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THE INTELLECTUAL CAPITAL PERFORMANCE OF POLISH BANKS: AN APPLICATION OF VAIC™ MODEL

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Abstract In the knowledge based economy intangible resources are the primary value drivers. This is particularly true of companies such as banks. However, intangible resources (also called Intellectual Capital) appear difficult to measure. Today, there are several methods that allow us to measure Intellectual Capital in listed companies. However, not all methods of measurement are adequate for listed banks. This paper uses the Value Added Intellectual Coefficient™ (VAIC™) ratio to measure the Intellectual Capital efficiency of the Polish listed banks using a five years period data set from 2005 to 2009. Three value efficiency indicators, Human Capital Efficiency (HCE), Capital Employed Efficiency (CEE) and Structural Capital Efficiency (SCE) which are the components of the VAIC™ ratio, were used in the analysis. The data set was divided into two groups of banks. The first group was that of 10 listed Polish banks and the second group was comprised of 10 listed comparable banks from Europe (which was the peer group). The results of the rankings of the banks for the average of five years (2005-2009) showed that for VAIC™ the top two performers in the study were Komercni Banka and BRD Groupe Societe Generale S.A. The BCGE - Banque Cantonale de Geneve, Bankas Snoras and BOŚ Bank were the worst performers. The results of ranking based on Human Capital Efficiency (HCE), showed similar results as that of VAIC™. There was observed a significant decrease of the VAIC™ ratio in the years 2008 and 2009 which was caused by the crisis on financial markets. The results extend the understanding of Intellectual Capital's role in creation of sustainable advantages for banks in developing economies.

JEL Classification: G21, M20, O16
Keywords: VAIC™, Intellectual Capital, Polish banking sector, intangibles

Received: 25.09.2012 Accepted: 30.07.2013

Introduction

The world economy has been mainly based on production. The factors creating values in the production economy were land, labor, capital and physical assets. However, in the last two decades, in the knowledge economy Intellectual Capital (IC) has become more important to adding values when it is compared to physical assets (Bontis, 2001). It is clear that tangible resources are necessary for the proper functioning of such a specific financial institution as a bank. This is particularly true of financial resources including customer deposits, which constitute the main source of supply of capital in the bank. However, the bank's resources are important in the form of IC consisting of: human capital (eg. knowledge, skills or their motivation), relational capital (including relationships with customers, investors or cooperators) and structural capital (including the technical infrastructure, databases and intellectual property).

The greatest interest in the concept of intangible resources comes at the beginning of the 21st century. The banking sector has never before been in such need of intellectual capital as a value driver of competitiveness and development. According to Usoff et al. (2002, p. 9) "knowledge has become the key economic resource and the dominant, and perhaps even the only source of competitive advantage". The interest and the role of intangible resources to manage these resources is the answer to the problems that arise from the dynamic growth of the number and types of bank stocks and the need for resources with the highest fitness for the realization of strategy. According to the World Bank (1998) " [...] for countries in the vanguard of the world economy, the balance between knowledge and resources has shifted so far towards the former that knowledge has become perhaps the most important factor determining the standard of living [. . .] today's most technologically advanced economies are truly knowledge-based." This task is very difficult, and its correct implementation requires managing several business processes. Banking activity is becoming less necessary as branches or subsidiaries of a more efficient and reliable system, employees are dedicated to the relationship with customers and managers take care of relationships with other employees.

Unfortunately, the concept of IC up till now has not been clearly interpreted. Literature abounds with discussions of intangible resources. We are dealing with many similar definitions and valuation models. However, despite the appreciable growth of interest in the development of the concept of IC management as the essential factors of competitiveness there are few publications on the assessment of the Polish banking sector. It is therefore considered that the undertaking of research on IC and IC valuation ratios in the Polish banking sector is justified by actual needs. One of the most popular ratios used to evaluate IC in banks is VAIC™ (Value Added of Intellectual Coefficient™). This ratio has been applied for example in such national banking sectors as the: Greek (Mavridis, 2005), Indian (Kamath, 2007), Japanese (Mavridis, 2004), Malaysian (Goh, 2005), Turkish (Yalama,2007), and Thai (Appuhami, 2007).

In this paper the author has set a goal of trying to measure the level of intangible resources in the Polish banking sector relative to comparative banks using the VAIC™ model.

Methodology of research

Selection of research sample

The aim was to determine the level of IC among domestic banks in relation to comparative banks. It was necessary to collect data that were consolidated (denominated in U.S. dollars) in annual reports of listed universal banks. The study adopted a timeline beginning in 2005 and ending in 2009. The main purpose of the selected research time period was the inclusion of both years for which there was a significant increase in the value of banks, as well as those years in which we have seen the collapse in capital markets caused by the subprime crisis. In the study the author used a group of 20 banks. First was a group of 10 domestic banks listed on the Warsaw Stock Exchange (with the exception of UniCredit Italiano SpA) and 10 foreign banks which are comparative companies for domestic banks. For each domestic bank the author set up a benchmark bank (comparative bank). For this purpose, using the annual reports of banks in Europe, for each of the 10 domestic banks the author selected a comparison group of 10 banks (a peer group) according to the criterion of the bank's total assets in 2010. Also taken into account were the value of equity, net income, the value of market capitalization ratio and the return on equity return on assets ratio (see Table 1).

However, taking into account the volatility of capital markets and the decline in profits in the banks during the crisis, the key factor for the appointment of the company was total assets of the comparative bank. In the next stage of the study subjects were selected from comparable ones that met the criterion of data availability for the period from 2005 to 2009 in the consolidated version.

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Table 1: Bank selection criteria for the test (the value at the end of 2010)

Bank	*Country*	*Total Assets (mil USD)*	*Equity (mil USD)*	*Net profit (mil USD)*	*Market capitalisation (mil USD)*	*ROE (%)*	*ROA (%)*
BPI SA	Portugal	61 042	2625	388	1666	14,49	0,62
PKOBP SA	Poland	57 240	7206	1083	18281	19,1	2,4
OTP BANK PLC	Hungary	46 877	6273	566	6737	10,71	1,43
PEKAO SA	Poland	45 239	6834	853	15844	15,04	2,27
KOMERCNI	Czech Rep.	37 225	4057	715	8990	21,13	2,3
BRE BANK SA	Poland	28 936	2387	334	4316	18,17	1,48
ZAGREBACKA	Croatia	20 134	2874	253	2897	10,71	1,53
BZWBK SA	Poland	17 933	2285	351	5298	20,04	2,55
FINANSBANK AS	Turkey	25 473	3495	608	5564	21,82	2,99
ING BS SA	Poland	21 767	1907	254	3924	16,52	1,45
BRD SA	Romania	15 496	1793	314	2685	21,36	2,47
MILLENNIUM	Poland	14 877	1380	136	2005	12,89	1,16
TEB AS	Turkey	13 672	1285	229	1591	20,92	1,97
KREDYT BANK SA	Poland	14 633	954	62	1348	8,3	0,54
SPAR NORD BANK	Denmark	12 196	805	47	317	6,54	0,43
HANDLOWY SA	Poland	12 657	2190	254	4121	14,52	2,51
BCGE	Switzerland	15 167	1027	60	211	6,79	0,46
GETIN HOLDING SA	Poland	14 439	1111	155	1682	14,17	1,09
BANKAS SNORAS	Lithuania	4 238	254	-7	140	-3,67	-0,22
BOS SA	Poland	5 125	365	21	424	6,78	0,48

Source: Own calculations based on annual reports of banks

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As a result of the analysis the author obtained 10 pairs of banks. The study was thus to make comparisons both in the domestic bank-pair comparative bank (foreign), and between two groups of banks (10 domestic and 10 foreign).

The methodology for determining the VAIC ™ ratio

Value Added of Intellectual Coefficient (VAIC™) allows us to measure the value added generated by the company. The model determines the extent to which resources of physical capital and intangible impacts on the achievement of that value. The author of this method is Ante Pulic (Pulic, 2004), who established two assumptions:

1) The method should be in respect for the valuation of intellectual assets in the companies that are listed and not-listed,
2) The method should provide information as to whether the human and structural capital contribute to the process of creating value or not.

VAIC ™ coefficient is the sum of three parameters:

1) efficiency rate of capital employed - CEE (Capital Employed Efficiency),
2) the rate of the effectiveness of human capital - HCE (Human Capital Efficiency),
3) the rate of structural capital efficiency - SCE (Structural Capital Efficiency)

Thus, the value added intellectual coefficient can be written as follows:

$$VAIC™ = CEE + HCE + SCE \quad (1)$$

where:
VAIC ™ - value added of intellectual coefficient,
CEE - capital employed efficiency ratio,
HCE - human capital efficiency,
SCE - structural capital efficiency.

The larger the size of the VAIC™ indicator of a company, the better the efficiency of all its resources and the greater its value added. A characteristic feature of this method is to estimate the degree of utilization of intellectual capital through the use of traditional data from the company's balance sheet. The VAIC™ ratio is determined at five steps:

• **Step 1:** Estimate total value added VA (Value Added). The basis for the calculation were the profit and loss account, where VA is given by the formula:

$$VA = NOPAT + Am + HC \quad (2)$$

where:
VA - value-added of enterprise,
NOPAT - net operate profit after tax,
Am - depreciation and amortization,
HC - total expenditure on employees (wages and salaries).

One of the more important assumptions in the calculation of the added value of the company is treating the sum of the expenditures on the company's employees in terms of investment and not cost.

• **Step 2:** Calculate the capital employed efficiency ratio (CEE). It is given by the formula:

$$CEE = \frac{VA}{CE} \quad (3)$$

where:
CE – Capital Employed which is Shareholders' Equity of enterprise,

Increase of this ratio suggests that a company is using employed capital more efficiently in the creation of its market value.

• **Step 3:** Determination of the human capital efficiency ratio (HCE). According to A. Pulic human capital corresponds to the general expenses of employees, such as salaries, wages, training, awards. This indicator is therefore calculated as the ratio of total value added, and employment costs:

$$HCE = \frac{VA}{HC} \quad (4)$$

The increase in this ratio reflects improvement of employee productivity, which in turn is transformed into an increase in value throughout the organization.

• **Step 4:** Determine the size of the structural capital (SC) of the firm. This ratio is calculated by subtracting from the total value-added of the company the value of its human capital HC:

$$SC = VA - HC \quad (5)$$

In business practice, there was observed an inverse relationship between the size of the human capital and the size of the structural capital (SC). On this

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basis, the efficiency ratio of structural capital (SCE) can be summarized as follows:

$$SCE = \frac{SC}{VA} \quad (6)$$

• **Step 5:** By summing the indicators listed in steps 2, 3 and 4 there is formed a general indicator of the efficiency of value creation based on the use of tangible and intangible assets of the company:

$$VAIC™ = CEE + HCE + SCE \quad (7)$$

The main advantage of the VAIC™ ratio is the simplicity of the calculation and the fact that all the necessary data are available in the financial statements of companies. In addition, the indicator allows a comparative analysis between companies operating in the same competitive sector and introducing basic standards for measuring the effectiveness of their activities. But the VAIC™ ratio has been subjected to criticism. The main objection is that human capital is associated only with employee benefits in the company. However in contrast to MVA, KCE™, CIV the VAIC™ ratio is an indicator often used by authors of research to measure the IC level of companies. This applies to both non-financial companies and banks.

The valuation of bank intellectual Performance – an application of

The VAIC ™ model

The highest average VAIC™ ratio for the period 2005-2009 was observed for Komercni banka (4.867), BRD (4.649) and BPI (4.273). The lowest values of average VAIC™ ratio during the research period belonged to BCGE (2.849), Bankas SNORAS (2.537) and BOS (2.228).

In 2007, the leader according to VAIC ™ ratio were banks such as BPI (5.599), Komercni banka (5.209), Getin Holding (5.134), BRD (4.770), OTP (4.079), Pekao (4.054) and BZWBK (4.000). This means that for every 100 units of BPI's cash from physical capital (CEE), human (HCE) and structural (SCE) BPI generated 559 monetary units of value added. While in 2008 the leaders in banking group were such banks as BPI (5.793), BRD (5.175), Komercni banka (4.948), Pekao (4.407), Getin Holding (4.156) and Zagrebacka banka (4.107). It is also worth noting that throughout the study period the coefficient of variation ranged from 0.16 in 2006 to 0.31 in 2009, which means that the distribution of ratios is characterized by moderate volatility.

The lowest value of VAIC™ ratio was observed for the years 2008 and 2009. This was in 2008, the BOS (1.538), the Bankas SNORAS (2.076), BCGE (2.706) and Spar Nord Bank (2.640). In 2009, the worst result in terms of values of VAIC ™ ratio was that of the Bankas SNORAS (0.935), Millennium (1.519), BOS (1.871) and BRE Bank (2.280). The largest decreases of VAIC ™ ratio in 2009 relative to 2008 were noted for such banks as Bankas SNORAS (down by 55%), Millennium (a decrease of 48%), BPI and BRE Bank (down by 42%), Kredyt Bank (a decrease of 35%) and Getin Holding (down by 30%). Five banks reported increase in the VAIC™ 2009 in relation to the year 2008: BOS Bank (+22%), TEB (an increase of approximately 9.5%), BCGE (an increase of about 6.5%), ING BS (up 3%) and Finansbank (a small increase of 1.2%) (see Table 2).

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Table 2: VAIC ™ ratio of domestic and comparative banks

Bank	2005	2006	2007	2008	2009	Av. 2005-2009
BPI SA	3,066	3,568	5,599	5,793	3,340	4,273
PKOBP SA	3,365	3,439	3,900	3,950	3,355	3,602
OTP BANK PLC	4,501	4,448	4,079	3,791	3,291	4,022
PEKAO SA	3,835	4,078	4,054	4,407	3,790	4,033
KOMERCNI	4,960	4,866	5,209	4,948	4,352	4,867
BRE BANK SA	3,286	3,529	3,741	3,949	2,280	3,357
ZAGREBACKA	3,658	3,488	3,711	4,107	4,088	3,810
BZWBK SA	3,600	3,962	4,000	3,514	3,404	3,696
FINANSBANK AS	4,630	3,856	4,075	3,315	3,355	3,846
ING BS SA	3,298	3,544	3,373	2,980	3,072	3,253
BRD SA	4,441	4,497	4,770	5,175	4,359	4,649
MILLENNIUM	4,617	2,940	3,282	2,892	1,519	3,050
TEB AS	3,306	3,322	2,756	2,522	2,764	2,934
KREDYT BANK SA	3,170	3,384	3,279	2,875	1,855	2,913
SPAR NORD BANK	3,123	3,705	3,119	2,640	2,323	2,982
HANDLOWY SA	3,321	3,750	3,587	3,055	2,891	3,321
BCGE	2,889	2,937	2,828	2,706	2,884	2,849
GETIN HOLDING SA	2,884	3,123	5,134	4,156	2,897	2,849
BANKAS SNORAS	3,411	3,293	2,973	2,076	0,935	2,537
BOS SA	2,563	2,564	2,603	1,538	1,871	2,228
Average	3,60	3,62	3,80	3,52	2,93	-
St. Deviation	0,68	0,56	0,85	1,07	0,92	-
Coefficient of variation	0,19	0,16	0,22	0,30	0,31	-

Source: Own calculations based on annual reports of banks

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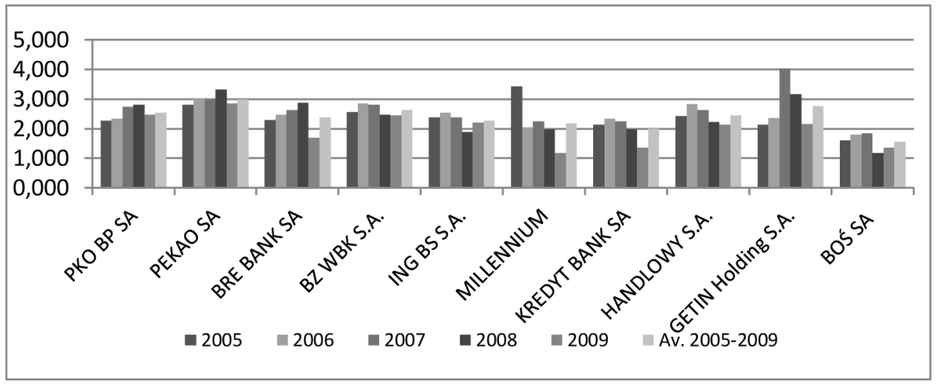
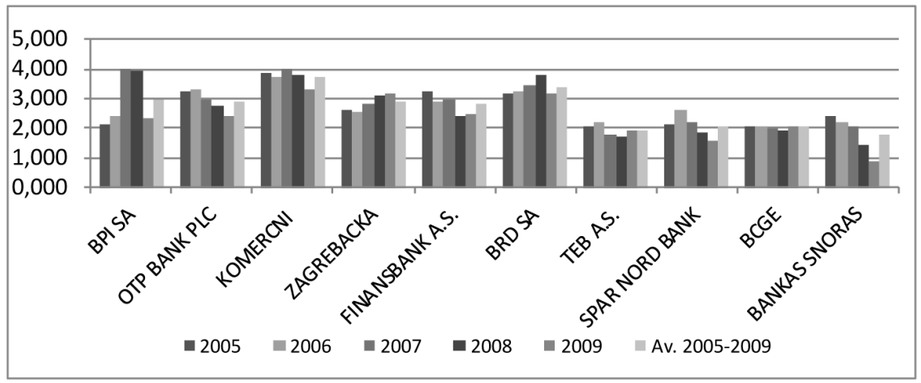
The value of the VAIC™ ratio in the research is mainly composed of the component of HCE (human capital efficiency). It is also noteworthy that the average efficiency ratio of human capital in comparative banks in each year of the study was higher than the same average HCE for domestic banks (See Figure 1). In addition, the comparative group of banks was characterized by higher levels of HCE ratio volatility than domestic banks. The leaders in terms of efficient use of human capital include the BPI, Komercni banka, BRD and Getin Holding. The lowest efficiency of human capital was characterized by Bankas SNORAS and BOS.

Figure 1: HCE ratio of domestic and comparative banks

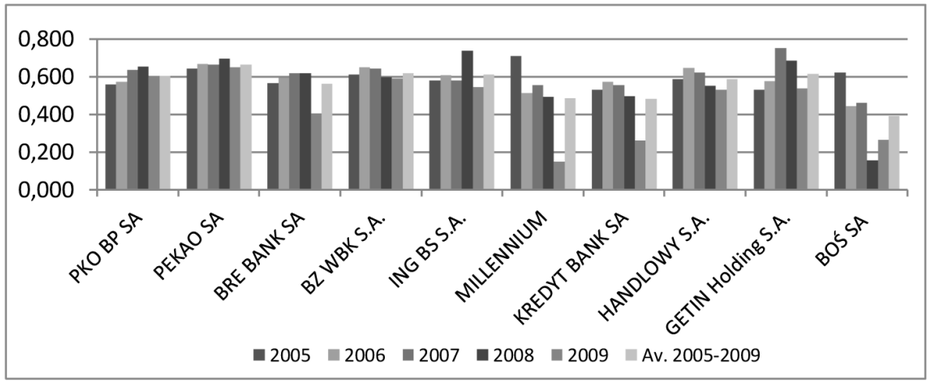


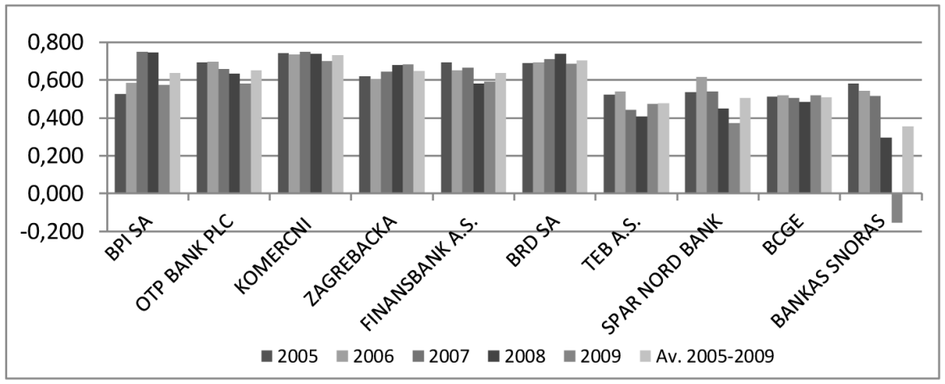


Source: Own calculations based on annual reports of banks

As for the SCE ratio for domestic banks, those which most effectively utilized their structural capital (see Figure 2), include ING BS (2008), Millennium (2005), Pekao (in 2008) and Getin Holding (in 2007 and 2008). Among the leaders of foreign banks in terms of utilization of capital canbe included Komercni Banka (the entire period of study), BRD (the entire period), and BPI (in 2007 and 2008). As with the average rate of HCE and SCE the comparative banks were higher than domestic banks. This means that the group of comparative banks showed a higher average of efficiency of structural capital.

Figure 2: SCE ratio of domestic and comparative banks





Source: Own calculations based on annual reports of banks

The worst outcome in terms of values of SCE ratio was noted by the Lithuanian Bankas SNORAS (-0.156). A negative value for the bank's SCE ratio was the result of very little value added (VA) in 2009 due to losses suffered by the bank caused by the subprime crisis. Lower values of the SCE from the other banks were also reported by the comparative Turkish TEB, Danish Spar Nord Bank and Swiss BCGE. In the group of domestic banks the lowest SCE was observed for Millennium Bank, Kredyt Bank and BOS Bank (See Figure 2).

Conclusions

Intellectual capital has become an important value driver within companies. This is especially true in a knowledge based economy. This study showed that intellectual capital of domestic and comparative banks is largely attributed to Human Capital Efficiency (HCE). It means that investments in human capital can give banks a higher value added than investing in structural or employed capital. The results of the rankings of the banks for the average of five years (2005-2009) showed that for VAIC™ the top two performers in the study were Komercni Banka and BRD Groupe Societe Generale S.A. The BCGE - Banque Cantonale de Geneve, Bankas Snoras and BOS Bank were the worst performers. The research also demonstrated that comparative banks were more efficient companies according to the level of value added of intellectual capital. There was observed a significant decrease of VAIC™ ratio in the years 2008 and 2009 which was caused by the crisis on the financial markets.

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