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THE SIGNIFICANCE OF INTELLECTUAL CAPITAL AND STRATEGIC ORIENTATIONS ON INNOVATION CAPABILITY AND FIRM PERFORMANCE

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Abstract

This research investigates the impact of intellectual capital and strategic orientations on the innovation capability and firm performance of Malaysian ICT SMEs. Data was collected from 213 firms relating to intellectual capital and the three strategic orientations; market orientation, learning orientation and technology orientation. Using Partial Least Squares structural equation modeling (PLS-SEM) to analyse the data, results indicate that while market orientation has a direct negative relationship to firm performance, market orientation influenced firm performance positively and significantly through the competitive mediating effect of innovation capability. Learning orientation and technology orientation are mediated by innovation capability in an indirect only pattern, while intellectual capital was found to be mediated by innovation capability in a complementary pattern. Findings reveal that innovation capability is positively and significantly related to firm performance and that market orientation, learning orientation, technology orientation and intellectual capital are all significant and positively related to innovation capability. The main findings highlight innovation capability as a strong determinant of firm performance through its direct and indirect effects. The developed model indicates that Malaysian ICT SMEs would perform better with greater emphasis on developing innovation capability through the enhancement of intellectual capital and the strategic orientations measured in this study.

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INTRODUCTION

The uncertainty of global business markets has become more challenging for firms with fierce competition in both developed and developing countries (Mateev & Anastasov 2010). Innovation is seen as a crucial factor to propel Malaysia to become a developed nation with high-income status by the year 2020 (Sulaiman et al., 2012, Hilmi et al., 2012). The development and prosperity of SMEs within the global information and communications technology (ICT) environment is perceived to be critically important and vital to any economy, including Malaysia (Beal and Abdullah, 2007). Focusing on ICT SMEs (part of the services sector) has been identified as a new source of growth for the economy in the Industrial Master Plan 3 or IMP3 (The Star, 2006). Due to the increasing market competition and dynamic environment globally, ICT SMEs particularly in Malaysia, face robust competition. They must continuously find ways to enhance their ability to innovate effectively and aim for sustainable growth and increased business performance.

Despite calls for greater innovative actions, the level of innovation in Malaysia is considered still low. According to the Ministry of Science, Technology and Innovation (MOSTI) (cited in Tan and Nasurdin, 2010), the level of innovation in Malaysia is much lower than its nearest neighbour, Singapore. Furthermore, Malaysia's weak position in terms of research and development (R&D) and innovation capability poses major challenges (Chandran et al., 2009). Malaysia lags behind, despite intense measures undertaken to promote innovation. As an example, the level of R&D indicators that is used to analyse the system of innovation in Malaysia has shown that Malaysia is not innovating at the frontier and lagging behind many other nations. R&D expenditures as percentage of Gross Domestic Product (GDP) for 1996 to 2000 for Malaysia are only 0.4% compared to Korea (2.4%), Singapore (1.9%) and India (1.2%) (Chandran, Rasiah & Wad 2009). Therefore, the government has highlighted the need to support innovation-led growth and capacity building in SMEs through the economic reform programs in its efforts to be a knowledge and technology driven economy (National Economic Advisory Council, 2010).

While studies on innovation are in abundance (e.g., Lee and Chew-Ging, 2007, Mohamed, 1995, Stuart, 2000, Abernathy and Clark, 1985), there is still little empirical evidence relating to how firms improve their innovation capability (Romijn and Albaladejo, 2002, Tang and Chi, 2011, Balan and Lindsay, 2010a), and the impacts on firm performance, even more so in the Malaysian context. As innovation plays a key role in the survival and growth of firms, developing innovation capability has become increasingly important (Francis and Bessant, 2005). There is a need for research to investigate the relative importance of various factors contributing to a firm's innovation capability (Drake et al., 2006, Barlow, 2000). Furthermore, Tang and Chi (2011) emphasise that few empirical studies have been undertaken on how ICT companies improve their innovation capability.

Many of the published studies relating to innovation in Malaysia are undertaken in the manufacturing sector (Hashim et al., 2005, Ibrahim et al., 2008, Bakar and Ahmad, 2010, Tan and Nasurdin, 2010). The majority of past studies on market orientation, learning orientation and innovation are conducted in large companies and in developed Western countries such as in the United States and United Kingdom, while to a large extent ignoring SMEs in developing countries (Keskin, 2006). Literature also shows that the relationships between intellectual capital and strategic orientations with innovation capability and firm performance are yet to be comprehensively explored, particularly in Malaysian ICT SMEs.

Malaysia is striving to achieve sustainable economic development where knowledge and know-how become the main drivers of economic growth (Majlis Inovasi Negara 2007). Intellectual capital helps nations shift from a traditional industrial economy to a knowledge-based economy (Mustapha & Abdullah 2004; Zhou & Fink 2003). However, there seems to be an absence of research examining the relationships between intellectual capital and firm innovation capability particularly at the SME level and even more so in the ICT sector. Strategic orientations provide a critical means for firms to survive and prosper in competitive markets (Zhou & Li 2007). Previous studies (e.g., Cano, Carrillat & Jaramillo 2004; Narver & Slater 1990; Wiklund & Shepherd 2005) have investigated the relationship between specific strategic orientations and organisational performance. However, only limited studies have been conducted to examine the impact of such orientations on innovation capability (Akman & Yilmaz 2008).

Based on the reasons discussed , this research investigates the significance of the relationship between intellectual capital and strategic orientations (market orientation, learning orientation and technology orientation) with innovation capability and resultant performance of ICT SMEs in Malaysia. Specifically, the main research question to be examined in the present study is: Do intellectual capital and strategic orientations significantly impact innovation capability and firm performance in Malaysian ICT SMEs?

LITERATURE REVIEW

Innovation Capability

In a highly competitive business environment with rapid technological advances and shorter product life cycles, SMEs need to expedite product development time and offer extended product variety. Hence, creating and sustaining competitive advantage depends on the firm's ability to continuously produce innovations (Tidd and Bessant, 2009).

Current research (e.g., Balan and Lindsay, 2010b, Wallin et al., 2010) has stressed that it is important to understand the innovation capability of firms in order to be able to assist them in improving their ability to innovate and hence enhance their abilities to survive and grow in a more rapidly changing environment. Researchers (e.g., Keskin, 2006, Calantone et al., 2002, Panayides, 2006) have supported the proposition that innovation capability has a positive and significant impact on firm performance.

Hogan, Soutar, McColl-Kennedy, and Sweeney (2011, p. 1266) suggest a holistic view of the innovation capability concept that is "a firm's ability, relative to its competitors, to apply the collective knowledge, skills, and resources to innovation activities relating to new products, processes, services, or management, marketing or work organisation systems, in order to create added value for the firm or its stakeholders." This research adopts the broad conceptualisation of innovation capability proposed by Hogan et al. (2011).

Hogan and associates introduce a three-dimensional innovation capability scale for service firms comprising of client-focused innovation capability (CFIC), marketing-focused innovation capability (MFIC) and technology-focused innovation capability (TFIC). The first dimension, CFIC, refers to "a firm's ability to provide clients with services and products that offer unique benefits superior to those of competitors, and an ability to solve clients' problems in innovative ways" (Hogan et al., 2011, p. 1268). The second dimension, MFIC, shows "a firm's ability to develop and implement novel promotional approaches, and innovative marketing programs; while TFIC reflects a firm's ability to adopt new software, integrated systems and technology, and an ability to innovate with new software and technology in order to keep ahead of the market" (Hogan et al., 2011, p. 1268).

Intellectual Capital

SMEs success is driven by the knowledge, experience and skills possessed by the owners and employees (Man and Lau, 2002). SMEs can compete on the basis of their know-how. Firms that are successful at leveraging knowledge are associated with increased efficiencies in operations, higher rates of successful innovations, improved customer service and increased ability to understand trends and patterns in the marketplace (Hsu, 2007).

Researchers (e.g., Nahapiet and Ghoshal, 1998, Youndt et al., 2004, Subramaniam and Youndt, 2005, Hsu and Sabherwal, 2011, Simsek and Heavey, 2011) view intellectual capital as equal to the concept of 'knowledge capital' or 'knowledge assets' and define it as the sum of all knowledge utilised by firms to achieve competitive advantage. *Human capital, organisational capital* and *social capital* are identified as the three key components of intellectual capital. Describing this definition of intellectual capital, Youndt, Subramaniam and Snell (2004) posit that the sum of all knowledge refers to knowledge that exists at various levels whether individual, network and organisational levels, from inside and outside of firms.

It is widely agreed that a firm's innovation capability is closely related to intellectual capital as knowledge resource firms utilise this capital in order to achieve sustainable success (Subramaniam & Youndt 2005; Tsai & Goshal,1998; Youndt, Subramaniam & Snell 2004

Intellectual capital has become a crucial factor for firms to achieve sustainable profit and performance in a knowledge-based economy (Hsu and Fang, 2009). The Resource-based view (RBV) suggests that intellectual capital impacts value creation and firm performance through cost reduction, advancing benefits provided to customers or by combining both actions (Youndt and Snell, 2004). In Youndt and Snell's (2004) study on public, single business unit organisations, it was revealed that human, social and organisational capital were all significantly related to performance.

It is acknowledged in the literature that knowledge resources serve as a source of sustainable competitive advantage and may enhance innovation performance indirectly through greater innovation capability (Urgal, Quintás & Arévalo-Tomé 2013). These researchers and others confirmed that innovation capability plays a mediating role in the association between knowledge resources and innovation performance hence, stressing that the capability for converting knowledge resources is important in developing innovative products.

Strategic Orientations

This research investigates three strategic orientations that could possibly affect a firm's innovation capability and performance: market, technology and learning orientations. The effects of individual strategic orientation dimensions have been widely studied (Hillebrand et al., 2011, Narver and Slater, 1990). However, research investigating combinations of strategic orientations such as customer orientation and technology orientation dimensions is limited (Hakala and Kohtamaki, 2010). Literature also reveals that combinations of market, learning and technology orientations are examined far less frequently (Hakala, 2011).

Market-oriented firms focus on the demand from customers or potential customers that help the firms to offer innovations most likely to be appreciated by customers (Han, Kim & Srivastava 1998; Menguc & Auh 2006). This indicates that market orientation would facilitate or enhance firm innovation capability via customer information constantly generated by firms which in turn leads toward opportunity recognition (Hurley & Hult 1998; Noble, Sinha & Kumar 2002). Many studies have established a positive impact of market orientation on innovation despite some fundamental variations in measurement approaches employed. For example, Mavondo, Chimhanzi, and Stewart (2005) argue that the success of new innovation is the result of market orientation performed by firms. Sandvik and Sandvik (2003) provide supportive evidence that market orientation has a significant and positive impact on product innovativeness.

A number of studies (e.g., Jaworski & Kohli 1993; Narver & Slater 1990; Ruekert 1992) have investigated the effect of market orientation on firm performance, arguing its superiority as a strategic orientation (Zhou, Yim & Tse 2005). Han, Kim and Srivastava (1998) propose that a market-oriented firm is likely to be innovative potentially leading to enhanced firm performance. Further, meta-analytic reviews undertaken by researchers validate the notion that market orientation is a predictor of firm performance (Cano, Carrillat & Jaramillo 2004; Kirca, Jayachandran & Bearden 2005).

Although the view that market orientation positively affects firm performance is widely supported, several empirical studies report negative or non-significant relationships (e.g., Han, Kim & Srivastava 1998; Hart & Diamantopulous 1993; Siguaw, Simpson & Baker 1998) or mixed results (Greenley 1995; Jaworski & Kohli 1993). With respect to the inconsistent findings, further research is critical to understand potential factors influencing the relationship between market orientation and firm performance (Kohli & Jaworski 1990; Narver & Slater 1990).

Previous studies have concluded that learning orientation can enhance firm innovation capability (Calantone, Cavusgil & Zhao 2002; Damanpour 1991; Kaya & Patton 2011). Calantone, Cavusgil and Zhao (2002) delineate three factors that firms committed to learning can consider to advance innovation capability. First, firms are more likely to focus on innovation and employ state-of-the art technology in the innovation process. Additionally, these firms have the capacity to develop and market a technological breakthrough. Second, by learning, firms have the knowledge and ability to understand and anticipate customer demands, thus firms are not likely to miss opportunities in emerging markets. Finally, firms that are committed to learning closely monitor their competitors' actions. Moreover, these firms have knowledge regarding their competitors' strengths and weaknesses, so they can learn from both the competitors' success and failures.

Researchers have found evidence to support a positive relationship between a learning orientation and business performance (Baker & Sinkula 1999b; Farrell 2000; Wang 2008). Fundamentally, the accumulation of learning can lead to reduction in cost of production. Hence, learning can generate better performance through innovation and by lowering the costs of producing goods or developing services (Mavondo, Chimhanzi & Stewart 2005).

While some empirical studies (e.g., Baker & Sinkula 1999b; Calantone, Cavusgil & Zhao 2002; Wang 2008) have found a direct relationship between learning orientation and firm performance, other researchers conclude that there is no direct link between both constructs, proposing the importance of potential mediators for the relationship. Santos-Vijande (2005), for example, found that learning orientation has no direct and significant relationship with firm performance but rather indirectly through market orientation as a mediator. They assert that learning orientation per se is insufficient to have a significant impact on firm performance. Likewise, Suliyanto and Rahab (2012) demonstrate that learning orientation cannot directly improve firm performance unless it is mediated by other variables that may intervene between learning and firm performance.

Significant evidence supports the notion that technology orientation improves innovation. Mu and Benedetto (2011) reveal that technology orientation relates positively and significantly with new product commercialisation performance in the Chinese market. Having technology orientation facilitates firm to produce better products and enable them to better market their innovations and ultimately achieve superior performance (Zhou, Yim & Tse 2005). It is common that technology-oriented firms engage in complex, high risk and advanced innovation projects. In order to ensure such innovation projects are successful, firms should have strong innovation capability (Akman & Yilmaz 2008).

Firm Performance

Financial performance serves as a basic measure for firm effectiveness. Performance assessment is traditionally confined to financial performance measures, some researchers emphasise the use of multiple performance indicators (Demirbag, Koh, Tatoglu & Zaim 2006; Shoham, Rose & Kropp 2005). Accordingly, to ensure firm performance is measured accurately, Dess and Robinson (1984) recommend that firms employ a composite measure. Rather than relying on a single indicator, utilising multiple indicators enables firms to measure performance via more complex and informative measures as well as assess the contribution of each indicator to the latent variable (Hagedoorn & Cloodt 2003).

It has been generally accepted in the literature that objective measures of performance are more preferred than subjective measures (Dess & Robinson 1984). However, it is very difficult for researchers to obtain objective data especially from small businesses because many owners/managers refuse to provide firm's objective and actual performance information to outsiders and this type of data is not released publicly (Dess & Robinson 1984; Sapienza, Smith & Gannon 1988). In addition, they may give biased performance outcomes if they are to report such data (Sapienza, Smith & Gannon 1988). On the other hand, research has provided evidence that objective and subjective performance measures tend to correlate significantly and propose that researchers utilise subjective measures of firm performance as an alternative in the absence of accurate objective measures (Dess & Robinson 1984; Venkatraman & Ramanujam 1986).

HYPOTHESES

The following hypotheses are proposed for the study:

Hypothesis 1	Intellectual capital has a positive and significant relationship with innovation capability of the firm.
Hypothesis 2	Intellectual capital has a positive and significant relationship with firm performance.
Hypothesis 3	Innovation capability mediates the relationship between intellectual capital and firm performance.
Hypothesis 4	Market orientation has a positive and significant relationship with innovation capability of the firm.
Hypothesis 5	Market orientation has a positive and significant relationship with firm performance.

Hypothesis 6	Innovation capability mediates the relationship between market orientation and firm performance.
Hypothesis 7	Learning orientation has a positive and significant relationship with innovation capability of the firm.
Hypothesis 8	Learning orientation has a positive and significant relationship with firm performance.
Hypothesis 9	Innovation capability mediates the relationship between learning orientation and firm performance.
Hypothesis 10	Technology orientation has a positive and significant relationship with innovation capability of the firm.
Hypothesis 11	Technology orientation has a positive and significant relationship with firm performance.
Hypothesis 12	Innovation capability mediates the relationship between technology orientation and firm performance.
Hypothesis 13	Innovation capability has a positive and significant relationship with firm performance.

EMPIRICAL DESIGN

This research utilises a survey to collect data from a sample ICT SMEs in Malaysia. The survey questionnaire is designed as a self-administered questionnaire and developed based on established measures. The sampling frame used was drawn from a list of companies on the SME Corp, Malaysia website. As at December 2010, the list contained 594 companies, which was used as the population frame (Sekaran, 2007). SMEs located in Greater Kuala Lumpur/Klang Valley region of Malaysia were selected, which comprises of Kuala Lumpur and its adjoining suburbs, cities and towns in the state of Selangor. This region is identified as the critical economic growth centre with over 37% of the Nation's GDP being produced in Kuala Lumpur and Selangor (SPAD, 2011). Participants are the owners, CEOs or managers of ICT SMEs from 378 companies in Greater Kuala Lumpur/Klang Valley region as listed in the directory. Participants are from ICT SMEs operating in four main sub-sectors as classified in the Malaysian Standard Industrial Classification 2008 (DOSM): 1) programming and broadcasting, 2) telecommunications, 3) computer programming, consultancy and related activities and 4) information services. Partial Least Squares structural equation modelling (PLS) and SmartPLS 2.0 (Ringle et al., 2005) were employed as analytical tools for the assessment of measurement and structural models.

Measurement

Intellectual capital comprises three dimensions: human capital, organisational capital and social capital (Subramaniam and Youndt, 2005). The intellectual capital scale is measured by 14 items: human capital (5 items), organisational capital (4 items) and social capital (5 items).A seven-point Likert Scale ranging from 1 "Strongly Disagree" to 7 "Strongly Agree" was used. Respondents were asked to indicate to what degree they agreed or disagreed with each statement.

Strategic orientation comprises three constructs: market orientation, learning orientation and technology orientation. The present research uses the market orientation scale by Nasution and Mavondo (2008). The market orientation scale comprises 17 items: customer orientation (4 items), competitor orientation (4 items), inter-functional coordination (4 items) and latent need fulfilment (5 items). Responses were recorded along a seven-point Likert Scale ranging from 1 "Strongly Disagree" to 7 "Strongly Agree".

The learning orientation scale was derived from Sinkula, Baker and Noordewier's (1997) and comprises three dimensions with 11 items including 1 reverse coded item as per Sinkula, Baker and Noordewier (1997). The dimensions are commitment to learning (4 items), shared vision (4 items) and open-mindedness (3 items). Responses were documented using a seven-point Likert Scale ranging from 1 "Strongly Disagree" to 7 "Strongly Agree".

The technology orientation construct was measured by ten items. TO1 to TO5 were derived from Akman and Yilmaz (2008) and TO6 to TO10 were adapted from Hakala and Kohtamaki (2011). A combination of these scales was used to provide a more comprehensive measurement of technology orientation. A seven-point Likert Scale ranging from 1 "Strongly Disagree" to 7 "Strongly Agree" was used to record the responses.

The innovation capability construct (Hogan et al., 2011) comprises three dimensions: client-focused innovation capability (CFIC), marketing-focused innovation capability (MFIC) and technology-focused innovation capability (TFIC). The scale consists of 13 items; CFIC (5 items), MFIC (4 items) and TFIC (4 items). In measuring innovation capability, respondents were asked to rate the capabilities of their companies in comparison with their competitors along a seven-point Likert Scale ranging from 1 "Much worse than competitors" to 7 "Much better than competitors".

Measures of firm performance were adopted from Wiklund and Shepherd (2003) and comprises 10 items. Subjective measures of firm performance were employed because respondents are generally reluctant to provide accurate information pertaining to objective measures. Respondents were asked to compare the development of their own firm over the past three years relative to their competitors for ten different aspects of performance. Responses were recorded by using a seven-point Likert Scale ranging from 1 “Much lower than competitors” to 7 “Much higher than competitors”. Items measuring firm performance include sales growth, growth in number of employees, revenue growth, net profit margin, product/service innovation, process innovation, adoption of new technology, product/service quality, product/service variety and customer satisfaction.

Model Evaluation

Based on the hypothesised relationships explained previously, the conceptual framework for this research integrates four hierarchical component models or multidimensional constructs (intellectual capital, market orientation, learning orientation and innovation capability) that are conceptualised at second-order level and two constructs (technology orientation and performance) specified as lower-order constructs.

Four latent variable constructs (intellectual capital, market orientation, learning orientation and innovation capability) were specified as Reflective-Formative Type II constructs in a hierarchical component model. This model have been frequently used in empirical research (Becker et al., 2012). All first-order constructs in the hierarchical component models are reflective in nature while the second-order constructs are formative. Two other constructs, performance and technology orientations are reflective.

The models in this research are assessed separately in a two-step process (Hair et al., 2011). In the first step of the evaluation process, reliability and validity of the item measures are examined before testing the structural model in order to ensure that the measures are representing the constructs of interest (Hair et al., 2011, Chin, 2010).

In the second step of the evaluation process, the assessment involves the examination of the structural relationships. The structural model is also referred to as the inner model that reflects the relationships between the latent variables (Hair et al., 2011, Henseler et al., 2012). The main focus in the structural model evaluation is maximising the variance explained or the R^2 for the endogenous latent construct as well as determining the size and significance of all paths coefficients.

The combination of repeated-indicator approach and the two-stage approach as recommended by Ringle, Sarstedt and Straub (2012) were applied to estimate parameters in the structural model. The repeated-indicator models were estimated using the path weighting scheme as suggested by Hair, Ringle and Sarstedt (2011) and Becker, Klein and Wetzels (2012). Mediation analysis was performed to test the mediating effect on firm performance. The guidelines by Zhao, Lynch and Chen (2010) were followed.

RESULT AND ANALYSIS

Participant Characteristics

Of the 378 questionnaires distributed to the entire ICT company population in Greater Kuala Lumpur/Klang Valley region as listed in the sampling frame, a total of 213 completed questionnaires were collected. This yielded a response rate of 35.9% of the national total population (594 companies) and 56.3% of the Greater Kuala Lumpur/Klang Valley population. Almost two thirds of the participants are male. Half of the participants held managerial and higher positions in the companies. Another 13% are Assistant Managers and 36% are executives, while 46% have finished secondary school and 42% have a diploma. Only 8% possess bachelor degrees and professional qualifications.

These companies are mainly involved in computer programming, consultancy and related activities (49%), followed by telecommunications activities (44%) and programming and broadcasting (7%). In terms of the legal structure of the companies, half are private companies, followed by partnerships (43%). The remaining are sole proprietors (4%) and family businesses (3%). 51% of companies were established between 2005 and 2009, indicating a cohort of relatively young SMEs. In terms of number of employees, almost two-thirds of companies have between 5 and 19 employees. 34% companies employ less than 5 employees and 4% companies employ between 20 and 50 employees. A wide distribution of annual sales turnover for the financial year 2011 is evident with 155 companies or 73% turning over between RM200,000 to RM2,000,000.

Measurement Model

A confirmatory factor analysis (CFA) was performed to assess reliability and validity of the scales. Following these procedures, 16 items with factor loadings less than 0.7 were removed from the model to maintain parsimony (Hair et al., 2013). One item was removed from the intellectual capital and learning orientation constructs, whereas five items were dropped from market orientation construct, six items from technology orientation construct and three items from firm performance.

TABLE 1 PSYCHOMETRIC PROPERTIES OF THE FIRST-ORDER CONSTRUCTS

Constructs	Loading	Sample Mean	Std Error	t-statistics	CR[a]	AVE[b]
Intellectual Capital:						
Human capital					0.946	0.779
ICHC1	0.878	0.879	0.011	82.671		
ICHC2	0.905	0.905	0.013	67.550		
ICHC3	0.891	0.891	0.015	58.686		
ICHC4	0.881	0.881	0.018	49.051		
ICHC5	0.858	0.857	0.020	43.778		
Organisational capital					0.868	0.687
ICOC1	0.835	0.836	0.025	34.085		
ICOC2	0.866	0.865	0.021	41.591		
ICOC4	0.784	0.778	0.045	17.518		
Social capital					0.889	0.616
ICSC1	0.791	0.792	0.031	25.306		
ICSC2	0.835	0.835	0.023	36.810		
ICSC3	0.820	0.821	0.024	34.388		
ICSC4	0.724	0.722	0.045	16.209		
ICSC5	0.749	0.748	0.051	14.774		
Market Orientation:						
Customer orientation					0.855	0.663
MOCTO2	0.825	0.825	0.021	38.828		
MOCTO3	0.826	0.826	0.036	23.201		
MOCTO4	0.792	0.791	0.033	23.765		
Competitor orientation					0.871	0.692
MOCPO2	0.828	0.826	0.030	27.763		
MOCPO3	0.825	0.823	0.037	22.170		
MOCPO4	0.842	0.843	0.027	31.649		
Inter-functional coordination					0.877	0.781
MOIFC1	0.876	0.874	0.033	26.550		
MOIFC2	0.892	0.894	0.014	64.468		
Latent need fulfilment					0.845	0.577
MOLAT1	0.719	0.712	0.056	12.844		
MOLAT2	0.728	0.727	0.044	16.481		
MOLAT4	0.776	0.776	0.032	24.489		
MOLAT5	0.812	0.814	0.025	32.083		
Learning Orientation:						
Commitment to Learning					0.883	0.654
LOCOM1	0.806	0.807	0.022	36.459		
LOCOM2	0.875	0.875	0.017	50.968		
LOCOM3	0.769	0.766	0.038	20.036		
LOCOM4	0.781	0.778	0.034	23.201		
Shared vision					0.877	0.642
LOVS1	0.740	0.738	0.038	19.658		
LOVS2	0.847	0.845	0.025	34.335		
LOVS3	0.863	0.863	0.019	44.833		
LOVS4	0.748	0.744	0.044	17.086		
Open-mindedness					0.887	0.796
LOMind1	0.908	0.908	0.015	61.893		
LOMind2	0.876	0.874	0.023	37.505		

Notes: [a]CR - Composite Reliability values; [b]AVE – Average Variance Extracted values

Table 1 Psychometric Properties for First-Order Constructs (continued)

Constructs	Loadings	Sample Mean	Std Error	t-statistics	CR[a]	AVE[b]
Technology Orientation					0.880	0.648
TO1	0.750	0.748	0.039	19.245		
TO2	0.853	0.852	0.020	42.451		
TO3	0.840	0.840	0.038	22.113		
TO4	0.771	0.770	0.033	23.247		
Innovation Capability:						
Client-focused innovation capability					0.927	0.717
INCFIC1	0.844	0.844	0.022	37.667		
INCFIC2	0.839	0.839	0.036	23.339		
INCFIC3	0.880	0.879	0.017	52.824		
INCFIC4	0.871	0.871	0.015	59.270		
INCFIC5	0.797	0.796	0.025	32.195		
Marketing-focused innovation capability					0.908	0.711
INMFIC1	0.846	0.845	0.022	39.357		
INMFIC2	0.892	0.892	0.018	50.469		
INMFIC3	0.842	0.840	0.027	30.991		
INMFIC4	0.789	0.786	0.039	20.462		
Technology-focused innovation capability					0.899	0.690
INTFIC1	0.767	0.768	0.031	25.034		
INTFIC2	0.898	0.899	0.013	67.393		
INTFIC3	0.857	0.854	0.024	35.159		
INTFIC4	0.795	0.793	0.033	24.393		
Firm Performance					0.944	0.707
PERF1	0.867	0.866	0.022	39.000		
PERF2	0.840	0.839	0.029	29.344		
PERF4	0.848	0.847	0.021	40.358		
PERF5	0.862	0.862	0.017	49.974		
PERF6	0.860	0.860	0.018	48.253		
PERF7	0.828	0.828	0.023	36.466		
PERF8	0.780	0.778	0.030	26.073		

Notes: [a]CR - Composite Reliability values; [b]AVE – Average variance extracted values

By conducting the final round of CFA, loadings for the items retained in the measurement model were obtained. Following which, the bootstrapping procedure was conducted to estimate the significance of each measurement item by examining the t-statistics. For this research, bootstrap t-statistics were computed on the basis of 1000 resamples (Henseler et al., 2009, Preacher and Hayes, 2008). The critical t-statistic for a two-tailed test is 1.96 at the 0.05 significance level (Hair et al., 2011).

Table 1 presents the psychometric properties of the first-order constructs comprising loadings for the final measurement items together with the sample mean, standard error and t-statistics to assess the significance of loadings. After removing items with loadings less than the threshold value, all measurement items loaded significantly and highly between 0.719 and 0.908 on their intended constructs achieving unidimensionality. Loadings above the threshold value of 0.7 are indicative of larger shared variance between a construct and its indicators than the variance of the measurement error (Gotz et al., 2010). Hence, results from CFA show strong evidence for reliability of the measurement items.

For checking internal consistency reliability, tests were conducted on composite reliability measures as suggested by Hair, Ringle and Sarstedt (2011). As depicted in Table 1, all first-order constructs displayed composite reliability between 0.845 and 0.946 which is well above the threshold value of 0.7 and considered satisfactory.

Convergent validity of the first-order constructs in this research was examined via AVE values as suggested by Fornell and Larcker (1981). AVE shows the average variance shared between a construct and its measures relative to the amount of measurement error (Chin, 2010, Hulland, 1999). Sufficient convergent validity is achieved when AVE value of a construct is at least 0.5 (Fornell and Larcker, 1981). This means that a construct explains more than 50% of the variance among the scale indicators (Gotz et al., 2010, Hair et al.,

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2011). Table 1 shows that the AVE for all constructs are within the range of 0.577 and 0.796, fulfilling the 0.5 threshold demonstrating convergent validity.

Structural model

Before evaluating the R^2, it is important to identify the significance as well as the sign and magnitude of the path coefficients by analysing the t-values and the path coefficients that were obtained by performing non-parametric bootstrapping procedure(Henseler et al., 2009, Peng and Lai, 2012). Results from the bootstrapping procedure are shown in Table 2.

TABLE 2 RESULTS OF BOOTSTRAPPING FOR STRUCTURAL MODEL EVALUATION

Hypothesis	Exogenous constructs	Endogenous constructs	β^a	Mean	Std. Error	T-Statistics^b	Expected sign	Result
H1	Intellectual capital	Innovation capability	0.225*	0.233	0.057	3.966	Positive	Supported
H4	Market orientation		0.273*	0.264	0.103	2.648	Positive	Supported
H7	Learning orientation		0.226*	0.236	0.068	3.321	Positive	Supported
H10	Technology orientation		0.227*	0.226	0.089	2.557	Positive	Supported
H2	Intellectual capital	Performance	0.301*	0.309	0.081	3.698	Positive	Supported
H5	**Market orientation**		**-0.189***	-0.188	0.091	2.086	Positive	**Not Supported**
H8	**Learning orientation**		**0.156n.s**	0.159	0.097	1.618	Positive	**Not Supported**
H11	**Technology orientation**		**0.080n.s**	0.080	0.090	0.891	Positive	**Not Supported**
H13	Innovation capability		0.454*	0.447	0.096	4.737	Positive	Supported

Notes:

a β : path coefficient
b t-statistics >1.96 are significant at $p<0.05$ (two-tailed)
*Significant at the 0.05 level (two-tailed)
n.s – not significant

With regard to the proposed relationships, the results provide support of strong positive significant relationships for 6 hypotheses: H1, H2, H4, H7, H10 and H13 (β=0.225, 0.301, 0.273, 0.226, 0.227 and 0.454 respectively). These coefficients exceed 0.1 and are significant at a level of $p<0.05$. H5 is not supported even though the coefficient is statistically significant at the level of $p<0.05$, because the path coefficient is negative (β=-0.189). Two other hypotheses, H8 and H11, are not supported (β=0.156 and 0.080 respectively) with t-statistics less than 1.96, thus are not significant at the level of $p<0.05$.

These results demonstrate that intellectual capital, market orientation, learning orientation and technology orientation positively contribute to explaining the variance in innovation capability. Examining the relevance of significant relationships between the four exogenous constructs with innovation capability, the results show that intellectual capital, market orientation, learning orientation and technology orientation carry comparable weights in impacting innovation capability with path coefficients that are similar in magnitude (β=0.225, 0.273, 0.226 and 0.227 respectively). This stresses the importance of considering all four constructs in influencing the level of innovation capability.

Regarding the direct relationships between the exogenous constructs and firm performance; innovation capability (β=0.454) and intellectual capital (β=0.301) affect firm performance most significantly.

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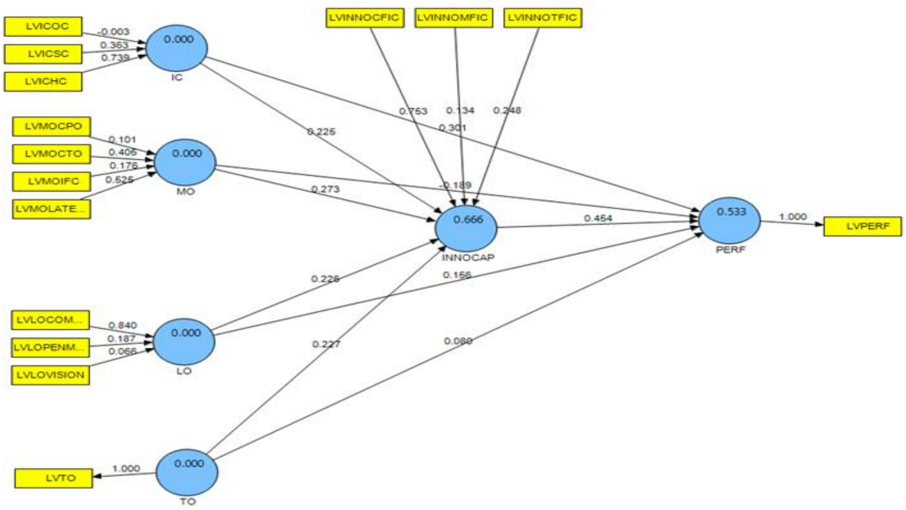
In contrast, market orientation negatively (β=-0.189) influences firm performance. Both learning orientation and technology orientation do not have direct significant impact on firm performance.

FIGURE 1 PLS ALGORITHM OF STRUCTURAL MODEL



The explanatory power of the structural model was examined by the coefficient of determination, R^2 values (Hair et al., 2012). R^2 represents the amount of variance in the endogenous constructs, in this research innovation capability and firm performance, that is explained by the model (Chin, 2010). According to Chin (1998), R^2 values of 0.67, 0.33, or 0.19 for endogenous latent constructs in the inner model can be described as substantial, moderate, or weak, respectively.

Referring to Figure 1, results indicate a robust model with 66.6% (R^2=0.666) or 67% of the variance in innovation capability explained by the first-order constructs, namely intellectual capital, market orientation, learning orientation and technology orientation. Hence, with respect to Chin's (1998) recommendation, the explained variance of innovation capability can be interpreted as substantial. The structural model also explains a considerable amount of 53.3% (R^2=0.533) of the variation in firm performance thus explaining in the upper range of moderate R^2 values as per Chin (1998).

Mediating Effects

TABLE 3 DIRECT, INDIRECT EFFECTS OF INNOVATION CAPABILITY ON FIRM PERFORMANCE

Path	Direct effect model			Indirect Effect[c] (*a x b*)	Se[d]	t-Stat[e] (a x b)/ Se[d]	Total Effect[f] (c') (a x b) + c	VAF
	β[a]	Se[b]	t-Stat					
IC→PERF (X→Y) c	0.301*	0.081	3.698	0.102*	0.032	3.218	0.403	0.253
MO→ PERF (X→Y) c	-0.189*	0.091	2.086	0.124*	0.056	2.234	0.313	0.396
LO→PERF(X→Y) c	0.156n.s	0.097	1.618	0.103*	0.037	2.760	0.259	0.398
TO →PERF (X→Y) c	0.080n.s	0.090	0.891	0.103*	0.047	2.196	0.183	0.563
	Direct effect model							
INNOCAP →PERF (M→Y) or (*b*)	0.454*	0.096	4.737					
IC →INNOCAP (X→M) or (*a*)	0.225*	0.057	3.966					
MO→ INNOCAP (X→M) or (*a*)	0.273*	0.103	2.648					
LO→INNOCAP(X→M) or (*a*)	0.226*	0.068	3.321					
TO →INNOCAP (X→M) or (*a*)	0.227*	0.089	2.557					

Notes: se = standard error, n.s = not significant,

[a] β = path coefficient
[b] Non parametric bootstrapping procedure was performed to test the significance of the PLS path modelling results
[c] Indirect effect of a variable X on performance (Y) was calculated by multiplying the coefficient for that variable toward innovation capability (X→M) and the coefficient of innovation capability toward performance (M→Y).
[d] Standard error of indirect effects were calculated based on recommendation by Hair et al. 2014.
[e] t-statistic values were calculated based on recommendation by Hair et al. 2014.
[f] Total effects of a variable X on performance (Y) was calculated by summing the direct and indirect path coefficients of that variable.
* t-statistics >1.96 are significant at $p<0.05$ (two-tailed)

Results presented in Table 3 indicate that innovation capability has a complementary mediating effect (partial mediation) on the relationship between intellectual capital and performance. Market orientation and firm performance is mediated by innovation capability in a competitive mediating effect. Innovation capability serves as an indirect-only mediator (full mediation) for the relationship between learning orientation and performance. Innovation capability also has an indirect-only mediating effect (full mediation) on the relationship between technology orientation and firm performance.

DISCUSSION

The significant impact of intellectual capital, market orientation, learning orientation and technology orientation on innovation capability are key findings in this study indicating that these constructs are critical determinants of innovation capability in Malaysian ICT SMEs.

Innovation capability is found to be a vital determinant of firm performance through its direct and indirect effects, indicating its importance as a dynamic organisational capability. The central message conveyed from the findings is that improving innovation capability is crucial for service firms, such as Malaysian ICT SMEs, to achieve superior performance.

Market orientation is found to have a significant and negative impact on firm performance in Malaysian ICT SMEs implying that sole emphasis on market orientation is potentially detrimental to performance. Similarly, Wong and Mavondo (2000) reveal that being highly market-oriented can reduce financial performance. According to the researchers, market orientation may be a liability as perceived by executives in the Australian Building and Construction industry. Most managers in their study viewed the creation of superior customer value through marketing efforts as an expense that does not contribute to long term financial performance in this industry. The present findings reinforce the necessity to consider the role of a mediator in the market orientation-performance relationship. The present study has provided evidence that the performance impact of market orientation is realised through innovation capability.

This study breaks new ground by modelling the effects of intellectual capital and strategic orientations as key constructs, forming a solid basis for the study of firm innovation capability and performance. Market orientation, learning orientation and technology orientation in combination with intellectual capital have similar explanatory power in explaining the variance in innovation capability. The power of these factors when combined makes a more significant contribution to enhanced innovation capability and firm performance. For Malaysian ICT SMEs, the challenges for channelling their resources and capabilities (intellectual capital and strategic orientations) towards the improvement of firm innovation capability rely upon management ability to develop and deploy an appropriate mix of crucial resources.

LIMITATIONS OF THE RESEARCH

The data was collected from a single industry that is ICT industry in a developing economy and focusing on SMEs. These firms are exposed to the same level of environmental uncertainties facing the industry. Therefore, findings of this research are limited to the Malaysian organisations' context. It may be inappropriate for the developed model to be used for the purpose of examining the impact of intellectual capital and strategic orientations in all industrial sectors and in other developing countries.

As a quantitative study, the findings are limited to understanding what impacts intellectual capital and strategic orientations have on innovation capability and firm performance. The results from path analysis do not explain for certain how these exogenous variables influence the endogenous variables. The path analysis can reveal the significant relationships between the exogenous and endogenous variables however, it is insufficient to provide subjective information that may need to be addressed by a qualitative method (Brannen, 2009).

CONCLUSION

The empirical results provide strong evidence of the explanatory power of the model developed indicating that Malaysian ICT SMEs would perform better with greater emphasis on developing innovation capability through enhancement of intellectual capital and the strategic orientations measured in this study. It also shows that greater benefits for firms in terms of performance will be achieved with higher innovation capability as there is a more substantial impact from intellectual capital and strategic orientations when higher innovation capability is achieved.

Overall, innovation capability is not only important to large firms, but also viewed by SMEs as a vital way to add value for customers and to differentiate their firms and their products or services from competitors in the pursuit of superior performance and sustainable competitive advantage. As intellectual capital and strategic orientations are dependent on managerial control (Leskovar-Spacapan and Bastic, 2007, Thornhill, 2006), this study will bring insights for the owners, CEOs or the management of Malaysian ICT SMEs to deploy a combination of crucial resources and capabilities essential for enhancing innovation capability and firm performance.

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