies of scale. It is because the more the understanding of the importance of innovation, the greater would be the insight into how firms can achieve better competitive strategies and performance.

Acknowledgment

The authors would like to thank Universiti Tun Hussein Onn Malaysia (UTHM) for supporting this research under the grant scheme Exploratory Research Grant Scheme (ERGS), Ministry of Education (MOE). Grant vote number (E013). The authors also would like to thank the relevant parties that have directly or indirectly contributed to the success of this study. The author wish to express their gratitude to the anonymous referees for their helpful comments and sincere suggestions to improve the paper.

References

[1] O'Sullivan, D., & Dooley, L. (2008). *Applying innovation*. Sage.

[2] Smith, D. (2010). *Exploring innovation*. McGraw-Hill Higher Education.

[3] Damanpour, F., & Daniel Wischnevsky, J. (2006). Research on innovation in organizations: Distinguishing innovation-generating from innovation-adopting organizations. *Journal of Engineering and Technology Management*, *23*(4), 269-291.

[4] Walker, R. M. (2008). An empirical evaluation of innovation types and organizational and environmental characteristics: towards a configuration framework. *Journal of Public Administration Research and Theory*, *18*(4), 591-615.

[5] Khalil, T. M. (2009). *Management of technology*. Tata McGraw-Hill Education.

[6] Rogers, E. (2003). *Diffusion of Innovations*. 5th Ed.. New York, Free Press.

[7] Knol, W. H., & Stroeken, J. H. M. (2001). The diffusion and adoption of information technology in small-and medium-sized enterprises through IT scenarios. *Technology Analysis & Strategic Management*, *13*(2), 227-246.

[8] Wymer, S. A., & Regan, E. A. (2005). Factors Influencing e-commerce Adoption and Use by Small and Medium Businesses. *Electronic Markets*,*15*(4), 438-453.

[9] Moghavvemi, S., Salleh, N. A. M., Zhao, W., & Hakimian, F. (2011). An Empirical Study of IT Innovation Adoption Among Small and Medium Sized Enterprises in Klang Valley, Malaysia.

[10] Tidd, J., & Bessant, J. (2011). *Managing innovation: integrating technological, market and organizational change*. Wiley. com.

[11] Damanpour, F., & Gopalakrishnan, S. (2001). The dynamics of the adoption of product and process innovations in organizations. *Journal of Management Studies*, *38*(1), 45-65.

[12] Chuang, T. T., Nakatani, K., Chen, J. C., & Huang, I. L. (2007). Examining the impact of organisational and owner's characteristics on the extent of e-commerce adoption in SMEs. *International Journal of Business and Systems Research*, *1*(1), 61-80.

[13] Tan, C. L., & Nasurdin, A. M. (2010). Knowledge management effectiveness and technological innovation: an empirical study in the Malaysian manufacturing industry. *Journal of Mobile Technologies, Knowledge and Society*, *13*.

[14] Salim, I. M., & Sulaiman, M. (2011). Organizational learning, innovation and performance: a study of Malaysian small and medium sized enterprises.*International Journal of Business and Management*, *6*(12), p118.

[15] Mavondo, F. T., Chimhanzi, J. and Stewart, J. (2005), "Learning orientation and market orientation: Relationship with innovation, human resource practices and performance", *European Journal of Marketing*, Vol.39, No.11, pp. 1235-1263.

[16] Tenth Malaysian Plan (2011-2015). Kuala Lumpur: The Economic Planning Unit.

[17] New Economic Model For Malaysia (2010). Percetakan Malaysia Bhd.

[18] Damanpour, F., & Aravind, D. (2012). Managerial innovation: Conceptions, processes, and antecedents. *Management and Organization Review*, *8*(2), 423-454.
[19] Ministry of Science, Technology and Innovation (MOSTI), (2011) Malaysia, *Annual Report 2011*, downloadable at www.mosti.gov.my
[20] Malaysian Science and Technology Information Centre (MASTIC), (2013) *Malaysia, National Survey of Innovation 2005-2008*, downloadable at www.mastic.gov.my.