

The Impacts of Intellectual Capital on Innovative Capability: Building the Sustain Competitive Advantage on a Resource-Based Perspective of Thailand Industrials

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Abstract: This research examined the impacts of intellectual capital on innovation capability leading to sustain competitive advantage in the context of Thailand industrials. Using the resource-based view of the firms, interconnections of the intellectual capital components and innovation capability were created as ways of understanding sustain competitive advantage. The model was tested using data collected from survey of 62 across different Thailand industrials and statistics based on regression analysis. The variables in model were measured by a number of scale items. Both reliability and validity were demonstrated. Regression analysis showed that components of intellectual capitals (human, structural and relational capital) have positive impacts on innovation capability and innovation capability positively affects sustain competitive advantage. These findings will help managers to design and manage intellectual capitals to enhance the innovation capability in the organization and to increase sustain competitive advantage.

Key words: Intellectual capital, innovation capability, sustain competitive advantage, analysis, Thailand

INTRODUCTION

Edvinsson and Malone (1997) represents that intellectual capital is information and knowledge for create value. Ramezan (2011) mentioned IC as is used to create and enhance the organizational value and ability to manage the resource of company. Thus, many researchers focus on intellectual capital as it was an asset of organization that leads to company's competitive advantage (Stewart, 1997; Roos and Roos, 1997).

This research attempted to integrate a Resource Based View (RBV) model by identifying intellectual capital of organizations. The RBV of firms is based on the concept of economic rent and the view of the company as a collection of capabilities. Resources are all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc., controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness (Barney, 1991). Despite the calls for increased understanding of intellectual capital issue, empirical literature in Thailand is sparse. This research therefore, attempted to address these gaps. The main aim was to gain an understanding of the effect of intellectual capital to organization with an emphasis on development for competitive advantage.

The purpose of this research was also to develop and to test a theoretical framework for explaining the intellectual capital, affects innovation capability which in

turn having impacts on sustain competitive advantage. In this research, the aim of the study was to answer the question what is the impact of intellectual capital on innovation capability leading to sustain competitive advantage?

Literature review and research hypotheses

Intellectual capital: A definition of Intellectual Capital (IC) is something firms can not touch but makes firms rich (Stewart, 1991, 1997). Bueno *et al.* (2004) define IC as a collection of intangible assets enable by an organization. Edvinsson and Malone (1997) believe that IC is the asset of knowledge, applied experience, organizational technology, customer relationships and professional skills that provide the firm with a competitive in the market.

Academics and managers indicated that IC is one of the importance competitive advantaged to firms (Edvinsson and Malone, 1997; Stewart, 1997). This research adopts the basic three components of IC (human, structural, relational capital) as suggested by Ramezan (2011). Their definition is given as:

- Human capital is defined as values and attitudes, aptitudes and know-how
- Structural capital is defined as contains both organizational and technology elements that integration and coordination within the firm
- Relational capital is defined as value of relationships that the firm maintains with external agents

Human capital is an importance source of innovation which the company can realize and create value in the knowledge-based economy. The competence of employees is the importance part of IC. Employees can creativity knowledge flexibly and to make innovation continuously. Chen *et al.* (2004) indicated that human capital is one of the key factors in developing the IC of the firms.

Structural capital is one part of IC which deals with system and structure of the firms. Bontis *et al.* (2000) studying on intellectual capital and firm performance shows that structural capital positively affects firm performance. Besides, Pena (2002) shows that structural capital affects new business survival and growth.

Relational capital is more directly affects of firm value and becoming the critical factor of IC. Organizations with strong outside relationships can lead to high relational capital. Many empirical studies also show that relational capital is very valuable to achieving innovation and economic success.

Innovation capability: Innovation is defined as the capability to develop new products that satisfy market needs applying appropriate process technologies to produce these new products developing and adopting new products and processing technologies to satisfy future needs and responding to accidental technology activities and unexpected opportunities created by competitors (Adler and Shenbar, 1990). Organizations with innovation strategy are the creators of change in their industries.

Therefore, an importance of management literature indicated that innovation capability has come to be an important part of the competitive power of the firms. This research adopted the definition of innovation capability from Lawson and Samson (2001) which state that innovation capability refers to the firm's ability to transform and knowledge and ideas into new products, processes systems for the benefit of the firms.

Sustain Competitive Advantage (SCA): The new business environment is increased uncertainty also competency of organization which to create Sustain Competitive Advantage (SCA). The emphasis of the source of advantage is referred to as the resource based view of the firm (Barney, 1991; Grant, 1991; Powell and Dent-Micallef, 1997). According to the resource based view sustainable competitive advantage is focused on the core competency of the firm. Barney (1991) argued that the competency of the firms is valuable, rare, difficult to imitate and

substitute which the basis of sustainable competitive advantage. This research adopted a definition of SCA from Kim *et al.* (2011) which define SCA as the long-term benefit of implementing some unique value-creating strategy which competitors do not implement simultaneously along with the inability to duplicate the benefits of this strategy.

Impact of intellectual capital on innovation capability: IC is a topic of increasing interest to firms that obtain profits from innovation. Henderson (1990) and Ross *et al.* (1996) demonstrated that the effective management of intellectual capital has been proposed as a critical component of innovation. IC is knowledge resources of organization which linked to innovation capability (Youndt *et al.*, 2004; Subramaniam and Youndt, 2005). Previous research argued that innovation is a result of the intellectual capital. Subramaniam and Youndt (2005) studied the relationship of intellectual capital dimension and innovation capability. Their results showed that human and social capital is a result of fundamental innovation capability. Based on the discussion above, this research offers the following hypothesis.

Hypothesis 1: Human capital positively affects innovation capability.

Hypothesis 2: Structural capital positively affects innovation capability.

Hypothesis 3: Relational capital positively affects innovation capability.

Impact of innovation capability on sustain competitive advantage: The previous empirical research supported the result that innovation leads to competitive advantages. For example, Weerawardena and O'Cass (2004) examined the role organizational innovation intensity on sustainable competitive advantage which the results indicated that organizational innovation has a positive effect on SCA. Also, the results of Australian study founding that the firms in both domestic and global markets have innovations leading to competitive advantage (AMC, 1995). Likewise, Porter (1990) argued that competitive advantage of firms is creating an act of innovation. Slater (1996) demonstrated the challenge of sustaining competitive advantage also describes that innovation is one key factor of sources of competitive advantage. Based on the discussion above, this research offers the following hypothesis.

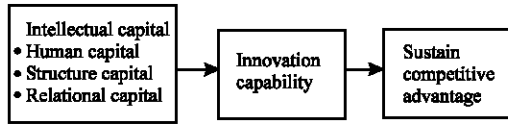


Fig. 1: The conceptual model

Hypothesis 4: Innovation capability positively affects sustain competitive advantage.

Research conceptual model: The concept model is shown in Fig. 1. In this model, the relationship between intellectual capital and innovation capability and innovation capability and sustain competitive advantage are shown.

MATERIALS AND METHODS

Sampling and data collection: In this research, questionnaire mail survey was used for data collection. Mail survey was sent to 330 of Thai industrials. The sample was taken from the database of Department of Export Promotion Ministry of Commerce. A cover letter, stamped reply envelope and copy of the questionnaire were sent to Chief Executive Officers (CEO)'s directing managers or general manager in a sample. About 2-3 weeks later, follow-up calls were made to those who have not responded to persuade them to respond. Beside, mail survey sent the questionnaire again to those who had not responded. With regard to the questionnaire mailing, 31 surveys were undeliverable because some firms were no longer in business or had moved to unknown locations. Deducting the undeliverable from original 330 mailed, the valid mailing was 299 surveys, from which 68 responses were received. Of the surveys completed and returned, only 62 were usable. The effective response rate was approximately 21.16%. According to David *et al.* (2001), the response rate for a mail survey without an appropriate follow-up procedure is <20%. Then, the response rate of this study was considered acceptable.

Construct measurement: To develop good research, constructs of variables are based on theory. Besides, the operationalization of the constructs was high degrees of validity and reliability (Churchill, 1979). Whenever possible, this research developed new items based on previous research. Each question required a response based on 5-point Likert scale. The usable questionnaire for survey can be pre-tested sequentially in stages (Churchill, 1979). A pretest of 30 resulted in change in the wording of certain and to minimize ambiguity (Burns and Bush, 1998).

After carefully developed, the items compose the scales of intellectual capital, innovation capability and sustain competitive advantage were accurated which content and reduced the biases.

RESULTS

Respondent profiles: The responding firms included a wild range of industries as shown in Table 1. Among the 62 responding firms, there were electronic (23) computer software developer (19), textiles (4) firms, furniture (4) and garment (1) firms.

Table 2 shows the types of firm ownership that had the most of respondents were from privately-owned (92.5%). The remaining respondents were from foreign-owned (4.8%) and state-owned (1.6%). As regards with the age of firms, 69.4% of respondents were >15 years while 14.5, 12.9, 3.2% were 11-15, 5-10 and 1-5 years, respectively. Around 62.9% of the responding firms had <100 employees while 37.1% had >101 employees. Results in Table 2 presents that 56.5% of respondents reported their firms' annual revenue was >15 million bath 43.6% had revenue <15 million bath.

Non-response bias: To determine non-response bias, Thai industrials specific t-test between early and late respondents (Armstrong and Overton, 1977) were used. No significant differences between the 2 groups for firm size were found indicating that non response bias was not a major problem in data.

Common method bias: Common method bias exists when the measurement technique introduce systematic variance into the measures (Doty and Glick, 1998). In addition, the Corrected Item-Total Correlation (CITC) used reliability test (Kerlinger, 1986). The Corrected Item-Total Correlation (CITC) of each measure was well above the suggested cut off of 0.30. Results in Table 3 shows that all CITC values were >0.40 which was sufficient for confirming level of reliability in research (Nunnally, 1978; Churchill and Iacobucci, 2002).

Reliability: Before the data analysis, measures the Kaiser-Meyer-Olkin (KMO) statistic is 0.75 which greater than the recommended cut off of 0.60. A reliability test based on the cronbach alpha statistic was used to test the reliability of the factors. As shown in Table 3, all the scales were reliable with the composite reliabilities ranging from 0.69-0.87, all >0.60. Besides, Table 3 shows the reliability level and factor loading for each item in a scale.

Table 1: Industry profile (N = 62)

Industry types	Frequency	Percentage
Electronic	23	37.10
Computer software developer	19	30.65
Engineer	11	17.74
Textiles	4	6.45
Furniture	4	6.45
Garment	1	1.61

Table 2: Respondents profile

Characteristics of firms	No. of respondents	Respondents (%)
Job title		
Managing Director	27	43.5
Chief Executive Officer	8	12.9
Managing Partner	6	9.7
Other	21	33.9
Working experience		
1-5	4	6.5
5-10	8	12.9
11-15	6	9.7
>15	44	71.0
Type of firm ownership		
State-owned	1	1.6
Privately-owned	58	92.5
Foreign-owned	3	4.8
Age of firm (year)		
1-5	2	3.2
5-10	8	12.9
11-15	9	14.5
>15	43	69.4
Number of employees		
<50	26	41.9
51-100	13	21.0
101-200	11	17.7
>200	12	19.4
Annual revenue (Million Bath)		
<5	5	8.1
5-10	10	16.1
11-15	12	19.4
>15	35	56.5

Table 3: Construct measure, validity and reliability analysis

Industry types	Items	Standardized item loading	CITC range of the underlying items
Human capital (Crobach's alpha = 0.8287)	HC1	0.875	0.7591
	HC2	0.861	0.7474
	HC3	0.795	0.6376
	HC4	0.747	0.5668
Structure capital (Crobach's alpha = 0.8047)	SC1	0.852	0.6971
	SC2	0.867	0.7226
	SC3	0.729	0.5419
	SC4	0.717	0.5283
Relational capital (Crobach's alpha = 0.6925)	RC1	0.738	0.4583
	RC2	0.826	0.5702
	RC3	0.811	0.5639
Innovation capability (Crobach's alpha = 0.8706)	IC1	0.813	0.6489
	IC2	0.926	0.8250
	IC3	0.941	0.8863
	IC4	0.794	0.6563
Sustain competitive advantage (Crobach's alpha = 0.7781)	SCA1	0.855	0.6634
	SCA2	0.934	0.8150
	SCA3	0.694	0.4428

Regression analysis results: Table 4 shows the means, standard deviations and correlation matrix for all variables.

Table 4: Correlation matrix, means and standard deviations

Measures	1	2	3	4	5
Mean	4.27	4.02	4.29	4.04	3.84
SD	0.37	0.34	0.40	0.31	0.40
Human capital					
Structure capital	0.733**				
Relational capital	0.525**	0.409**			
Innovation capability	0.608**	0.431**	0.653**		
Sustain competitive advantage	0.460**	0.409**	0.400**	0.599**	

**p<0.01

Table 5: Regression analysis results

Hypothesized link	β	t-value	Sig.	Adjusted R ²
Human capital (Innovation capability)	0.576	5.455	0.000	0.363
Structure capital (Innovation capability)	0.383	3.105	0.003	0.177
Relational capital (Innovation capability)	0.625	6.401	0.000	0.435
Innovation capability (Sustain competitive advantage)	0.673	6.584	0.000	0.409

All hypotheses are supported at the 1% level

The correlations among the variables are absence of multi-collinearity. VIF of 1.0 indicates the absence of multi-collinearity and maximum VIF in excess of 10.0 indicated multi-collinearity. Further diagonal of the colinearity indicated very low Variance Inflation Factors (VIF) in this study is 1.129.

To test the hypotheses, the research employed a Ordinary Least Square (OLS) regression analysis approach. The investigation the effects of each dimension of intellectual capital on innovation capability and sustain competitive advantage. In this research, the equations are represented by:

$$\text{Innovation capability} = \beta_{01} + \beta_1 \text{Human capital} + \beta_2 \text{Firm age} + \Sigma \quad (1)$$

$$\text{Innovation capability} = \beta_{02} + \beta_3 \text{Structure capital} + \beta_4 \text{Firm age} + \Sigma \quad (2)$$

$$\text{Innovation capability} = \beta_{03} + \beta_5 \text{Relational capital} + \beta_6 \text{Firm age} + \Sigma \quad (3)$$

$$\text{Sustain competitive advantage} = \beta_{04} + \beta_7 \text{Innovative capability} + \beta_8 \text{Firm age} + \Sigma \quad (4)$$

Table 5 shows the regression results. Furthermore, in analysis hypotheses 1-3 the results indicated that human, structure and relational capital have significant and positive effect on innovation capability ($\beta_1 = 0.576$,

Table 6: Results of hypothesis tests

Hypothesized link	Supported
H ₁ : Human capital innovation capability	Supported
H ₂ : Structure capital innovation capability	Supported
H ₃ : Relational capital innovation capability	Supported
H ₄ : Innovation capability sustain competitive advantage	Supported

$p < 0.01$); ($\beta_3 = 0.383$, $p < 0.01$); ($\beta_5 = 0.625$, $p < 0.01$), respectively thus hypothesis 1-3 are supported. Therefore in analysis hypotheses 4, the results indicated that innovation capability has significant and positive effect on sustain competitive advantage ($b_7 = 0.673$, $p < 0.01$), thus hypothesis 4 is supported.

Likewise, the exploratory powers (Adjusted R²) are very satisfactory: 0.363, 0.177 and 0.435. This result indicated that innovation capability is mainly explained by intellectual capital. Besides, adjusted R² of 0.409 indicated sustain competitive advantage as explained by innovation capability. Table 6 shows that four hypotheses are supported.

DISCUSSION

Recently, IC has been received much attention from scholars, enterprise for development. This research therefore focused on and filled the research gap. This research explored the influence of three dimensions of intellectual capitals, i.e., human, structural and relational capital on innovation capability and bring about to sustain competitive advantage.

Intellectual capital and innovation capability: Human capital positively affects innovation capability ($b_1 = 0.576$, $p < 0.01$) so managers should investment in human capital to achieve innovation capability. This model explains 36.3% of innovation capability. This result is consistent with Santos-Rodrigues *et al.* (2010)'s study noting that human capital is important for the innovation capacity of the company. Harmoniously, Dakhli and de Clercq (2004) show a positive relationship between human capital and innovation. Therefore, Cohen and Levinthal (1990) noted that the firms have good quality employees for help create the internal knowledge and absorb external technological knowledge.

Structural capital positively affects innovation capability ($b_3 = 0.383$, $p < 0.01$). This model explains 17.7% of innovation capability. Structural capital is the infrastructure that firms development their employees (human capital) into innovation (Roos *et al.*, 1998; Edvinsson and Sullivan, 1996). Firms that have information technology investment will help expand knowledge and increase knowledge transfer (Davenport and Prusak, 1998). Therefore, firms with

strong structural capital will create human capital to full potential and structural capital is becoming one of the most important core competences of a company. Chen *et al.* (2004) noted that in the 21st century, structural capital is the way for more a successful company to competitive excellence than competitors. Thus, a firm should provide structural capital to encourage employees for share knowledge.

Relational capital positively affects innovation capability ($b_5 = 0.625$, $p < 0.01$). This model explains 43.5% of innovation capability. Erickson and Rothberg (2009) noted that firms with numerous or strong outside relationships possess high relationship capital. A firm should build good relationships with stakeholders, customers and suppliers to improve innovation capability. Many theories and empirical studies argued that customer collaboration is very valuable to achieving innovation. This result is consistent with Gemunden *et al.* (1992), Gales and Mansiur-Cole (1995) giving a concept that this collaboration benefit may lead to new product ideas that improves product development efficiency. Therefore, previous studies also confirm that relationships between customer and organization are key elements to new product success (Gupta and Souder, 1998).

Innovation capability and sustain competitive advantage: Innovation capability positively affects sustain competitive advantage ($b_7 = 0.673$, $p < 0.01$). This model explains 40.9% of sustain competitive advantage. This result is consistent with study result of Weerawardena and O'Cass (2004) indicated that organizational innovation has a positive effect on Sustainable Competitive Advantage (SCA). Innovation capability is a special asset of the firm. The capacity to innovate is the most important factors that impact business performance (Hurley and Hult, 1998). Consistently, Porter (1998)'s concept agree that innovation is a driver of competitiveness, profitability and productivity. Likewise, innovation is the creators of change industries. McEvily *et al.* (2004) note that innovation is one means for organization can achieve sustainable growth.

Managerial implication and practice

Implications for theory: This research had been focused on IC dimensions human, structural and relational capital which examined their effects on innovation capability and sustain competitive advantage. Significantly contributes, IC extends established concepts of innovation capability by which organization should create excellence resources. This is consistent with Barney (1991)'s concept which indicating that the RBV of the firm gained support,

knowledge came to be identified as one of the key resource to competitive advantage. That is, firms have resources that are valuable, rare, imitable and non-substitutable which capable of sustaining competitive advantage. This resource cannot contribute to competitive advantage if a resource is similar to its competitors (no heterogeneity). As for its contribution to intellectual capital research, this research has addressed an important research gap in resources of the firm that is the intellectual capital to create innovation capability which brings about to sustain competitive advantage.

Implications for practice: This research highlights the importance of IC on innovation capability leading to sustain competitive advantage in the context of Thailand industrials. Furthermore, the research results show that IC dimensions (human, structural and relational capital) positively affect innovation capability indicating that a firm emphasizing human capital (individual capability, knowledge, techniques and experiences create good ideas and innovation of the firm), structural capital (infrastructure to serves for employees knowledge databases, organizational charts, etc.) and relational capital (relationship with both customers and collaborations for the sharing and exchanging of knowledge to create innovation of the firms) for sustain competitive advantage of organization. Also, manager and practitioner of firms should obtain more education, training, nurture motivation and provide resources. More importantly, conceptual framework can be opened up a new way for further research on the role of intellectual capital as an important tool in innovation capability leading to sustain competitive advantage.

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