CHAPTER VI

THE IMPACT OF INTELLECTUAL CAPITAL ON PRODUCTIVITY
IN THE BANKING INDUSTRY IN THAILAND

6.1. Introduction and Background

Competition at a cross-border scale makes local banks adjust their competitive positions to sustain their financial performances. The value created depends far less on their physical assets than on their intangible ones. These assets, often described as intellectual capital, are being recognized as the foundation of organizational competitiveness in the twenty-first century. The banking industry is one of the most knowledge-intensive industries. Intellectual Capital (IC) generally represents the critical resource in the value creation process.

6.2. Literature Review

There are several definitions for intellectual capital. Intellectual capital can be viewed as knowledge, in formation, intellectual property and experience that can be put to use to create wealth (Stewart, 1997). Intellectual capital includes all employees, organizational knowledge and their abilities to create value added and led to sustainable competitive advantage. Intellectual capital has been identified as a set of intangibles (resources, capabilities and competences) that drive the organizational performance and value creation. (Bontis, 1998) This suggests causal relationships between intellectual capital and organizational value creation. At least three elements are common in almost all definitions; (i) intangibility; (ii) knowledge that creates value; and (iii) effect of collective practice (Maria do Rosario Cabrita and Jorge Landeiro Vaz) It is assumed that competitive advantage depends on how efficient the firm is in building sharing, leveraging and using its knowledge.

Increasing attention on the pivotal role played by intellectual capital in value creation process has resulted in the method of measuring intellectual capital. Pulic (1998) proposed the Value Added Intellectual Coefficient (VAIC^{TM}) to provide information about the value creation efficiency of tangible and intangible assets within a company. VAIC ^{TM} is an analytical procedure designed to enable management, shareholders and other relevant stakeholders to effectively monitor and evaluate the efficiency of Value Added (VA) by a firm's total resources and each major resource component. Value added (VA) is the difference between sales (OUT) and inputs (IN): OUT - IN = VA. Output (OUT) represents the overall income, all the products and services sold on the market. Inputs (IN) contain all the expenses, everything that come into the company. Labor expenses are not calculated into input due to the active role in the value creating process, intellectual potential, represented by labor expenses) . Value added grows out of physical capital and intellectual potential. Instead of valuing the intellectual capital of a firm, the VAIC method mainly measures the efficiency of firms' three types of inputs: physical and financial capital, human capital, and structural capital, namely the Capital Employed Efficiency (CEE) — indicator of VA efficiency of capital employed, the Human Capital Efficiency (HCE) — indicator of VA efficiency of human capital, and the Structural Capital Efficiency (SCE) — indicator of VA efficiency of structural capital. The sum of the three measures is the value of VAIC. The higher VAIC value results in better companies value creation potential.

Banking industry is one of the sectors, that utilizes intensive Intellectual Capital. With regards to bank performance and intellectual capital, there are some researches that study the role of Intellectual Capital on banks' performance. Pulic used VAIC^{TM} model, which he developed and measured intellectual capital performance of Austrian banks in from 1993-1995 and Croatian banks from 1996-2000. They revealed significant differences in bank ranking based on efficiency and performance. Dimitrios G. Mavridis (2004) applied the VAIC^{TM} method in order to analyze the data of Japanese banks over the financial period of 1 April 2000-31 March 2001. He analyzed the intellectual or human (HC) and physical capital (CA) of the Japanese banking sector and discussed their impact on the banks' value-based performance. The study confirmed the

existence of significant performance differences among the various groups of Japanese banks but also the differences between the Japanese and some European banks (Greece and Austria).

Pek Chen Goh (2005) measured the intellectual capital performance of commercial banks in Malaysia over the period of 2001-2003, using efficiency coefficient called VAIC" developed by Ante Pulic. As a whole, all banks had relatively higher human capital efficiency than structural and capital efficiencies. Domestic banks were generally less efficient compared to foreign banks. There were significant differences between rankings of bank according to efficiency and traditional accounting measures.

G. Barathi Kamath (2007) estimated and analyzed the Value Added Intellectual Coefficient (VAIC^{TM}) for measuring the value-based performance of the Indian banking sector over a period of five years from 2000 to 2004. The study confirmed the existence of vast differences in the performance of Indian banks in different segments, and there was also an improvement in the overall performance over the study period. There was an evident bias in favor of the performance of foreign banks compared with domestic banks.

With regards to bank performance in Thailand, Saovanee Chantapong (2001) examined the impact of the crisis and the financial sector restructuring introduced after 1997 financial crisis in Thailand on Thai banking Industry. It was found the domestic banks experienced larger negative impacts from the financial crisis than foreign banks and foreign banks performance rebounded faster than that of domestic banks. Hidenobu Okuda and Suvadee Rungsomboon (2004) investigated the impact of foreign bank entry on Thai domestic banks using panel data on 17 domestic commercial banks from 1990 to 2002. An increase in foreign bank presence led to a rise in overhead expenses, a decline in profits, and an increase in the interest spreads of domestic banks. In the short run, increased competition from foreign banks negatively affected domestic banks but domestic banks' performance should improve in the long run. Saovanee Chantapong (2005) estimated and compared cost efficiency of domestic and foreign banks in Thailand by using bank-panel data between 1995 and 2003. The

estimated results suggested that the unit costs of production of domestic and foreign banks were indistinguishable, although the two types of banks focused on different areas of the banking business. However, there are very few studies on intellectual capital performance in Thailand.

6.3. Statement of Problem

The Banking industry was severely hit by the economic crisis during 1997 and 1999. Its financial performance has been turned into profit since 2001. All banks were found to have reduced their credit exposure during the crisis years. They have gradually improved their profitability during the post-crisis years. The results indicated that foreign bank profitability was higher than the average profitability of the domestic banks.

After the eruption of 1997 economic crisis, the group of foreign banks performed better than the group of the Thai banks when considering the return on assets. The group of the Thai banks experienced larger negative impacts from the financial crisis than the group of foreign banks and foreign banks performance rebounded faster than that of domestic banks.

With the comparison between the group of Thai banks and the group of foreign-owned banks, starting from 2001, it is found that the Thai banks has earn margins higher than foreign banks because the Thai banks' costs of the deposits are slightly cheaper. However, the return on assets for the foreign bank is on average higher that the Thai banks. The difference in financial performance between the two groups results in the further study on how the intellectual capital plays a role in the different performances.

6.4. Research Objective

This study aims to evaluate the relationship between intellectual capital capability and financial performance of commercial banks in Thailand. It examines interrelationships among intellectual capital components and organizational

performance, with the level of human capital efficiency (HCE), capital employed efficiency (CEE) and structural capital efficiency (SCE). As an exploratory study, this study should indicate factors in determining the productivity of commercial banks in Thailand, from the perspective of intellectual capital performance.

6.5 Research Methodology

6.5.1. Model Estimation

The regression models examine the relationships between productivity and the aggregate measure of intellectual capital VAIC, and its three major components; Human capital efficiency (HCE); Capital employed efficiency (CEE); and Structural capital efficiency (SCE). The regression models are as follows:

Model 6.1: $SPR_{it} = \beta_0 + \beta_1 VAIC_{it} + GROUP_{it} + \varepsilon_{it}$

Model 6.2: $SPR_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 CEE_{it} + \beta_3 SCE_{it} + GROUP_{it} + \varepsilon_{it}$

Model 6.3: $ICH_{it} = \beta_0 + \beta_1 VAIC_{it} + GROUP_{it} + \varepsilon_{it}$

Model 6.4: $ICH_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 CEE_{it} + \beta_3 SCE_{it} + GROUP_{it} + \varepsilon_{it}$

6.5.2. Variable definitions

Dependent variables:

Productivity

The two financial performance variables, reflecting firms' productivity are defined as follows:

1. Staff Productivity (SPR) refers to Total income, including net interest income and non interest income, over human capital expenses.

2. Income per head (ICH) refers Total income, including net interest income and non interest income, over number of employees

Independent variables:

1. VAIC is a measure for corporate intellectual ability (Pulic, 2000b), providing an easy-to-calculate, standardized, and consistent basis of measure, enabling effective comparative analyses across firms. Data used in the calculation of VAIC are based on financial statements. The procedures calculating VAIC are as follows:

$$VAIC^{TM}_i = CEE_i + HCE_i + SCE_i \quad \text{where}$$

$VAIC^{TM}$ = VA intellectual coefficient for firm i;

CEE_i = VA/CE_i VA capital employed coefficient for firm i

HCE_i = VA_i/HC_i; human capital coefficient for firm i;

SCE_i = SC_i/VA_i; structural capital VA for firm i;

VA_i = Output – Input (Total Income – Operating Expenses excluding Salaries and employee benefits)

CE_i = book value of the net assets for firm i

HC_i = Salaries and employee benefits for firm i;

SC_i = $VA_i - HC_i$ structural capital for firm i.

2. Human capital efficiency (HCE) refers to indicator of VA efficiency of human capital.

3. Capital employed efficiency (CEE) refers to indicator of VA efficiency of capital employed.

4. Structural capital efficiency (SCE) refers to indicator of VA efficiency of structural capital.

5. GROUP refers to types of commercial banks i.e. 0 = foreign banks' branches and 1 = commercial banks registered in Thailand (Thai banks).

6.5.3. Data

The study of Thai banking industry will include an investigation of an 8-year evolutionary path of the industry from 2000 until 2007, which is the period of events

leading to changes in banks' competitiveness. The data used in the model consists of half-year bank-level data which is acquired from the published statistics by the Bank of Thailand, which classify the data into 2 groups, commercial banks registered in Thailand (Thai banks) and foreign banks' branches. The variables are selected from the banks' balance sheet and income statements.
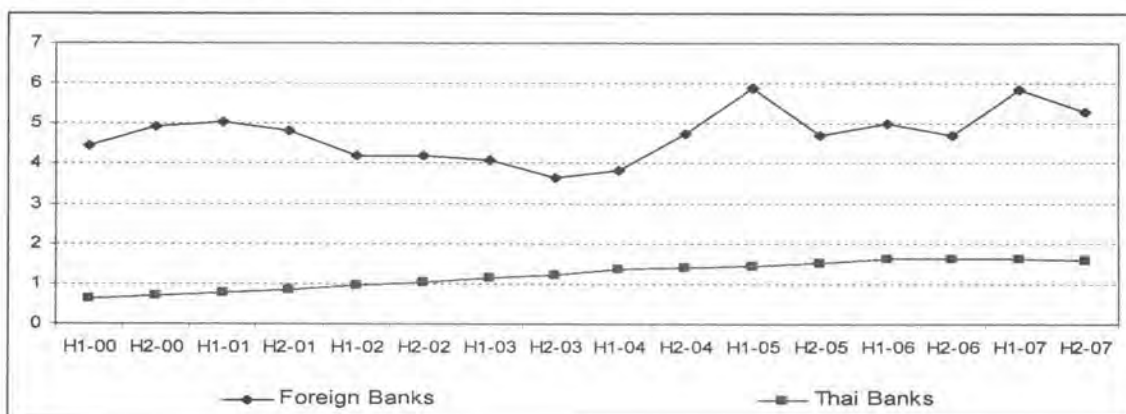
6.6. Empirical Results

The graphs below are plotted to see how change the industry is over the period of 2000 to 2007.

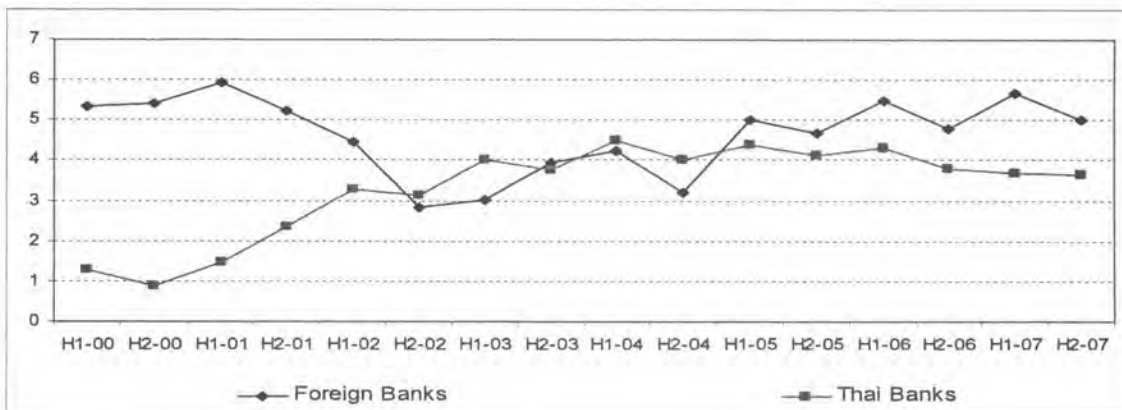Figure 16 Productivity: Gross Income / Human Capital Expenses
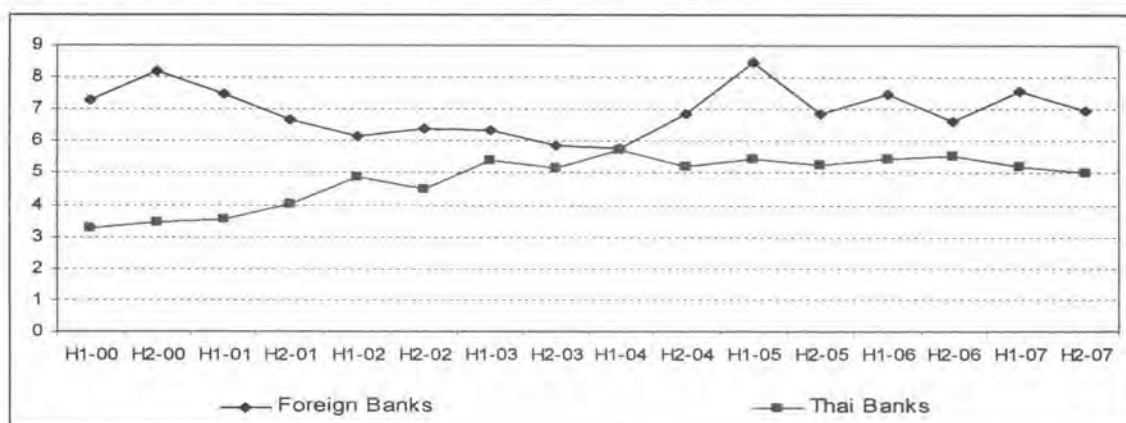
Source: own calculation
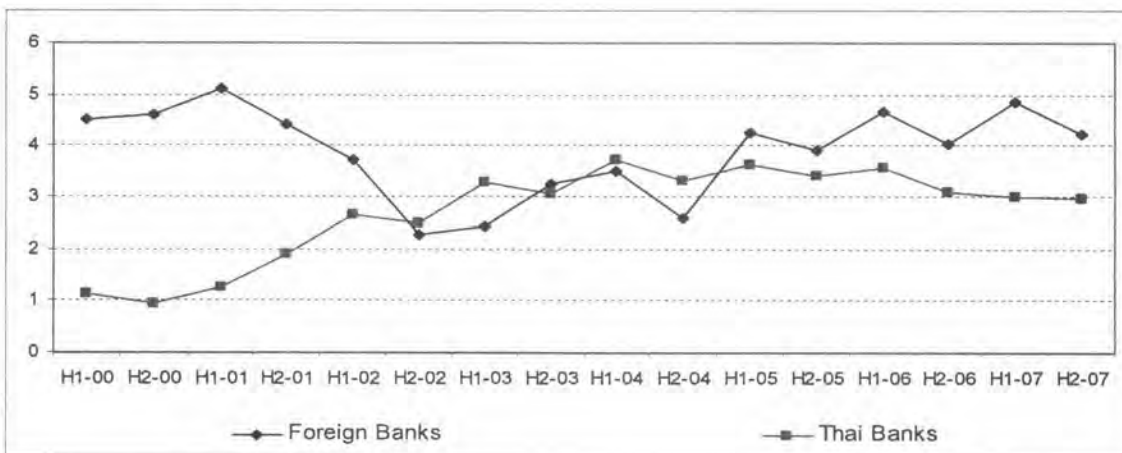
Figure 17 Productivity: Gross Income/Head
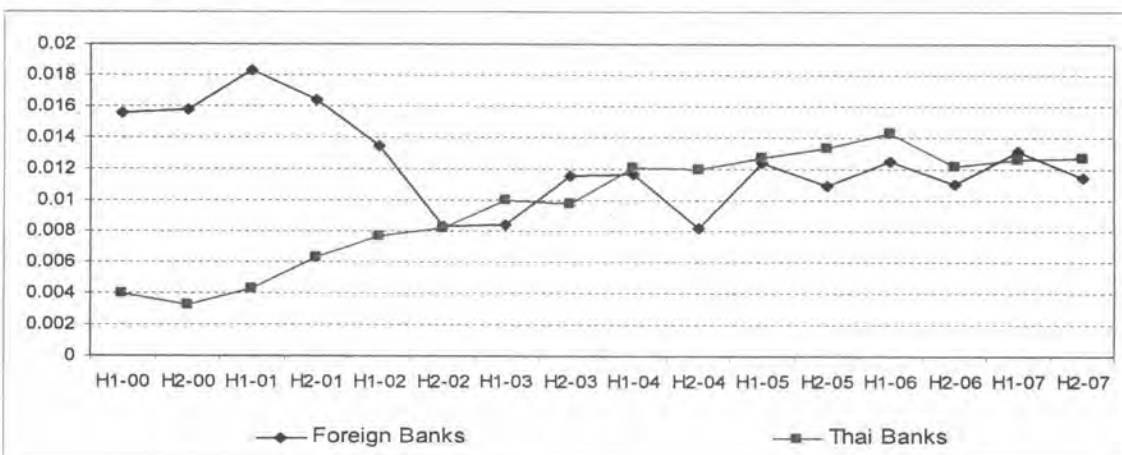

Source: own calculation

Figure 18 VAIC

Source: own calculation

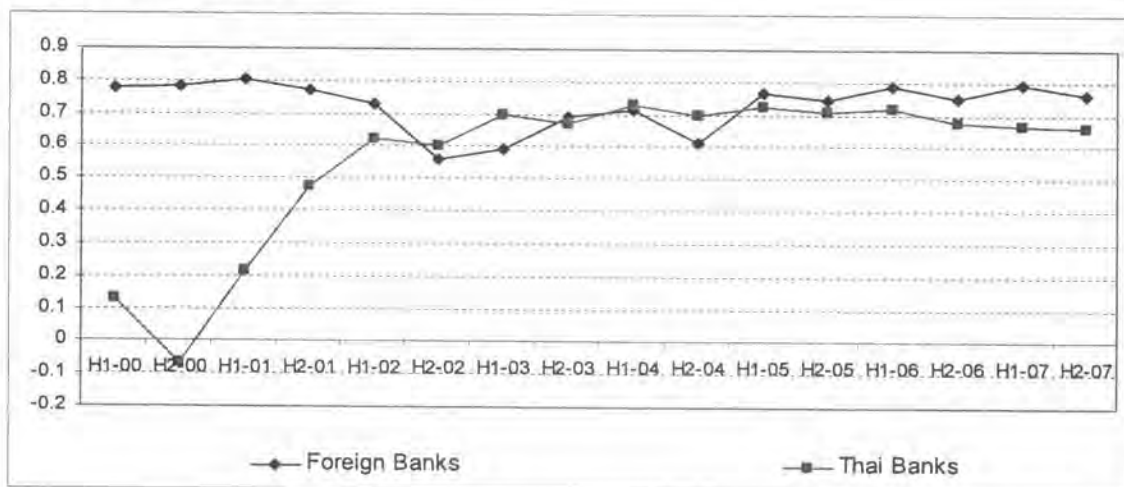Figure 19 HCE: VA / HC

Source: own calculation

Figure 20 CEE: VA /CE

Source: own calculation

Figure 21 SCE: SC / VA

Source: own calculation

From figure 16 to 21, globalization through competition from foreign companies had forced Thai firms to change and improve their competitive position. In terms of marginal productivity, measured by Gross Income divided by Human Capital Expenses, foreign banks had higher ratio than Thai banks. The foreign banks had a ratio of 7.27 in 2000 and 6.97 at the end of 2007. However, during the past 8 years, Thai banks had increased their marginal productivity from 3.25 to 5.01 accordingly. In addition, foreign banks had higher gross income per head than Thai banks. The foreign banks had 4.47 million Baht per head in 2000 and 5.31 million Baht per head. However, during the past 8 years, Thai banks had increased their productivity from 0.67 million Baht per head to 1.57 million Baht per head at the end of 2007.

With regards to VAIC, foreign banks had relatively higher index value than Thai banks. From the beginning of 2000, foreign banks had the index value of 5.325 and ended with 5.015 in 2007. Comparatively, Thai banks had the index value of 1.282 in 2000 and improved their productivity dramatically to 3.646 in 2007. For the human capital efficiency, foreign banks had the index value at 4.530 in 2000 and ended with 4.239 in 2007. Increasingly, Thai banks upgrade their level of efficiency index from 1.148 to 2.97. Similarly, Thai banks had increased the efficiency of capital employed from 0.004 to 0.013 but foreign banks reduced the level of efficiency from 0.016 to

0.012. Lastly, Thai banks improved the structural efficiency close to that of foreign banks, Thai banks index was upgraded from 0.129 to 0.663 compared and foreign banks had the index value from 0.779 in 2000 to 0.764 in 2007.

Tables 12 and 13 represent descriptive statistics and correlation analyses for the dependent and independent variables.

Table 12   Estimation results: regression analysis

	Model 6.1				Model 6.2		
Variable	Coefficient	t-ratio		Variable	Coefficient	t-ratio	
VAIC	0.6065	7.5464		HCE	0.6410	2.5464	
GROUP	-1.2946	-6.5379		CEE	-39.7026	-0.6625	
				SCE	1.1518	1.2068	
Constant	4.1208	10.5346		GROUP	-1.2712	-5.8596	
				Constant	4.0911	10.1694	

R-squared	0.8841	Mean dependent var	5.87904	R-squared	0.8869	Mean dependent var	5.8790
Adjusted R-squared	0.8761	S.D. dependent var	1.327833	Adjusted R-squared	0.8701	S.D. dependent var	1.3278
S.E. of regression	0.4674	Akaike info criterion	1.405668	S.E. of regression	0.4786	Akaike info criterion	1.5066
Sum squared resid	6.3346	Schwarz criterion	1.54308	Sum squared resid	6.1840	Schwarz criterion	1.7356
Log likelihood	-19.4907	Hannan-Quinn criter.	1.451216	Log likelihood	-19.1056	Hannan-Quinn criter.	1.5825
F-statistic	110.6115	Durbin-Watson stat	1.757917	F-statistic	52.9101	Durbin-Watson stat	1.7588
Prob(F-statistic)	0.0000			Prob(F-statistic)	0.0000		

*, **, *** indicate significant levels of 10, 5, 1 percent respectively

Model 6.1: $SPR_{it} = \beta_0 + \beta_1 VAIC_{it} + GROUP_{it} + \varepsilon_{it}$

$SPR_{it} = 4.1208 + 0.6065\, VAIC_{it} - 1.2946 GROUP_{it}$

From Table 12 Model 6.1, the correlation analyses show that, under the univariate correlation, Productivity is positively related with VAIC, suggesting that banks' productivity is positively and significantly associated with the intellectual ability. The higher VAIC value, the better productivity the bank can obtain. However, the SPR-GROUP relationship is negatively correlated, indicating that different groups of the commercial banks provide different levels of productivity ratio. It is likely that the foreign banks' branches have higher productivity than the commercial banks registered in Thailand, providing that they have the same VAIC indicator.

Model 6.2: $SPR_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 CEE_{it} + \beta_3 SCE_{it} + GROUP_{it} + \varepsilon_{it}$

$SPR_{it} = 4.0911 - 0.6410 HCE_{it} + -39.7026 CEE_{it} + 1.1518 SCE_{it} - 1.2712 GROUP_{it}$

From Table 12 Model 6.2, Productivity is positively related to HCE and SCE whereas it is negatively related to CEE and GROUP, suggesting that banks' Productivity is positively associated with the intellectual ability's components, especially human capital efficiency (CEE). The Productivity-SCE relationship is negatively correlated but with a small impact. The major contribution on Productivity is from Human capital efficiency (HCE). Furthermore, the Productivity-CEE relationship is not significant, supporting that it has less impact on Productivity. In addition, the Productivity-GROUP relationship is negative, indicating that different groups of the commercial banks provide different levels of Productivity. The foreign banks' branches can perform better productivity through human capital management

Table 13   Estimation results: regression analysis

Model 6.3				Model 6.4		
Variable	Coefficient	t-ratio		Variable	Coefficient	t-ratio
VAIC	0.3196	4.6911		HCE	0.6650	3.2574
GROUP	-3.0722	-18.3070		CEE	-57.7022	-1.1873
Constant	3.2381	9.7673		SCE	-0.5158	-0.6664
				GROUP	-2.9635	-16.8458
				Constant	3.2203	9.8715

R-squared	0.9572	Mean dependent var	2.9693	R-squared	0.9618	Mean dependent var	2.9693
Adjusted R-squared	0.9543	S.D. dependent var	1.8521	Adjusted R-squared	0.9561	S.D. dependent var	1.8521
S.E. of regression	0.3961	Akaike info criterion	1.0748	S.E. of regression	0.3881	Akaike info criterion	1.0874
Sum squared resid	4.5501	Schwarz criterion	1.2122	Sum squared resid	4.0664	Schwarz criterion	1.3164
Log likelihood	-14.1967	Hannan-Quinn criter.	1.1203	Log likelihood	-12.3983	Hannan-Quinn criter.	1.1633
F-statistic	324.3697	Durbin-Watson stat	1.2151	F-statistic	169.7658	Durbin-Watson stat	1.3152
Prob(F-statistic)	0.0000			Prob(F-statistic)	0.0000		

*, **, *** indicate significant levels of 10, 5, 1 percent respectively

Model 6.3: $ICH_{it} = \beta_0 + \beta_1 VAIC_{it} + GROUP_{it} + \varepsilon_{it}$

$ICH_{it} = 3.238091 + 0.3196\ VAIC_{it} - 3.0722 GROUP_{it}$

From Table 13 Model 6.3, ICH is positively and significantly related with VAIC, suggesting that banks' cost efficiency is positively associated with the intellectual ability. The higher VAIC value, the higher income per head ratio can be obtained. It is likely that the intellectual capital plays a major role in acquiring banks' income. In addition, the ICH-GROUP relationship is negative, indicating that different groups of the commercial banks provide different levels of generating income. The foreign banks' branches can generate more income per head than the commercial banks registered in Thailand, providing that they have the same VAIC indicator.

Model 6.4: $ICH_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 CEE_{it} + \beta_3 SCE_{it} + GROUP_{it} + \varepsilon_{it}$

$ICH_{it} = 3.2203 + 0.6650 HCE_{it} - 57.7022 CEE_{it} - 0.5158 SCE_{it} -$
$2.9635 GROUP_{it}$

From Table 13 Model 6.4, INC is positively related with HCE whereas it is negatively related with CEE, SCE and GROUP, suggesting that banks' ability to generating income depends on the intellectual ability's components, human capital efficiency (HCE). Furthermore, the INC-CEE and INC-SCE relationship is not significant, supporting that it has less impact on the ability to generate income. In addition, the INC-GROUP relationship is negative, indicating that different groups of the commercial banks provide different levels of Income per head ratio. The foreign banks' branches can generate more income per head significantly than the commercial banks registered in Thailand.

6.7. Conclusion

Empirical findings show some strong association between the efficiency of intellectual capital and banks' productivity. With regards to productivity, the intellectual

ability has a strong impact on generating the banks' productivity. When it is classified into major components, the efficiency of human capital (HCE) plays a major role in creating productivity. Furthermore, competitive advantage can be achieved through enhancing the ability of human capital. Therefore, the human resources management is an important major factor in creating value in the banking industry, resulting from the strong correlation between productivity and human capital efficiency (HCE). As a result, globalization had forced Thai banks to improve their performance by upgrading their intellectual capital including human capital competency and structural competitency.

Intellectual capital is increasingly becoming acceptable as an important factor for sustainable corporate advantages. The results underline the importance of intellectual capital in enhancing firm productivity. Developing intellectual capital is no less important than capital investments for companies. Therefore, Intellectual capital should be increasingly recognized as one of the major investment for driving the company's sustainable growth, together with the other factors of production.

Overall, the empirical findings, based on correlation and linear multiple regression analysis, indicate that the association between the efficiency of intellectual capital by banks' major resource components and the dimensions of productivity is limited. This application has a limitation in that the data for foreign banks employed in the model is a consolidated one. So, the model is not able to specify the performance of each particular commercial bank due to the limitation on the published data by the government agency. It would be better if the model can incorporate the more specific data for the model of regression to see the impact on each commercial bank. Despite the limitations of using data, the present study provides valuable insights into the association between intellectual capital and productivity. Finally, this study helps to extend the current research agenda on the intellectual capital discipline in the area of value creation.