

Knowledge Management, Innovative intelligence and Sustainable Competitive Advantage in Small and Medium Enterprises

Rohana Ngah, Zarina Salleh, and Ismail Ab Wahab

Universiti Teknologi MARA, Malaysia, {hana.ngah; zarsalleh; iwahab596} @gmail.com

ABSTRACT

This study is to explore the relationship of knowledge management, innovative intelligence and sustainable competitive advantage by using partial least square. Knowledge management practices are known for its impact on organizational performance however, it is yet to be explored on sustainable competitive advantage especially on Small and Medium Enterprises (SME). This study is also attempts to explore the role of innovative intelligence in mediating the relationship. Hundred twenty questionnaires have been collected from knowledge-based SMEs. Partial least square analysis is used in the analyses to determine the relationships. Knowledge management was found to have indirect relationship with sustainable competitive advantage where innovative intelligence served as a mediator of the relationship of knowledge management and sustainable competitive advantage. The findings showed that SMEs have not exploited their organizational knowledge to develop sustainable competitive advantage through innovation. Innovative intelligence is identified as an important catalyst for SMEs to sustain its competitive advantage.

Keywords: Knowledge Management Practices, Innovative intelligence, Sustainable Competitive Advantage.

I INTRODUCTION

Knowledge management is a weapon for company's competitive advantage (Lee & Choi, 2000). According to OECD report (1996), knowledge-based economy is an economy that is directly based on the production, distribution and use of knowledge and information. Knowledge plays a greater role in productivity and economic performance. Knowledge management (KM) has become an important component for sustaining competitive advantages. Small and medium-sized enterprises (SMEs) play an important role in the Malaysian economy. SMEs contributed to 99% of business establishments in Malaysia. It contributed 33% to Malaysia GDP. SMEs are known to be poor in practicing a complete knowledge management due to cost and expertise (Montequin et al., 2006). However, SMEs commonly practice knowledge sharing through informal interactions. However, knowledge management practices can help

SMEs to be more competitive and innovative as well as can lead SMEs to sustainable competitive advantage (SCA). In addition, KM can also help to improve organizational and individual performance (Friedman & Prusak, 2008). Knowledge management is commonly practiced in large organizations and has been proven to contribute to the organization's success. SMEs can benefit from KM practices regardless of their size and location (Okuneye & Karsten, 2002). Not many studies of KM practices have been done on SMEs especially on SCA thus this study would explore the relationship of KM, innovative intelligence and sustainable competitive advantage in exploring any possibilities.

II LITERATURE REVIEW

A. Knowledge Management and Sustainable Competitive Advantage

In a knowledge economy, knowledge remains as the main resources for companies to gain its competitive advantage. If knowledge in the organization is properly managed and become formalized, the organization can achieve its strategic competitive advantage compared to its competitors (Chikati & Mpofu, 2013). Knowledge management is a process that supports organization to acquire, accumulate, create, disseminate and protect important knowledge so as to exploit their knowledge-based resources thus propel them to be innovative in the market (Khan, 2014) as well as furthering the organization's objectives (Davenport & Prusak, 2000). Competitive advantage is the aspects enterprises have to go beyond or better than competitors in the specific business (Wei et al. 2010) while Wu (2010) described the competitive advantage as the value creation, value capture and value protect (Mahdi et al., 2011). According to Barney (2008), competitive advantage is temporary where it will result in profit and attract competition which shortens the company's competitive advantage while sustainable competitive advantage is when competitors are unable to imitate the source of advantage or if no one produces a better offering for a long period of time (Barney, 2008). Companies that effective and efficiently manage their organizational knowledge will be able to create and sustain its competitive advantage (Deel & Hill, 1996). Knowledge management can play a role in sustaining competitive by transforming knowledge from tacit to explicit and from individual to organizational (Gao et al. 2008).

B. Knowledge Management and Innovative intelligence

Knowledge is the main important ingredient for innovation. In today's knowledge economy, organizations must rely on innovation as a source of competitive advantage (Weiss & Legrand, 2011). Many studies found that knowledge management leads to innovation (Mathews, 2003). Intelligence can be defined as the ability to apprehend the interrelationship of presented facts in such a way to guide towards the desired goal (Ahmad, 2015). Merriam-Webster dictionary provides a definition of intelligence as the ability to apply knowledge to manipulate one's environment. Intelligence has been a main focus of organizations to survive the competition. Few type of intelligence has been discussed for sometimes such as competitive intelligence (Danet, 2006), financial intelligence (Sternberg, 2004), emotional intelligence (Amy, 2010; Erin B. McLaughlin, 2012) and multiple intelligence (Weiss & Legrand, 2011). Weiss & Legrand (2011) promote that companies must have intelligence pertaining to innovation in order to identify and exploit innovation in the company to gain competitive advantage. They defined innovative intelligence is defined as the human cognitive ability to gain insight into problems or opportunities in new ways and to discover new and unforeseen implementable solutions (Weiss & Legrand, 2011). It is important for the company to acquire innovative intelligence as it creates the capability to gain insights into complex problems or opportunities and discover new and unforeseen solutions that can be implemented (Ünay & Zehir, 2012). The ability of SMEs to use innovative intelligence is crucial to achieving competitive advantage in the competition. Innovative intelligence can help SMEs to discover business opportunities through knowledge management.

C. Knowledge Management and Innovative intelligence and Sustainable Competitive Advantage

Innovation has become the backbone of every company (Tidd and Bessant, 2011). However, innovation has become increasingly difficult and challenging due to changing customer needs, competitive pressure and rapid technological change (Cavusgil et al., 2003). KM supports innovation through new ideas and exploitation of organization's knowledge and thinking power (Parlby & Taylor, 2000) which helps company develops and sustains its competitive advantage. Knowledge resides in people and structure. As knowledge management helps to change from tacit knowledge to explicit knowledge, this can create and develop innovative intelligence in the company. For SMEs, smaller size helps them to discover their innovative intelligence thus produce

innovation output to sustain their competitive advantage. Knowledge management has been said to have an impact the sustainable competitive advantage in large companies but remains vague in SMEs. SMEs might be able to create competitive advantage but having difficulty in sustaining it. According to Rangone (1999), basic capabilities for SME's sustainable competitive advantages are innovation capability, production capability, and market capability.

III RESEARCH METHODOLOGY

The study population comprises owners, senior managers, and managers of SMEs that operating in central of Malaysia. A purposive sampling technique was employed because the relevance of its nature to this study. To ensure meaningful data are collected, each respondent was required to acknowledge that his company is involved in R&D and innovation before completing the questionnaire. About 140 responses were received from 300 questionnaires distributed indicated 45 percent of response rate. However, 5 were rejected due to errors in completing sections of the questionnaire. Data were collected using a questionnaire which used a seven-point Likert scale response format. Survey items were developed from a review of the literature and pilot tested with 10 SMEs' owners. Not many changes were made to the final version of the questionnaires. Knowledge management practices measurement was adapted from Lee & Choi (2002), Gold et al (2001) and Nonaka & Takeuchi (1995) and sustainable competitive advantage measurement was adapted from Zabid (2000), Bamberger (1989), Roberts & Grover (2012) and Wu et al. (2007).

IV FINDINGS

The demographic profile of respondents is presented in Table I. There was almost equal representation from manufacturing and service sectors of 41.9% and 58.1 respectively. Majority has between 5-75 workers and majority of SME recorded annual sales turn-over in between RM300, 000 to 15 million. About 28% of SMEs have been operating more than 10 years and the majority has been in business for 5-7 years.

To assess the model, SmartPLS M3 2.0 (Ringle et al., 2005) was used to estimate the parameters in the outer and inner model. PLS tries to maximize the variance explained of the dependent variables. It offers many benefits with respect to distribution requirements, type of variables, sample size and the complexity of the model to be tested. This study utilized PLS path modeling with a path-weighting scheme for the inside approximation (Chin, 1998; Tenenhaus et al., 2005; Wetzels et al., 2009). Nonparametric bootstrapping approximation was applied with 200 resampling to obtain the standard

errors of the estimates (Chin, 1998; Tenenhaus et al., 2005; Wetzels et al., 2009).

Table 1. Demographic Profile of Respondents

Variables	Category	Frequency	%
Sector	Manufacturing	57	42.5
	Services	79	58.5
Annual allocation of R&D	<50 k	73	57.9
	51 – 100k	25	18.4
	101 – 300 k	13	9.6
	> 300k	15	11.0
Annual Sales Turnover	< 300k	34	32.1
	300k – 5 mil	74	54.4
	5 mil – 15 mil	18	13.2
	> 20 mill	13	9.3

Assessment of the measurement model

In assessing the measurement model, convergent validity which is the degree to which multiple items measuring the same concept are in agreement was tested. As suggested by Hair et al. (2010), the factor loadings, composite reliability and average variance extracted was used to assess convergence validity. The loadings for all items exceeded the recommended value of 0.5 (Hair et al., 2010). Composite reliability values (see Table 2), which depict the degree to which the construct indicators indicate the latent construct ranged from 0.923 to 0.956 which exceeded the recommended value of 0.7 (Hair et al., 2010). The average variance extracted, which reflects the overall amount of variance in the indicators accounted for by the latent construct, were in the range of 0.708 and 0.789 which exceeded the recommended value of 0.5 (Hair et al., 2010). Therefore, the measures of the all the variables/constructs have high levels of convergent validity.

Table 2. Result Of The Measurement Model

Variable	Construct	Loadings	α	CR	AVE
KM	KA	0.759 – 0.901	0.708	0.923	0.708
	KAP	0.844- 0.885	0.751	0.924	0.751
	KC	0.852-0.893	0.772	0.932	0.772
	KD	0.777-0.893	0.719	0.948	0.712
	KP	0.854-0.903	0.768	0.943	0.768
SCA	CL	0.788-0.907	0.851	0.887	0.723
	PD	0.789-0.922	0.872	0.919	0.789
	INVPER	0.789-0.915	0.912	0.938	0.742
IINV		0.832-0.945	0.946	0.956	0.756

Notes: CR- composite reliability; α – Cronbach's alpha; AVE- average variance extracted; KA – Knowledge Acquisition, KAP – Knowledge Accumulation, KC- Knowledge Creation, KD- Knowledge Dissemination, KP- Knowledge Protection; CL – cost leadership; PD – Product Differentiation; INVPer- Innovation Performance; KD4 was deleted due to low loadings.

Discriminant validity of constructs

Discriminant validity is the extent to which the measures is not a reflection of some other variables and is indicated by the low correlations between the

measure of interest and the measures of other constructs (Cheung and Lee, 2010). Discriminant validity can be examined by comparing the squared correlations between constructs and the average variance extracted for a construct (Fornell and Larcker, 1981). As shown in Table 3, the squared correlations for each construct are less than the average variance extracted by the indicators measuring that construct indicating adequate discriminant validity. In total, the measurement model demonstrated the adequate convergent validity and discriminant validity.

Table 3. Discriminant Validity of Constructs

	1	2	3	4	5	6	7	8	9
1 KA	0.70 8								
2 KA P	0.52 0	0.75 1							
3 KC	0.68 1	0.69 9	0.77 2						
4 KD	0.59 9	0.63 3	0.69 7	0.71 2					
5 KP	0.55 8	0.49 4	0.62 2	0.68 0	0.76 8				
6 CL	0.20 6	0.15 5	0.16 8	0.17 6	0.14 4	0.72 2			
7 PD	0.20 1	0.27 1	0.25 5	0.25 7	0.25 6	0.16 4	0.79 2		
8 IPP	0.25 9	0.41 5	0.30 8	0.36 3	0.37 2	0.34 8	0.41 5	0.74 2	
9 INV	0.49 0	0.58 2	0.59 1	0.60 0	0.55 6	0.26 8	0.34 7	0.41 3	0.75 6

Note: Diagonals are the AVE while the off-diagonals are the squared correlations.

Assessment of the Structural Model

Figure 1 represents the structural model results with the coefficients for each path that indicates the causal relations among the constructs in the model (Sang, Lee and Lee, 2010). The tests on the significance of the path and hypothesis in the path model were performed using the SmartPLS's bootstrap re-sampling technique. KM has a weak relationship to SCA (0.307) and has explained variance of 0.094 in SCA. However, KM has a strong indirect relationship with SCA (0.564, $p>0.01$) where innovative intelligence (IInv) mediates the relationship between KMP and SCA. Together, both KMP and IInv contributed 23.6% of variance explained in SCA. There could be other factors influenced the SCA in SMEs in Malaysia.

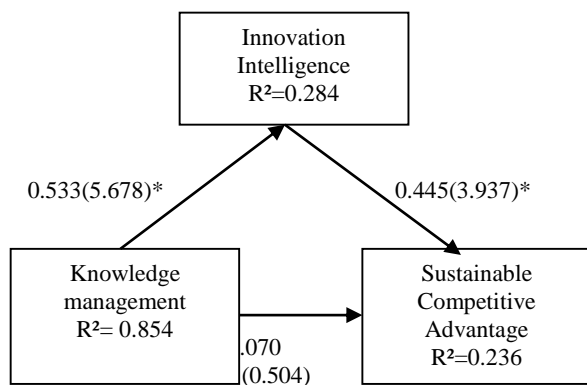


Figure 1. Structural Model

V CONCLUSION

This paper attempts to investigate the relationship of KM and SCA of SMEs. The finding showed that KM has a weak relationship to SCA of SMEs. This finding is similar to Banjo & Doren (2015) knowledge management orientation has not fully utilized by SMEs to leverage their knowledge-based resources. Plessis (2007) found that the difficulty in managing knowledge are faced by organization regardless of size, however, large organizations have more systematic structures and focus. Nevertheless, it has shown that knowledge management is important to help SMEs in gaining its SCA. KM has been used widely in large organizations which KM was proven to contribute to the organizational effectiveness (Nghah et al. 20086). However, KM has not been widely explored in SMEs as SMEs always been perceived too small and not capable of practicing KM. Innovation is extremely dependent on knowledge (Plessis,2007). Knowledge management has a strong relationship to innovation intelligence which is similar to study done by Lee and Choi (2002) where they found a strong relationship between knowledge creation and creativity. This is can be reiterated that the systematic flow of knowledge inside the organization would develop innovative intelligence. Knowledge management has an impact on SCA through innovative intelligence. This finding is similar with Ahmad (2015) who found that KM has an impact on SCA via business intelligence.

Limitations

This study has certain limitations. This study only focuses on SMEs are assumed to be knowledge-intensive. As such, there is still room for further investigation into the adoption of innovation by a more general population. Second, the study was carried out innovation performance as one of the elements of SCA which was never used before. Therefore, the future research should focus on SMEs that involved actively in innovation and technology to generate more accurate findings. Finally, a bigger size of sample and respondents would give better results.

Additionally, the instrument was also self-administered and there could be situations where respondents may need further clarification, which was not available. Finally, this study provides an empirical finding of innovative intelligence which has never been done before. It is interesting to find out the importance of innovative intelligence especially in helping SMEs in sustaining their competitive advantage. In fact, the findings have shown that innovative intelligence has a strong impact on innovation performance which proven that innovative intelligence is important to improve innovation in the organization. Knowledge management is important to SMEs to competitive advantage and improves their innovation capability through innovative intelligence. This study has shown that innovative intelligence exists in SMEs and has been utilized effectively. Thus, the findings have important implications not only for theory but for practice as well.

ACKNOWLEDGEMENTS

The authors would like to thank the Research Management Institute of Universiti Teknologi MARA and the Ministry of Education for supporting and funding this study. This study was awarded a research grant by the Ministry of Education (MOE), Malaysia, under the Fundamentals of Research Grant Scheme (600-RMI/FRGS 5/3 (69/2014)).

REFERENCES

- Ahmad, A. (2015). Sustaining Competitive Advantage via Business Intelligence, Knowledge Management, and System Dynamics. *Advances in Business Marketing & Purchasing*, 22A (1-2).
- Bamberger, I. (1989). Developing competitive advantage', *Long-Range Planning*, 22(5), 27-35
- Banjo, R. & Doren, C. (2015). Knowledge management view of environmental sustainability in manufacturing SMEs in the Philippines. *Journal of Knowledge Management Research and Practices*. DOI 10.1057/kmrp.2015.30
- Barney A (1997). Exploiting organizational knowledge in the learning organization. *Work Study*, 46 (6): 202-206.
- Cheung, C.M.K. and Lee, M.K.O. (2010), A theoretical model of intentional social action in online social networks, *Decision Support Systems*, 49(1), 24-30
- Chin, W. (1998). Issues and opinions on structural equation modeling, *MIS Quarterly*, 22(1),7-16.
- Cavusgil, S.T., Calantone, R.J., Zhao, Y. (2003). Tacit knowledge transfer and firm innovation capability. *Journal of Business & Industrial Marketing*, 18(1), 6-21.
- Chikati, R. & Mpofu, N. (2013). Developing Sustainable Competitive Advantage through Knowledge Management. *International Journal of Scientific & Technology Research*, 2(10), 77 – 81.
- Danet, D. (2006). Competitive Intelligence and SMEs: Small Firms are They Less Intelligent Than the Large Ones? Available at SSRN 875405.
- Darcy, C., Hill, J., McCabe, T., & McGovern, P. (2014). A consideration of organisational sustainability in the SME context. *European Journal of Training and Development*, 38(5), 398-414. doi: 10.1108/ejtd-10-2013-0108.
- Davenport T. H. & Prusak, L. (1998). *How Organizations Manage What They Know*, Boston, Harvard Business School

- Fornell, C. and Larcker, D.F. (1981), Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*. 18(1), 39-50.
- Gao F, Li M, Clarke S (2008). Knowledge, management, and knowledge management in business operations. *Journal of Knowledge Management*. 12(2):3-17.
- Gold A. H., Malhotra A. & Segars, A. H. (2001). Knowledge management: An organisational capabilities perspective. *Journal of Management Information Systems*, 18(1), 185-214.
- Hair, J.F., Black, W.C., Babin, B.J. and Anderson, R.E. (2010), *Multivariate Data Analysis*, Prentice-Hall, Upper Saddle River, NJ.
- Khan, R.A. (2014). Sustainable competitive Advantage through knowledge management. *International Journal of Advanced Research in Computer Engineering & Technology*, 3(4), 1079-1082.
- Lee, H. and Choi, B. (2003). Knowledge Management Enablers. Process and organizational performance; an integrative view and empirical examination. *Journal of Management Information Systems*. 20 1 179-228.
- Mahdi, O.R., Almsafir, M.K. & Yao, L. (2011). The role of knowledge and knowledge management in sustaining competitive advantage within organizations: A review. *African Journal of Business Management*. 5(23), 9912-9931, doi: 10.5897/AJBM11.1118
- Matthews, J. (2003). Knowledge Management and Innovation: How are they related? KM Challenge 2003 Knowledge Management Conference April 24, Melbourne.. Retrieved from <http://eprints.qut.edu.au/14629/1/14629.pdf>.
- Montequin, V.R., Fernandez, F.O., Cabal, V .A. and Gutierrez, N.R. (2006) . An integrated framework for intellectual capital measurement and knowledge management implementation in small and medium-sized enterprises. . *Journal of Knowledge Management* 32(6) 525-538.
- Ngah, R. , Chua, B.H. and Ibrahim, R. (2008). Knowledge management and trust in Auditing firms in Malaysia. *Conference paper in IBIMA 2008*.
- Omotayo, Funmilola Olubunmi, "Knowledge Management as an important tool in Organisational Management: A Review of Literature" (2015). *Library Philosophy and Practice* (e-journal). Paper 1238. <http://digitalcommons.unl.edu/libphilprac/1238>
- Plessis, d.M. (2007). The role of knowledge management in innovation. *Journal of Knowledge Management*, 11(4), 20 – 29. Doi. <http://dx.doi.org/10.1108/13673270710762684>
- Ranggone, A. (1999). A Resource-Based Approach to Strategy Analysis in Small-Medium Sized Enterprises. *Small Business Economics* 12, 233–248.
- Ringle, C.M., Wende, S. and Will, A. (2005), "SmartPLS 2.0 (beta)", available at: www.smartpls.de (accessed April 22, 2016).
- Roberts, N. and Grover, V. (2012), Investigating firm's customer agility and firm performance: the importance of aligning sense and respond capabilities, *Journal of Business Research* , 65(5), 579-585
- Tidd, J & Bessant, J. (2011). *Managing Innovation. Integrating Technological, Market and Organizational Change*. 5th ed. John Wiley & Sons Ltd, Sussex, UK.
- Tenenhaus, M., Vinzi, V.E., Chatelin, Y.M. & Lauro, C. (2005), PLS path modeling, *Computational Statistic and Data Analysis*, 48(1), 159-205.
- Ünay, F. G., & Zehir, C. (2012). Innovation intelligence and entrepreneurship in the fashion industry. *Procedia - Social and Behavioral Sciences*, 41, 315-321. doi: 10.1016/j.sbspro.2012.04.036
- Weiss, D., & Legrand, C. (2011). *Innovative Intelligence* Ontario, Canada: Wiley and Sons.
- Wetzels, M., Schroder, G.O. and Oppen, V.C. (2009), Using PLS path modelling for assessing hierarchical construct models: guidelines and empirical illustration, *MIS Quarterly*, 33(1), 177-95.
- Wu S.E., Lin, L.Y. & Hsu M.Y. (2007). Intellectual Capital, Dynamic Capabilities And Innovative Performance Of Organisations *International Journal of Technology Management*, 39(3-4). Doi: <http://dx.doi.org/10.1504/ijtm.2007.013496>
- Zabid, M.A.R (2000). Business Strategies and Competitive Advantage Factors in the Electronics Industry in Malaysia. *Jurnal Pengurusan*, 19, 27-39.