

# DOES ICT BASED NETWORK COMPETENCE MEDIATE STRATEGIC COMPETENCY'S IMPACT ON SMES' COMPETITIVE ADVANTAGE? AN EMPIRICAL EVIDENCE FROM MALAYSIAN MANUFACTURING SMES

**Shehnaz Tehseen, Sunway University Business School**

**Eiad Yafi, Universiti Kuala Lumpur**

**Sulaiman Sajilan, Universiti Kuala Lumpur**

**Habib Ur Rehman, DXC Technology**

**Saad Masood Butt, Australian Computer Society**

## ABSTRACT

*Information and communication technologies (ICTs) have been considered as a strong mechanism for improving business growth and achieving competitive advantage. ICT based network competence is critical for developing and maintaining long-term relationships with customers, suppliers and other relevant parties. Assuming the mediating role of ICT based network competence, the main objective of this paper was to analyse the mediating effects of ICT based network competence in the relationship between strategic competency and firms' competitive advantage in the context of Malaysian manufacturing SMEs. Survey strategy was used to collect data via standard structured questionnaire from 170 Malaysian entrepreneurs of manufacturing SMEs from Selangor and Kuala Lumpur. PLS-SEM technique was used for analysis of data. The study found a positive significant impact of strategic competency on competitive advantage, and also revealed a strong mediating influence of ICT based network competence on the relationship between strategic competency and competitive advantage.*

**Keywords:** Strategic Competency, ICT Based Network Competence, SMEs Competitive Advantage, Malaysian Manufacturing SMEs, Resource Dependence Theory (RDT), Resource-Based View (RBV).

## INTRODUCTION

SMEs are widely considered the backbone of any country's economy and are playing a vital role in the development of all countries (Soomro & Aziz, 2015; Kraja & Osmani, 2015). SMEs are critical in developing a culture of entrepreneurship, stimulating competition, producing huge employment opportunities, enhancing the quality of human resources, opening new opportunities for businesses and supporting the large scale industries (Karides, 2005). They can lead to new innovations into markets and are considered catalysts in the society (Reijonen & Komppula, 2007).

The Malaysian SMEs also contribute significantly to its economic development

(Tajudin et al., 2014). According to Aris (2007), SMEs in Malaysia have huge potential to contribute to its economy because of their outputs and labour-intensive features. Advancements in SMEs are becoming the target of all the developing countries to attain the status of high-income nation by assisting more dynamic entrepreneurs. Without the support of creative and innovative entrepreneurs in different sectors, it will be very difficult for Malaysia to get the status of the high-income nation (Rahman & Ramli, 2014).

Malaysia goes in and out of recession because of frequent economic crises. The large firms can survive due to their strong financial base but SMEs are facing challenges regarding competitive advantage during the economic crisis in Malaysia (Farooq & Abideen, 2015). Alam (2010) observed social barriers as the main obstacles for SMEs in achieving the competitive advantage. Some SMEs are more successful in Malaysia than others due to several factors.

But according to Ahmad (2007), existing studies reveal contradictions about the important factors for the sustainable competitive advantage of Malaysian SMEs. For instance, studies have widely acknowledged the importance of entrepreneurial and firm's capabilities for attaining the sustainable competitive advantage (Fernandes et al., 2017; Parayitam & Guru-Gharana, 2010). However, this study claims that strategic competency is one of the pivotal dynamic capabilities that may lead to the firms' competitive advantage (Onn & Butt, 2015). This claim also resonates with some other studies that argued that lack of strategic competency causes the unsuccessful SMEs businesses (Tehseen & Ramayah, 2015; Ahmad, 2007; Beaver & Jennings, 2005; Dulewicz & Higgs, 2000).

Though many recent studies have recognised the importance of strategic competency's impact on business performances (Sandada, 2015; Nguyen et al., 2015), very little study has been conducted in the context of Malaysian manufacturing SMEs to explore the influence of strategic competency towards the success of SMEs businesses (Ahmad et al., 2012; Ahmad, 2007).

This study claims that strategic competency of entrepreneurs influences more towards the business' success when the firms build their ICT based network competence to get other critical business resources such as knowledge, technology, expertise etc. Thus, the role of ICT based network competence cannot be neglected in the drive to achieving competitive advantage both in local and international markets. ICT based network competence is essential for Malaysian SMEs' entrepreneurs to develop and maintain the long lasting relationships with their customers, suppliers, competitors and other external parties to minimize the potential impacts of environmental turbulence on their businesses.

Although the local researchers have acknowledged the vital role of network competence, ICT based network competence and its impact on Malaysian SMEs' businesses has been not studied yet in the context of manufacturing sector (Tehseen et al., 2018). Thus, in the era of globalization with ICTs technologies, ICT based network competence has been assumed as the key mechanism to enhance the impacts of other internal resources or factors on Malaysian SMEs' business success. This study aims (i) to determine the influence of strategic competency on competitive advantage (ii) to examine the mediating role of ICT based network competence on the relationships between strategic competency and SMEs' competitive advantage among Malaysian

manufacturing SMEs.

The next section describes the underpinning theories, research framework and development of hypotheses based on literature review.

## UNDERPINNING THEORIES AND RESEARCH FRAMEWORK

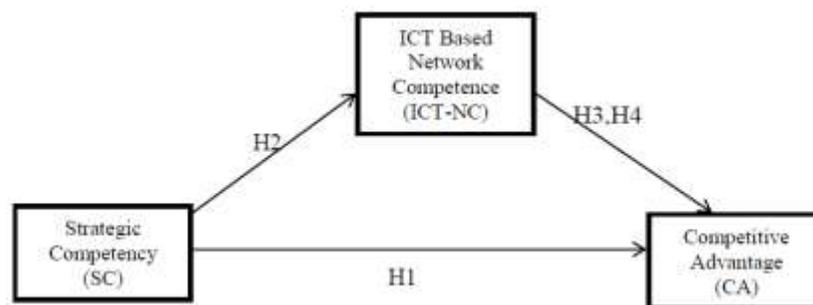
Based on underpinning theories namely Resource Based View (RBV) and Resource Dependence Theory (RDT), the research framework was developed by integrating the concepts of strategic competency and ICT based network competence. Like many other studies (Suhaimi et al., 2018; Umar & Ngah, 2017), the present study also argues that strategic competency is the strongest predictor of competitive advantage of SMEs and supports the theory of Resource Based View (RBV) that the unique sets of resources generate the competitive advantages for firms (Tehseen et al., 2015; Saffu et al., 2008; Barney, 1991, 1986).

Though the term “*network competence*” has been commonly used in the studies of entrepreneurship, we have adapted the meaning of this construct and related it with ICTs tools and applications. For the purpose of this study, the term “*ICT based network competence*” can be defined as the ability of the firms to develop and maintain the long-term relationships and to communicate effectively with their suppliers, customers, competitors, and other relevant external parties by using information and communication technologies (ICTs) tools and applications including tools such as computers, laptops, mobile phones and specific applications namely WhatsApp, Facebook, Twitter, LinkedIn etc. Social networking that is in its maturity stage and has been recognized as a potential resource based on such ICTs facilities used by entrepreneurs. These ICT facilities have become the most effective tools of learning, shaping opinion, exchanging information, and sharing of knowledge that are widely exploited by the entrepreneurs operating in different types of businesses. The entrepreneurs are using various ICT tools and techniques in order to boost their businesses, better organize and manage their daily tasks (Jacobfeuerborn, 2011).

We have observed the intensive use of WhatsApp and Facebook applications by the entrepreneurs, particularly in the Malaysian context to build close relationships with their customers and suppliers as well as to exchange the information with external parties. Malaysian entrepreneurs are searching and retrieving relevant business information from the Internet. They are well aware of the benefits of advanced Email services, communicators, synchronized calendars and organizers, voice over IP telephony (e.g. Skype) as well as advantages of mind maps to draft, memorize and quickly share the ideas. In the intense competitive business environment, entrepreneurs are well aware of the necessity of progress evaluation tools that assist them in measuring the business outcome. Moreover, the entrepreneurs are massively exploiting multimedia and wikis for the purpose of their products/services promotions. They are using ICTs applications and techniques by using the virtual reality to visualize their services and products, and setting up the simulation models to analyse the market trends and estimate the business outcomes.

The concept of network competence is based on the Resource Dependence Theory (RDT) (Tehseen & Sajilan, 2016; Tehseen et al., 2015). Thus, ICT based network competence can also be associated with the RDT. RDT states that a firm depends on various contingencies in its surrounding business environment (Salancik &

Pfeffer, 1978). Salancik & Pfeffer (1978) claimed that the organisations indeed have to manage their relationships with the external parties whom they depend on directly or indirectly because uncertain actions of such external parties can make insecure the survival and success of the organisations. Thus, the firms need to develop the relationships with other firms to attain the required resources (Sajilan & Tehseen, 2019; Uzhegova et al., 2018; Nohria & Garcia-Pont, 1991; Kogut & Singh, 1988; Salancik & Pfeffer, 1978). Besides the network competence has been viewed as an important dynamic capability that leads towards the competitive advantage of firms (Uzhegova et al., 2018; Tehseen & Sajilan, 2016). In the proposed theoretical framework, the strategic competency has been taken as the independent variable, SMEs' competitive advantage is the dependent variable, and ICT based network competence is the mediator in the relationship between strategic competency and competitive advantage (Figure 1). Since many studies have considered the utmost importance of network competence for attaining the firms' sustainable competitive advantage (Tehseen et al., 2019; Tehseen & Sajilan, 2016; Ziggers & Henseler, 2009; Dyer & Singh, 1998). Thus, this study also espouses ICT based network competence may have the positive influence on the success of businesses and may act as a mechanism in the relationship between strategic competency and competitive advantage (Figure 1).



**FIGURE 1**  
**RESEARCH FRAMEWORK**

### DEVELOPMENT OF HYPOTHESES

#### Strategic Competency and Competitive Advantage

The strategic competency involves the entrepreneurs' strategic thinking that reflects their ability to develop effective strategic plans (Stonehouse & Pemberton, 2002). This competency enables the entrepreneurs to develop strategies during the uncertain situations. Consequently, Ahmad (2007) has linked this competency area with the behaviours of entrepreneurs to forecast industry's changes and trends; to generate a competitive edge and to design strategy for the bad scenario. Similarly, a number of studies have related the strategic competency of entrepreneurs with the success and competitive advantage of businesses (Suhaimi et al., 2018; Umar & Ngah, 2017; Yusuff et al., 2016; Rahman et al., 2015; Tehseen & Ramayah, 2015; Wickramaratne et al., 2014; Kaur & Bains, 2013; Ahmad et al., 2010; Ahmad, 2007; Man, 2001).

Likewise, a number of studies have assumed the relationship between the strategy and technological competence as well as the relationship between strategy and network competence (Ritter & Gemünden, 2004). The rationale behind this assumption is that the prospecting firms are used to be continuously engaged in the environmental scanning (Hambrick, 1982). The entrepreneurs of SMEs identify the attractive business opportunity by observing the environmental trends including economic trends, social trends, technological advances, and political action and regulatory changes; focus on solving the customers' problems related to existing products and services; and strive to fill up the market gap by providing the unique products or services that are needed by the customers (Barringer & Ireland, 2019). Thus, strategic competency enables entrepreneurs to develop as well as execute strategic plans at right time to achieve superior success. The firms develop strategies to deal with the environmental uncertainties and thus, the entrepreneurial strategic competencies are crucial to formulating and executing the long-term strategies. Thus, the firms are also mostly engaged in developing their strategic competencies to do effective planning for the success of their businesses.

The success of manufacturing businesses depends on their networking with the external parties including suppliers, customers, and other related organisations. Thus, we do assume a positive relationship between the strategic competency and ICT based network competence. This is because the strategic competency of entrepreneurs depends on resources such as information and knowledge on latest markets trends that the entrepreneurs may attain from their networks. Thus, they use various ICT tools and facilities to communicate with external parties as well as to gain the critical knowledge and information. In other words, the entrepreneurs will be able to get timely market information only when they have developed strong relationships with the customers, suppliers and competitors. Thus, the entrepreneurial strategic competency enables them to develop ICT-based network competence by utilizing various ICTs techniques such as WhatsApp, Facebook, mobile phones etc. to gain timely information. Thus, the following hypotheses can be developed based on above literature:

*H1. Strategic competency has a direct positive effect on the competitive advantage.*

*H2: Strategic competency has a direct positive effect on ICT based network competence.*

### **The Mediating Effect of ICT Based Network Competence**

Several studies have highlighted the positive impact of strategic competency on competitive advantage of firms in various contexts (Rahman et al., 2015; Tehseen & Ramayah, 2015; Kaur & Bains, 2013; Ahmad et al., 2010; Ahmad, 2007; Man, 2001). Besides it can be assumed that ICT based network competence may act as a mediator in the relationship between the strategic competency and competitive advantage due to the competencies of entrepreneurs which depend on their social contacts that they manage through ICTs facilities. Thus, entrepreneurs are more likely to be able to develop as well as exhibit their knowledge, abilities, and skills when they have resources to gain the required knowledge, skills, and abilities. Since the ICT based network competence is critical for attaining all essential resources required by the entrepreneurs. Thus, it can be assumed that entrepreneurs' network competence may act as a mechanism through which the strategic competency of entrepreneurs impacts the competitive advantage of

the business. Moreover, a number of studies have related the network competence with the growth and competitive advantage of SMEs' businesses in the local as well as international markets (Ritter & Gemunden, 2004).

What is more, ample studies have found networks support the small firms in gaining the valuable resources to achieve survivability and growth by entering new markets (Yli-Renko et al., 2001). Behyan (2016) established that the external networks significantly contribute to enhancing the firms' performance in entering the international and overseas markets and beginning exports. Kheng & Minai (2016) contended that Malaysian-Chinese entrepreneurs develop and maintain long-term relationships with their suppliers, customers and friends. In addition, several studies have highlighted the utmost importance of network competence in achieving business success, improving coordination of various activities and providing the opportunities to learn about market and industry (Boso et al., 2013; Park & Luo, 2001). Thus, the abilities of the firms and entrepreneurs to develop strong network relationships with key parties are critical for the superior performance and for sustainable competitive advantage in the markets (Uzhegova et al., 2018; Tehseen & Sajilan, 2016; Ziggers & Henseler 2009). Furthermore, based on our observations and experience, the Malaysian entrepreneurs are well aware of the use of ICTs facilities in order to sustain the close relationships with their key customers, suppliers and other key stakeholders. Thus, ICT based network competence plays a vital role in the context of Malaysian SMEs businesses. Consequently, we have developed the following hypotheses:

*H3: ICT based network competence has a direct positive effect on the competitive advantage.*

*H4: ICT based network competence mediates the relationship between strategic competency and competitive advantage.*

## METHODOLOGY

### Sample, Data Collection and Constructs Measures

The Malaysian manufacturing SMEs were the populations of this study. The present study constitutes the sample of 170 respondents who were the entrepreneurs of SMEs in the manufacturing sector from state of Selangor and Kuala Lumpur. The non-probability sampling technique was used to access the target respondents. To examine the relationships among the main constructs by adopting the partial least squares (PLS) technique, Smart PLS 3.2.7 was applied to evaluate the measurement model and structural model. PLS-SEM analysis was selected because it can assess all paths simultaneously and does not need a large sample size. The other reasons for using PLS-SEM were the non-normal data, small sample size, new relationships, and prediction oriented research of this study (Ramayah et al., 2018; Hair et al., 2017; Hair et al., 2011). We have assessed the sample size using G\*Power 3.1.9.2 software, an extension of the prior versions (Faul et al., 2007). Since our PLS model involves only 1 predictor of the competitive advantage, therefore, a minimum sample size of 55 was needed to generate a power of 0.80 for our PLS model with 0.15 of medium effect size (Hair et al., 2017). Thus, using 170 respondents, our PLS model has met the minimum sample size requirement and generated more power. Five-point Likert scale was used to measure the

responses. All measures were adapted from the existing literature. For instance, strategic competency and competitive advantage were measured with five and four items respectively that were adapted from Ahmad (2007); Li & Liu (2014) respectively. Besides the six items to measure the network competence were adapted from Verbeke & Van Tulder (2011).

## DATA ANALYSIS AND RESULTS

### Demographic Profile

The respondents consisted of 65.9% males and 34.11% females. Most of the respondents were between 41-50 years (63.5%). The respondents included 29.41% Malays, 41.18% Chinese and 29.41% Indians. The majority of respondents were married (74.2%). Most of the respondents had a bachelor degree (68.8%). 49.8% firms were of age between 9-15 years. 89% firms were small manufacturing businesses with sales turnover from RM300,000 to less than RM15 million and with employees from 5 to less than 75.

### Measurement Model Analysis

The integrity of measures has been assessed by evaluating their validity and reliability. The reliability refers to the instrument of assessment's quality to constantly measure a concept, while validity assesses the instrument's quality to develop measures in a particular concept (Sekaran & Bougie, 2010). The measurement analysis of the specified model was done by using the function of PLS-Algorithm of Smart-PLS to get the values of AVE (Convergent validity), Composite Reliability (CR), rho A (true reliability); and Cronbach's Alpha. Table 1 show that all the items' outer loadings are above the minimum value of 0.4. The convergent validity of each latent variable is also above the minimum value of 0.5. The composite reliability is also more than 0.6 for each latent variable.

Variables	Items	Indicators' Outer Loadings	(Convergent Validity) AVE	(Composite Reliability) CR	rho_A	Cronbach's Alpha
<b>Strategic Competency (SC)</b>	SC1	0.629	0.527	0.846	0.793	0.773
	SC2	0.673				
	SC3	0.801				
	SC4	0.813				
	SC5	0.693				
<b>Competitive Advantage (CA)</b>	CA1	0.815	0.631	0.872	0.811	0.805
	CA2	0.746				
	CA3	0.772				
	CA4	0.841				
<b>ICT based Network Competence (ICT-NC)</b>	ICT-NC1	0.82	0.507	0.85	0.834	0.782
	ICT-NC2	0.800				
	ICT-					

	NC3	0.799			
	ICT-NC4	0.781			
	ICT-NC5	0.698			
	ICT-NC6	0.556			

Besides the second category of construct validity which is discriminant validity has been also assessed using HTMT. Henseler et al. (2015) recommended the evaluation of the correlations by using heterotrait-monotrait ratio (HTMT) to assess the discriminant validity. This latest approach reveals the prediction of the true correlation between two constructs. 0.90 is the threshold value for HTMT with confidence interval's value of less than 1 as suggested for assessing the discriminant validity through criterion of HTMT (Henseler et al., 2015). Table 2 reveals that HTMT has been established for our PLS model. Thus, the above findings lead to the satisfaction with the measurement model assessment due to its adequate convergent validity, reliability and discriminant validity.

	CA	ICT-NC	SC
CA			
ICT-NC	0.503 (0.348, 0.634)		
SC	0.512 (0.336, 0.667)	0.579 (0.419, 0.706)	

The second stage of analysis consists of the structural model analysis and testing of hypotheses.

### Assessment of the Structural Model

The assessment of the structural model constitutes the examination of the collinearity, the coefficient of determination ( $R^2$ ), path coefficients ( $\beta$ ), effect size ( $f^2$ ) and predictive relevance ( $Q^2$ ). The values of Variance Inflation Factor (VIF) were examined to assess the collinearity issues. The VIF values of all the constructs were between 1.211 and 2.328. Therefore, collinearity among the constructs is not any issue in the structural model. After analysing the VIF values, the method of bootstrapping has been used with 1000 resamples using PLS 3.2.7 to get the values of standard path coefficients, t-values, as well as the standard errors to examine the significance of each of the hypotheses' relationship (Hair et al., 2017). Hayes & Preacher's (2014) approach has been used to test the indirect effects of strategic competency on competitive advantage. Table 3 reveals that the direct path coefficient for strategic competency construct shows a positive as well as a significant relationship with competitive advantage ( $\beta=0.274$ ,  $t=2.786$ ). Thus, H1 has been supported. Besides findings showed positive and significant influence of strategic competency on ICT based network competence ( $\beta=0.455$ ,  $t=7.742$ ). Therefore, H2 is also supported. H3 is also accepted because of the positive and significant relationship that has been found between ICT based network competence and competitive advantage ( $\beta=0.269$ ,  $t=2.820$ ). Moreover, since the mediating

impact of ICT based network competence between strategic competency and competitive advantage is positive and significant ( $\beta=0.123$ ,  $t=2.659$ ), H4 is supported.

Hypotheses	Beta Values	SD	T statistics	P-values	Decision	Mediation
H1: SC->CA	0.274	0.099	2.786***	0.006	Supported	-
H2: SC->ICT-NC	0.455	0.059	7.742***	0	Supported	-
H3: ICT-NC->CA	0.269	0.095	2.820***	0.005	Supported	-
H4: SC->ICT-NC->CA	0.123	0.046	2.659***	0.058	Supported	Yes

Note: Critical T- value\*\*\*2.57 (Significance Level=1%).

In addition, the coefficients of determination ( $R^2$ ) are 0.215 and 0.207 respectively for competitive advantage (CA) and for network competence. Cohen (1988) suggested that  $R^2$  values of 0.26 and 0.13 should be considered as substantial and moderate respectively whereas the value of 0.02 for  $R^2$  should be considered as weak. Thus,  $R^2$  values of both the endogenous constructs have been found between moderate to be substantial because they are higher than 0.13, suggesting a moderate PLS model. We also evaluated the effect size ( $f^2$ ). Based on Cohen's (1988) guidelines, the  $f^2$  effect size of 0.02, 0.15 and 0.35 should be taken for small, medium and large effects of the independent latent variables. Thus, based on Cohen's (1988) guidelines, strategic competency has been found to have its small impact on competitive advantage (i.e.,  $f^2=0.076$ ). Besides influence of ICT based network competence on competitive advantage is small because of  $f^2$  value of 0.073. However, strategic competency has its medium impact on ICT based network competence with  $f^2$  value of 0.262. The blindfolding procedure has been used to get the  $Q^2$  value which is applied only for the reflective measurement models (Hair et al., 2017). Since both the endogenous latent variables such as ICT based network competence and competitive advantage have been measured reflectively, their  $Q^2$  values have been reported as well. In this study, the  $Q^2$  values of the ICT based network competence and competitive advantage are 0.123 and 0.094 respectively, representing the medium predictive relevance for our PLS model (Cohen, 1988).

### PLS FINDINGS AFTER REMOVAL OF CMV IMPACTS

Since this study has used similar type of respondents (e.g., entrepreneurs) and data for all variables were collected from them, there could be the possibility of common method variance issue in this study. CMV occurs because of self-reported data by same type of respondents (Tehseen et al., 2017; Podsakoff & Todor, 1985). CMV was defined as systematic error variance that is shared among latent variables due to same measurement method (Richardson et al., 2009). CMV could bias the predicted relationships among variables and measures (Jakobsen & Jensen, 2015).

We have controlled the impact of CMV by using one of the MLMV techniques called Construct Level Correction (CLC) that was earlier suggested by Chin et al. (2013) to remove any influence of CMV from the PLS studies. To implement the CLC

approach, we collected seven unrelated measures of social desirability scale during our data collection that was not associated with any of the constructs of interest. These seven items of the social desirability scale (Form X1) adopted from Fischer & Fick (1993) were used to model CMV control construct using the CLC approach.

The structural relationships which have been obtained after modelling the CMV control variables represent the path coefficients among the models' constructs without CMV impacts. The path coefficients of study's latent variables (Table 4) did not significantly change after removing the influence of CMV using CLC technique. Moreover, in line with Chin et al. (2013), we have removed 87% impact of CMV by using seven items of social desirability in CLC approach. Table 4 also reveals that path coefficients were remained significant in CLC estimation as they were remained significant in the original PLS estimation. This clearly shows that CMV did not influence our study's findings. Thus, our study's findings are more reliable to draw implications and conclusions.

Hypotheses	Original PLS Estimation				CLC Estimation			
	Beta Values	T Statistics	Decision	Mediation	Beta Values	T Statistics	Decision	Mediation
<b>H1: SC-&gt;CA</b>	0.274	2.786***	Supported	-	0.286	3.192***	Supported	
<b>H2: SC-&gt;ICT-NC</b>	0.455	7.742***	Supported	-	0.442	7.999***	Supported	
<b>H3: ICT-NC-&gt;CA</b>	0.269	2.820***	Supported	-	0.236	2.512**	Supported	
<b>H4: SC-&gt;ICT-NC-&gt;CA</b>	0.123	2.659***	Supported	Yes	0.124	2.573***	Supported	Yes

Note: \*\*\*2.57 (significance level= 1%).

## DISCUSSION

The main aim of this study was to assess the mediating role of ICT based network competence between strategic competency (SC) and SMEs' competitive advantage (CA) in the context of Malaysian manufacturing SMEs. The empirical results of this study have provided several important insights that can add value to the existing body of knowledge on competitive advantage's literature. The study reveals the mediating effects of ICT based network competence between strategic competency construct and competitive advantage. A positive correlation relationship has also been found between strategic competency and competitive advantage. This positive result is consistent with the findings of many other studies that also found positive impact of strategic competency on superior firm's performances (Suhaimi et al., 2018; Umar & Ngah, 2017; Yusuff et al., 2016, Ahmad, 2007). This emphasizes the utmost importance of strategic competency for the competitive advantage of manufacturing SMEs' business in Malaysia. Therefore, manufacturing businesses need to develop and execute the most effective strategies which depend on the ability of entrepreneurs' execution intelligence.

Moreover, strategic competency has been found to have its positive relationship with ICT based network competence. This means that Malaysian entrepreneurs' strategic competency that is related to the long-term plans and formulation as well as the execution of strategies lead to the ICT based network competence of entrepreneurs. This clearly indicates that the strategic competency of entrepreneurs enables them to acquire the critical resources by developing the long-term relationships with external parties including customers, suppliers, competitors, and other relevant organisations which become easy via ICT facilities. The result regarding the positive and significant influence of ICT based network competence on competitive advantage also highlights the importance of networking for attaining the sustainable competitive advantage. This finding is consistent with many other studies as well that have found the positive impact of network competence on the competitive advantage of SMEs in various contexts (Tehseen et al., 2018; Parida et al., 2017; Kheng & Minai, 2016; Perin et al., 2016; Thrikawala, 2011).

## CONCLUSIONS AND FUTURE RESEARCH

The present study has revealed the utmost importance of ICT based network competence in the context of Malaysian manufacturing SMEs for their competitive advantage. ICT based network competence has found to be strong mediator in the relationships among strategic competency and competitive advantage even in the era of huge environmental turbulence in the surroundings of Malaysian manufacturing SMEs. Thus, the strong mediating impact of ICT based network competence on competitive advantage has provided the evidence regarding its importance of the competitive advantage in the manufacturing sector of Malaysia.

This study has some practical implications. For instance, Malaysian governments as well as policy makers need to initiate the specific training programmes for the current and future businesses to enhance their ICT based network competence. The government needs to make some special arrangements with SMEs and their partner firms to enhance their relationships that can be done through several supporting programmes. The present study has practical and theoretical contributions. For example, it has highlighted the importance of ICT based network competence that may be one of the possible solutions for managerial problems. In addition, this study has claimed that ICT based network competence is a mechanism through which the SMEs can attain their essential business resources such as information and knowledge regarding technology, market trends, and customers' needs etc. Therefore, ICT based network competence may assist in minimising the failure rates among SMEs, improving their contribution to the productivity, GDP and employment. The theoretical contribution of this study is that it has developed a new empirical model by establishing a new theory of mediation that highlights the impacts of ICT based network competence on the relationship between strategic competency and manufacturing SMEs' competitive advantage.

Moreover, the study has some future recommendations: (i) future studies can analyse the mediating influences of ICT based network competence among other entrepreneurial competencies' dimensions and competitive advantage, (ii) further studies should also examine the specific competencies required for the competitive advantage of businesses in the context of other Malaysian sectors such as retail and

wholesale, construction, mining and agriculture, (iii) likewise, an examination and comparison of several entrepreneurial competencies across diverse Malaysian industries and ethnic groups will also provide interesting insights for the competitive advantage, and (iv) the empirical model developed for this study should be assessed for its validity across different Malaysian SMEs.

## REFERENCES

- Aris, N.M., (2007). SMEs: Building blocks for economic growth. *Journal of the Department of Statistic Malaysia*, 1, 1-14.
- Ahmad, N.H., (2007). A cross cultural study of entrepreneurial competencies and entrepreneurial success in SMEs in Australia and Malaysia. Unpublished PhD Thesis, University of Adelaide, South Australia.
- Ahmad, N.H., Amran, A., & Halim, H.A., (2012). Ethical and socially responsible practises among SME owner-managers: Proposing a multi-ethnic assessment. *Journal of Southeast Asian Research*, 21(1), 1-9.
- Alam, S.S., (2010). Assessing barriers of growth of food processing SMIs in Malaysia: A factor analysis. *International Business Research*, 4(1), 252.
- Ahmad, N.H., Halim, H.A., & Zainal, S.R.M. (2010). Is entrepreneurial competency the silver bullet for SME success in a developing nation? *International Business Management*, 4(2), 67-75.
- Barney, J.B., (1986). Strategic factor markets: Expectations, luck, and business strategy. *Management Science*, 32(10), 1231-1241.
- Barney, J.B., (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.
- Barringer, B.R., & Ireland, R.D. (2019). *Entrepreneurship: Successfully Launching New Ventures*. 6th ed. New Jersey: Pearson Prentice-Hall.
- Behyan, M. (2016). Investigating the influence of external networks on internationalization success of firms, In e-commerce in developing countries: With focus one-Tourism (ECDC), 2016 10th International Conference on (1-18).IEEE.
- Boso, N., Story, V.M., & Cadogan, J.W. (2013). Entrepreneurial orientation, market orientation, network ties and performance: Study of entrepreneurial firms in a developing economy. *Journal of Business Venturing*, 28(6), 708-727.
- Beaver, G., & Jennings, P. (2005). Competitive advantage and entrepreneurial power: The dark side of entrepreneurship. *Journal of Small Business and Enterprise Development*, 12(1), 9-23.
- Cohen, J. (1988). *Statistical power analysis for the behavior science*, LawranceEribaum Association.
- Chin, W.W., Thatcher, J.B., Wright, R.T., & Steel, D. (2013). Controlling for common method variance in PLS analysis: The measured latent marker variable approach. In *New perspectives in partial least squares and related methods* (231-239). Springer NewYork..
- Dyer, J.H., & Singh, H., (1998). The relational view: cooperative strategy and sources of inter organisational competitive advantage. *Academy of Management Review*, 23(4), 660-679.
- Dulewicz, V., & Higgs, M. (2000). Emotional intelligence-A review and evaluation study. *Journal of Managerial Psychology*, 15(4), 341-372.
- Farooq, W., & Abideen, Z.U. (2015). SMEs' preparedness to face economic crisis: A proposed framework for Malaysian SMEs. *East West Journal of Business and Social Studies*, 4(2), 66-79.
- Faul, F., Erdfelder, E., Lang, A.G., & Buchner, A. (2007). G\* Power 3: A flexible statistical power analysis program for the social, behavioural, and biomedical sciences. *Behavior Research Methods*, 39(2), 175-191.
- Fischer, D.G., & Fick, C. (1993). Measuring social desirability: Short forms of the Marlowe-Crowne social desirability scale. *Educational and Psychological Measurement*, 53(2), 417-424.
- Fernandes, B., Ferreira, J.M., Gimenez, F.A.P., & Rese, N. (2017). The inception of dynamic capabilities in SMEs. *International Journal of Entrepreneurship*, 21(2), 1-13.
- Hambrick, D.C. (1982). Environmental scanning and organizational strategy. *Strategic Management Journal*, 3(2), 159-174.
- Hayes, A.F., & Preacher, K.J. (2014). Statistical mediation analysis with a multi categorical independent variable. *British Journal of Mathematical and Statistical Psychology*, 67(3), 451-

470.

- Henseler, J., Ringle, C.M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115-135.
- Hair, J.F., Hult, G.T.M., Ringle, C.M., & Sarstedt, M. (2017). A primer on partial least squares structural equation modeling (PLS-SEM). Thousand Oaks: Sage.
- Hair, J.F., Hult, G.T.M., Ringle, C.M., & Sarstedt, M. (2014). A primer on partial least squares structural equation modeling (PLS-SEM). Thousand Oaks: Sage.
- Hair, J.F., Ringle, C.M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing Theory and Practice*, 19(2), 139-152.
- Jacobfeuerborn, B. (2011). ICT tools for supporting innovation and entrepreneurship. *The role of computer science in economics and social sciences. Innovations and interdisciplinary implications*, 38-44.
- Jakobsen, M., & Jensen, R. (2015). Common method bias in public management studies. *International Public Management Journal*, 18(1), 3-30.
- Kogut, B., & Singh, H. (1988). The effect of national culture on the choice of entry mode. *Journal of International Business Studies*, 411-432.
- Karides, M. (2005). Whose solution is it? Development ideology and the work of micro-entrepreneurs in Caribbean context. *International Journal of Sociology and Social Policy*, 25(2), 30-62.
- Kiggundu, M.N. (2002). Entrepreneurs and entrepreneurship in Africa: What is known and what needs to be done. *Journal of Developmental Entrepreneurship*, 7(3), 239-258.
- Kraja, Y.B., & Osmani, E., (2015). Importance of external and internal environment in creation of competitive advantage to SMEs. (Case of SMEs, In the Northern Region Of Albania). *European Scientific Journal*, 11(13).
- Kaur, H., & Bains, A. (2013). Understanding the concept of entrepreneur competency. *Journal of Business Management & Social Sciences Research*, 2(11), 31-33.
- Kheng, L.K., & Minai, M.S. (2016), The network characteristic of Chinese SMEs in Malaysia and their performance, in proceedings of the ASEAN entrepreneurship conference 2014 (39-47). Springer Singapore.
- Lee, C., Lee, K., & Pennings, J.M. (2001). Internal capabilities, external networks, and performance: A study on technology-based ventures. *Strategic Management Journal*, 22(7), 615-640.
- Li, D.Y., & Liu, J. (2014). Dynamic capabilities, environmental dynamism, and competitive advantage: Evidence from China. *Journal of Business Research*, 67(1), 2793-2799.
- Man, W.Y.T. (2001). Entrepreneurial competencies and the performance of small and medium enterprises in the Hong Kong services sector. (Doctoral dissertation, The Hong Kong Polytechnic University).
- Nguyen, B., Chen, C.H.S., Wu, M.S.S., & Melewar, T.C. (2015). Ethical marketing in Singapore, Malaysia, and Thailand. *Ethical and Social Marketing in Asia*, Oxford: Chandos Publishing, 55-74.
- Nohria, N., & Garciaa, R.P., Pont, C. (1991). Global strategic linkages and industry structure. *Strategic Management Journal*, 12(S1), 105-124.
- Onn, A., & Butt, S.M. (2015). Dynamic capabilities in Malaysian electrical and electronic industry. *Durresamin Journal*, 1(1), 2-7.
- Parida, V., Pesämaa, O., Wincent, J., & Westerberg, M. (2017). Network capability, innovativeness, and performance: A multidimensional extension for entrepreneurship. *Entrepreneurship & Regional Development*, 29(2), 94-115.
- Parayitam, S., & Guru-Gharana, K. (2010). Economics of resource based and dynamic capabilities view: A contemporary framework. *Academy of Strategic Management Journal*, 9(1), 83-93.
- Perin, M.G., Sampaio, C.H., Jiménez-Jiménez, D., & Cegarra-Navarro, J.G. (2016). Network effects on radical innovation and financial performance: An open-mindedness approach. *BAR-Brazilian Administration Review*, 13(4), 1-24.
- Park, S.H., & Luo, Y. (2001). Guanxi and organizational dynamics: Organizational networking in Chinese firms. *Strategic Management Journal*, 22(5), 455-477.
- Podsakoff, P.M., & Todor, W.D. (1985). Relationships between leader reward and punishment behavior and group processes and productivity. *Journal of Management*, 11(1), 55-73.
- Reijonen, H., & Komppula, R. (2007). Perception of success and its effect on small firm performance. *Journal of Small Business and Enterprise Development*, 14(4), 689-701.

- Richardson, H.A., Simmering, M.J., & Sturman, M.C. (2009). A tale of three perspectives: Examining post hoc statistical techniques for detection and correction of common method variance. *Organizational Research Methods*, 12(4), 762-800.
- Ramayah, T., Cheah, J., Chuah, F., Ting, H., & Memon, M.A., (2018). Partial Least Squares Structural Equation Modelling (PLS-SEM) using SMARTPLS 3.0: An Updated and Practical Guide to Statistical Analysis (2nd ed). Pearson: Malaysia.
- Rahman, N.A., & Ramli, A., (2014). Entrepreneurship management, competitive advantage and firm performances in the craft industry: Concepts and framework. *Procedia-Social and Behavioral Sciences*, 145, 129-137.
- Ritter, T., & Gemünden, H.G. (2004). The impact of a company's business strategy on its technological competence, network competence and innovation success. *Journal of Business Research*, 57(5), 548-556.
- Rahman, S.A., Amran, A., Ahmad, N.H., & Taghizadeh, S.K. (2015). Supporting entrepreneurial business success at the base of pyramid through entrepreneurial competencies. *Management Decision*, 53(6), 1203-1223.
- Sekaran, U., & Bougie, R. (2010). Research method for business, A skill building approach. John Wiley & Sons Inc.
- Salancik, G.R., & Pfeffer, J. (1978). A social information processing approach to job attitudes and task design. *Administrative Science Quarterly*, 5(3), 224-253.
- Saffu, K., Apori, S.O., Elijah-Mensah, A., & Ahumatah, J. (2008). The contribution of human capital and resource-based view to small-and medium-sized tourism venture performance in Ghana. *International Journal of Emerging Markets*, 3(3), 268-284.
- Sajilan, S., & Tehseen, S. (2019). Network competence and firm performance: The mediating role of entrepreneurial innovativeness among Malaysian Chinese entrepreneurs of wholesale businesses. *Asian Academy of Management Journal*, 24(1), 187-201.
- Suhaimi, N.H.B.M., Al Mamun, A., Zainol, N.R., & Nawati, N. (2018). The moderating effect of a supportive environment toward the relationship of entrepreneurial competencies and the performance of informal women entrepreneurs in Kelantan, Malaysia. *The Journal of Developing Areas*, 52(1), 251-259.
- Stonehouse, G. & Pemberton, J. (2002). Strategic Planning in SMEs-some empirical findings. *Management Decision*, 40, 853-861.
- Sandada, M., (2015). Strategic planning dimensions in small and medium enterprises (SMEs) in south Africa: Their relative importance and variations in selected demographic variables. *Ecoforum Journal*, 4(1), 8.
- Soomro, R.H., & Aziz, F. (2015). Development of small and medium enterprises during post nationalization period in Pakistan: Issues, challenges and remedies. *International Journal of Research in Social Sciences*, 5(1), 66-78.
- Tajudin, A., Aziz, R.A., Mahmood, R., & Abdullah, M. H., (2014). Relationship between Entrepreneurial Orientation and Business Performance of SMEs in Malaysia. *International Journal of Management Excellence*, 2(3), 221-226.
- Tehseen, S., Qureshi, Z.H., & Ramayah, T. (2018). Impact of network competence on firm's performances among Chinese and Indian entrepreneurs: A multigroup analysis. *International Journal Entrepreneurship*, 22(2), 1-14.
- Tehseen, S., & Ramayah, T. (2015). Entrepreneurial competencies and SMEs business success: The contingent role of external integration. *Mediterranean Journal of Social Sciences*, 6(1), 50-61.
- Tehseen, S., Sajilan, S., Ramayah, T., & Gadar, K. (2015). An intra-cultural study of entrepreneurial competencies and SMEs business success in whole sale and retail industries of Malaysia: A conceptual model. *Review of Integrative Business and Economics Research*, 4(3), 33-48.
- Tehseen, S., & Sajilan, S. (2016). Network competence based on resource-based view and resource dependence theory. *International Journal of Trade and Global Markets*, 9(1), 60-82.
- Tehseen, S., Ramayah, T., & Sajilan, S. (2017). Testing and controlling for common method variance: A review of available methods. *Journal of Management Sciences*, 4(2), 146-175.
- Tehseen, S., Ahmed, F. U., Qureshi, Z. H., & Uddin, M. J. (2019). Entrepreneurial competencies and SMEs' growth: The mediating role of network competence. *Asia-Pacific Journal of Business Administration*, 11 (1), 2-29.
- Thrikawala, S. (2011). Impact of strategic networks for the success of SMEs in Sri Lanka. *World J Soc Sci*, 1(2), 108 -119.

- Umar, A., & Ngah, R. (2017). The relationship of entrepreneurial competencies and business success of Malaysian SMEs: The mediating role of innovation and brand equity. World Academy of Science, Engineering and Technology. *International Journal of Economics and Management Engineering*, 4(6).
- Uzhegova, M., Torkkeli, L., & Kuivalainen, O. (2018). Subsidiary's network competence: Finnish multinational companies in Russia. *Journal of East-West Business*, 1-32.
- Verbeke, A., & van Tulder, R. (2011). *Entrepreneurship in the Global Firm* (6). Emerald group publishing.
- Wickramaratne, A., Kiminami, A., & Yagi, H. (2014). Entrepreneurial competencies and entrepreneurial orientation of tea manufacturing firms in Sri Lanka. *Asian Social Science*, 10(18), 50.
- Yli-Renko, H., Autio, E., & Sapienza, H.J. (2001). Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms. *Strategic Management Journal*, 22(7), 587-613.
- Yussuf, Y.Z., & Bakar, A.A. (2016). Entrepreneurial competencies and business performance among women entrepreneurs. *Proceeding: The 2nd International Conference on Business Management (ICBM 2016) 1(1)*, 978-967
- Ziggers, G.W., & Henseler, J. (2009). Inter-firm network capability: How it affects buyer-supplier performance. *British Food Journal*, 111(8), 794-810.

Shehnaz Tehseen<sup>1</sup>, Eiad Yafi<sup>2\*</sup>, Sulaiman Sajilan<sup>3</sup>, Habib ur Rehman<sup>4</sup> and Saad Masood Butt<sup>5</sup>

<sup>1</sup>Sunway University Business School, Malaysia

<sup>2</sup>Universiti Kuala Lumpur, Malaysia

<sup>3</sup>Universiti Kuala Lumpur, Malaysia

<sup>4</sup>DXC Technology, Noida, India

<sup>5</sup>Australian Computer Society, Australia

**\*corresponding author:** Eiad Yafi, Universiti Kuala Lumpur, Malaysia, E-mail: eiad@unikl.edu.my