

INTELLECTUAL CAPITAL PERFORMANCE OF POLISH BANKS IN 2005-2011 PERSPECTIVE – AN APPLICATION OF KCE™ MODEL

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Abstract: *In the knowledge economy intangible resources are the primary value drivers. This is particularly true of companies such as Banks. However, intangible resources (Intellectual Capital) appear difficult to measure. Today, there are several methods that allow to measure Intellectual Capital in listed companies. However, not all methods of measurement are adequate for listed Banks. The paper uses the KCE™ (Knowledge Capital Earnings™) ratio, to measure the Intellectual Capital efficiency of the Polish listed Banks in the peer group. The time horizon was set for the period due to the possibility of recognition of years in which banks recorded a higher income and years in which recorded a drop in revenue caused by the subprime crisis in financial markets (2005-2011). The results extend the role of understanding of the Intellectual Capital in creation of sustainable advantages for Banks in developing economies.*

Keywords: *KCE™, Intellectual Capital, Polish banking sector, intangibles valuation*

JEL Classification: *G21, M20, O16*

1. INTRODUCTION

The world economy has been mainly based on tangible assets and production. The major value drivers in “production economy” were land, labor, capital and physical assets. However, in the last two decades, in the knowledge economy the Intellectual Capital (IC) has become more important to add values when it is compared to physical assets [3]. It is clear that tangible resources are necessary for the prospering of bank - which is a specific financial institution. This concerns financial resources including customer deposits, which constitute the main source of supply of capital in the bank. Bank's intangible resources (also called Intellectual Capital – IC) can be divided into: human capital (e.g. knowledge, skills or employee motivation), relational capital (including relationships with customers, investors or cooperators) and structural capital (including the technical infrastructure, databases and intellectual property). The interest in intangible resources and the role of IC management is the answer to the problems that have arisen with the rapid increase in the number and types of bank's resources. Parallel there is also a need to provide those resources of the highest relevance for the implementation of banks strategy. This task is very difficult, and its proper implementation requires a number of business process management. The banking activities are becoming less necessary branches or subsidiaries of a more efficient and reliable system, employees who take care of the relationship with customers or managers who take care of relationships with other employees. The greatest interest in the concept of intangible resources falls on the beginning of the XXI century. From the *subprime-crisis* point of view, banking sector did not need intellectual capital as a driver of competitiveness and development as much as today.

According to Usoff [2] “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 its strategy. According to World Bank [7] “ [...] 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 living [...] today's most technologically advanced economies are truly knowledge-based.” This task is very difficult, and its correct implementation requires managing several business (innovation) processes. Innovation process as a tool stimulates improvement of competitiveness in banking business. More and more often it is the company's *innovational capital* which is emphasized along with organizational capital, or market capital. In a period of high dynamics of globalization processes it seems that the term “*innovational capital*” will have strong influence over the value of particular entities [5]. IC is naturally connected with innovation capital. On the other hand innovation capital is always exposed to risk. Using of IC not effectively, may cause the risk of value-gap. Therefore only by knowing the sources of risk the right models of risk's management could be created. And only that kind of a model can be an effective tool increasing chances to achieve full success [6].

Unfortunately, the concept of intellectual capital, until now is not clearly interpreted. Literature is full of discussions about intangible resources, intangible assets, intellectual capital, intangible capital and so on. We are dealing with many similar definitions and valuation models. However, despite the noticeable growth of interest in developing the concept of intangible asset management as critical to competitiveness, there is little published on the assessment of the domestic banking sector from the intangible assets point of view. In this paper the author has set a goal to try to measure the level of intangible resources in Polish banking sector relative to comparative banks using the KCE™ ratio (Knowledge Capital Earnings™ ratio).

2. METHODOLOGY OF RESEARCH

Description of the methodology of the study are presented in two sections: A - Selection of peer group and B - Methodology of KCE™ ratio calculation.

A. Selection of peer group

The study of intellectual capital valuation of domestic banks in relation to the comparative banks required creation of peer group. The study adopted a timeline starting in 2005 and ending in 2011. The main reason for the choice of the period of the study was to include both years for which reported a significant increase in the banks, as well as those years in which we have seen the collapse of the capital markets caused by the *subprime* crisis. Study sample consisted of twenty banks. Ten were domestic (polish) public banks (listed on the Warsaw Stock Exchange). The other ten banks were foreign banks which are comparable companies (peer group) in the study. The main criteria of the selection was (data for 2011): the total assets of the bank, value of shareholders' equity, net income, market capitalization value of return on equity and return on assets. However, according to the volatility of the capital markets and the decline in profits in the banks during the crisis, the key factor for determining the comparative company was the amount of the bank's assets. In the next stage of the examination of peer companies was selecting those that meet the criterion of availability of data for the period from 2005 to 2011 in the consolidated version. The selection of the peer group also took into account the bank's business profile and product range.

B. Methodology of KCE™ ratio calculation

Knowledge Capital Earnings (KCE™) is a development of CIV indicator [4]. This method was developed by Professor B. Lev - lecturer of Stern Business School from New York [1]. The starting point of KCE™ indicator is the assumption that the economic output of the company is the sum of the use of Physical Capital, Financial and Knowledge capital, which can be represented by the formula:

$$EO = a(PC) + b(FC) + c(KC)$$

where:

EO - The economic output of the company,

PC - Physical Capital,

FC - Financial Capital,

KC - Intellectual Capital,

a, b, c - Coefficients of individual capitals.

KCE™ ratio is determined in five stages:

- **Step 1:** estimate the value of Normalized Earnings (NE). That is an average earnings from last three years (including the current year), and estimates of earnings for the next three years. It eliminates the short-term fluctuations which distort the further calculations. B. Lev proposes the following algorithm:

$$NE = \frac{E_{t-2} + E_{t-1} + E_t + 2 \cdot (E_t + E_{t+1} + E_{t+2})}{9}$$

Number of years under consideration is a matter of convention. Depends inter alia on the availability of data, or the nature of the industry in which the Company operates. Companies with a high learning curve (where capital expenditure quickly return) does not require greater numbers of years in order to estimate the NE.

- **Step 2:** Determine the normalized earnings of the firm from the use of Physical Capital - NE_{PC} . In order to determine the company's NE_{PC} Physical Capital (PC)- PC must be multiplied by the rate of return on physical capital ROPC, as shown in formula:

$$NE_{PC} = PC \cdot ROPC$$

Physical Capital is determined by the formula:

$$PC = \text{Fixed Assets} + \text{Stock} - \text{Long-term Liabilities}$$

The rate of return on Physical Capital ROPC be reflected by the rate of return for the sector in which the company operates. However, B. Lev, on the basis of the study assumes a value of 7%, which represents an annual average rate of return on physical capital to the economy of the United States.

- **Step 3:** Determination of Normalized Earnings from the use of the firm's Financial Capital - NE_{FC} . In order to determine NE_{FC} the Financial Capital (FC) of the company multiplied by the rate of return on financial capital (ROFC):

$$NE_{FC} = FC \cdot ROFC$$

The Financial Capital (FC) by the author of KCE™ ratio consists of cash, bonds, company shares and financial instruments. The rate of return on Financial Capital, according to B. Lev is 4.5%, which represents an annual return of ten-year government bonds in the years 1980-1990 in the USA.

- **Step 4:** Estimation of Normalized Earnings generated by the firm's intellectual capital (NE_{IC}) by the formula:

$$NE_{IC} = NE - (NE_{PC} + NE_{FC})$$

- **Step 5:** Determine the value of KCE™ ratio as the quotient of NE_{IC} and ICDR (intellectual capital discount rate):

$$KCE = \frac{NE_{IC}}{ICDR}$$

B. Lev assumes that ICDR stands at 10.5%, and it is an average rate of return on shares in companies and biotechnology companies engaged in software development in the years 1980-1990 in USA. In the opinion of the author of this paper KCE™ ratio truly reflects the knowledge capital but does not necessarily evaluate IC. Moreover, basing the calculation on the basis of the average industry may seem an oversimplification. In addition, it is difficult to prove what portion of the profit results from the use of physical and financial assets.

3. RESEARCH RESULTS

The highest average KCE™ ratio for the period 2005-2011 was observed for OTP Bank (25.218 mil USD), PKO BP (15.854) and THB (14.677). The lowest values of average KCE™ ratio during the research period belonged to KAS Bank (-95), BOŚ (71) and Spar Nord Bank (365) (see Figure 1). From the competitive position point of view results for domestic banks (using the average KCE™) are as follows: PKO BP, BZWBK, Kredyt Bank, Handlowy, Getin Holding and BOŚ Bank had better competitive position (average value of KCE™ ratio was higher than in comparative bank). In case of last four domestic banks (Pekao, BRE Bank, ING BS and Millennium) competitive position was lower.

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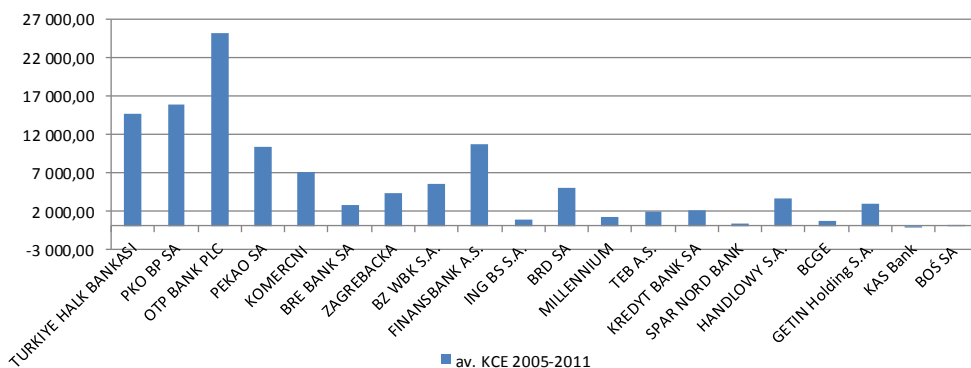


Figure 1 Average values of KCE™ ratio for domestic and peer group banks for 2005-2011 period (mil USD)
Source: Own calculations based on annual reports of banks

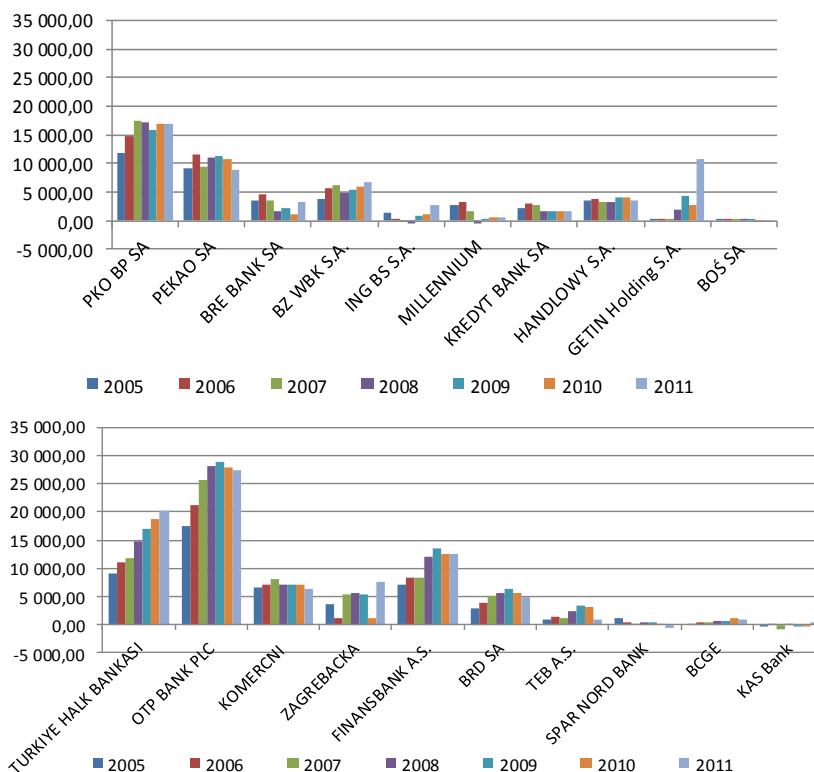


Figure 2 Values of KCE™ ratio for domestic and peer group banks in 2005-2011 period (mil USD)
Source: Own calculations based on annual reports of banks

Analysis of Figure 2 there is noticeable disparity regarding the results of the surveyed banks. It gives an insight into the structure of the banking sector in Poland from the “financial” and “non-financial strength”. One can identify two large banks (PKO BP and Pekao), four medium ones (BRE Bank, BZWBK, Kredyt Bank and Handlowy) rest of the banks are rather marginal in banking sector. It could be argued that currently height of the Knowledge Capital Earnings™ depends on the amount of material-tangible resources of the bank.

In 2005, the leader according to KCE™ ratio were banks such as: OTP (17.495), PKO BP (11.912) and ex aequo THB (9.160) with Pekao (9.172). At this point it is worth noting that the THB during the study period increased more than twice the value of KCE™ ratio (see Table 1.). This is the only case when seen steady growth throughout the study period. In other cases, the devaluation of the KCE place either in 2009-2011 or 2010-2011. From the standpoint of the average value of KCE™ ratio for each tested year it is worth noting that average ratio has increase from year to year,

except 2010. It is also worth noting that standard deviation is mostly close to the average KCE™ ratio which shows the high level of variability in collected the data.

In every year of research maximum level of the KCE™ ratio (best result) was one of the Hungarian OTP Bank. The worst result in 2005-2011 period was: KAS Bank (in 2005, 2007, 2009 and 2010), Getin Holding in 2006, ING BS in 2008 and Spar Nord Bank in 2011. Interpretation of negative values of KCE™ ratio is problematic. However, this can be considered as an outflow of capital resulting from this and no other use of the knowledge in the bank.

In Figure 3 there is presented Normalized Earnings of the firm from the use of Physical Capital - NE_{PC} in 2005-2011 period. We can see that value of NE_{PC} is correlated with KCE™ ratio values. But still nominal values of NE_{PC} are much below results achieved form KCE™ analysis. The best result was 80 mil USD in 2007 of OTP Bank. In the same year OTP reached KCE™ level of 25.698 mil USD which is 321 times more than NE_{PC} .

Table 1 KCE™ values for domestic (polish) banks and peer group in 2005-2011 period

	Bank	KCE (mil USD)							Av. 2005-2011
		2005	2006	2007	2008	2009	2010	2011	
1	TURKIYE HALK BANKASI (THB)	9 160,27	10 959,06	11 855,09	14 728,53	17 109,67	18 678,51	20 252,03	14 677,59
2	PKO BP SA	11 912,35	14 738,13	17 545,74	17 213,05	15 808,03	16 949,87	16 814,71	15 854,55
3	OTP BANK PLC	17 495,00	21 207,37	25 698,98	28 125,44	28 752,92	27 973,41	27 274,03	25 218,16
4	PEKAO SA	9 172,10	11 464,91	9 365,90	10 974,76	11 250,07	10 831,71	8 925,11	10 283,51
5	KOMERCNI	6 555,75	7 053,96	8 132,59	7 219,24	7 203,34	7 138,18	6 447,98	7 107,29
6	BRE BANK SA	3 616,77	4 501,72	3 595,12	1 505,54	2 087,84	1 197,11	3 230,54	2 819,23
7	ZAGREBACKA	3 519,71	1 081,80	5 331,87	5 718,59	5 440,56	1 120,80	7 571,07	4 254,91
8	BZ WBK S.A.	3 855,26	5 709,44	6 056,74	4 907,50	5 481,08	6 026,10	6 668,44	5 529,22
9	FINANSBANK A.S.	7 070,04	8 374,64	8 333,12	12 007,86	13 500,00	12 521,76	12 663,26	10 638,67
10	ING BS S.A.	1 282,48	414,15	-215,79	-586,64	875,11	1 209,11	2 659,87	805,47
11	BRD SA	2 941,38	3 832,39	5 077,97	5 582,64	6 481,18	5 593,11	4 834,66	4 906,19
12	MILLENNIUM	2 810,18	3 304,45	1 614,61	-440,72	43,64	620,79	454,27	1 201,03
13	TEB A.S.	912,47	1 419,25	1 223,87	2 513,68	3 303,12	3 039,43	957,02	1 909,83
14	KREDYT BANK SA	2 188,40	2 900,73	2 616,41	1 666,10	1 721,78	1 514,98	1 735,17	2 049,08
15	SPAR NORD BANK	1 292,74	476,78	121,39	486,59	524,30	117,94	-458,43	365,90
16	HANDLOWY S.A.	3 380,78	3 644,42	3 332,08	3 279,03	4 158,77	4 111,82	3 456,57	3 623,35
17	BCGE	257,29	356,05	503,71	607,75	636,81	1 149,78	868,98	625,77
18	GETIN Holding S.A.	412,17	102,51	254,64	1 881,41	4 197,30	2 650,15	10 623,30	2 874,50
19	KAS Bank	-14,58	178,75	-812,16	236,96	-398,56	-340,25	482,65	-95,31
20	BOŚ SA	277,02	385,59	160,77	85,86	34,97	-316,07	-128,92	71,32
	Average	4405	5105	5490	5886	6411	6089	6767	-
	St. deviation	4580	5718	6714	7409	7485	7648	7523	-
	Coefficient of variation	1,04	1,12	1,22	1,26	1,17	1,26	1,11	-

Legend: BRD - BRD GROUPE SOCIETE GENERALE SA TEB-Turk Ekonomi BANKASI AS; BCGE - BANQUE DE GENEVE CANTONALE;

Source: Own calculations based on annual reports of banks

In Figure 4 there is presented Normalized Earnings of the firm from the use of Financial Capital - NE_{FC} in 2005-2011 period. We can see that value of NE_{FC} is less correlated with KCE™ ratio values than NE_{PC} . Interesting is that Turkiye Halk Bankasi – THB has the second score according to KCE™ ratio but in the NE_{FC} point of view THB is rather close to average. It was caused by the relative high level of NE – Normalized Earnings achieved by bank.

In this case Intellectual Capital interpretation is most accurate: using relatively low level of Physical and Financial capital THB was able to achieve very high Earnings. It would not be possible if there were not high level of IC. The best result of THB's NE_{FC} was 751 mil USD in 2011. In the same year THB reached KCE™ level of 20.252 mil USD which is almost 27 times more than its NE_{FC} .

To sum up, in contrast to the most commonly used indicators of IC valuation (such as e.g. MV/BV, VAIC™, CIV) for revenue ratio of Knowledge Capital (KCE™), it was

possible to evaluate (in monetary terms) the level of intellectual capital of all surveyed banks.

4. CONCLUSIONS

The intellectual capital has become an important value driver of banks. This is especially true in a knowledge based economy. This study showed that intellectual capital of domestic and comparative banks is largely attributed to earnings. The bigger the bank, the greater the nominal value of intellectual capital. The results of the research using Knowledge Capital Earnings™ ratio confirms this statement. In group of domestic banks the leader was PKO BP. In the Peer group the leader was OTP bank (by evaluation based on the average KCE™ in 2005-2011 period). If the Earnings are not sufficient, you may receive a negative value KCE™ ratio. But is not it true that banks with a lower level of intangible resources perform worse. Intellectual capital management is an art in itself. It's all about cash flow (earnings in the bank) which is a measure of the quality of intellectual capital management process.

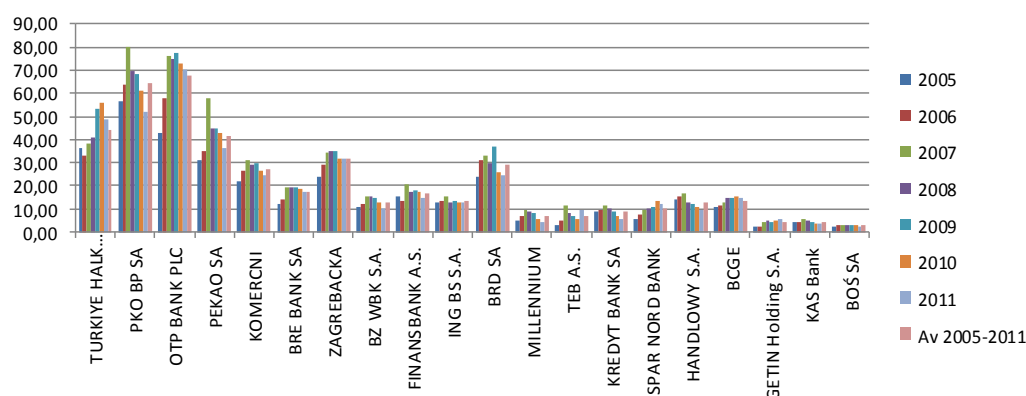


Figure 3 Normalized earnings of the bank from the use of Physical Capital - NE_{PC} in 2005-2011 period (mil USD)

Source: Own calculations based on annual reports of banks

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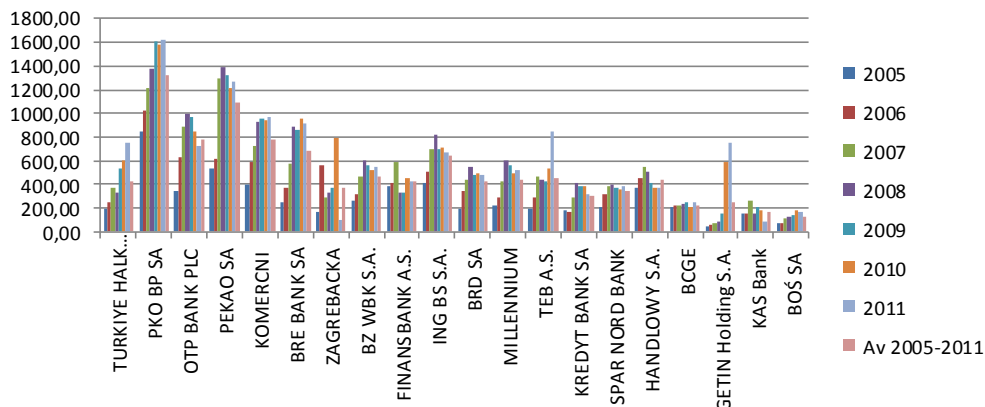


Figure 4 Normalized earnings of the bank from the use of Financial Capital – NE_{FC} in 2005-2011 period (mil USD)

Source: Own calculations based on annual reports of banks

In sum there are no accepted definition of intellectual capital and its valuation method. Although the KCE™ ratio should not be relatively difficult to use in practice, it is quite rare. It seems that the main reason for this is the lack of conviction among practitioners and theorists to the method of determining the value of intangible assets due to the

rather vague approach to the concept of Intellectual Capital. Moreover, in times of instability in the financial markets more attention is paid to risk measures, which according to the author is not entirely correct, than the possibility of measuring the level of intangible assets of the company. This is particularly true of service companies such as banks.

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