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3. INVESTMENTS IN HUMAN CAPITAL DEVELOPMENT MADE BY ENTERPRISES AND THEIR MARKET VALUE

Keywords

Human capital, development of human capital, market value of enterprises

Introduction

Real and financial resources of enterprises depreciate in their real value. Analysis of changes in market and book value of entities proves it. Therefore personnel function is one of the most crucial tools used for creating value of a modern enterprise.

The main goal of this article is to answer to a following question: is there any positive relationship between a scope of investments in human resource development (training and inservice training) and changes in market value? Character of this article is theoretic and empiric. Theoretic material from the domestic and international literature is used to discuss this issue. The main source of the empiric data is a research conducted in 2004 by the author on the sample of enterprises quoted on the Warsaw Stock Exchange.

To obtain the main goal of this article a comparative analysis of selected indices and standards in the population and groups selected due to intensity of investment made by entities in order to develop human capital. Also the goal of this article has impact on its content as the following issues will be discussed:

- Personnel function impact on object value
- Results of classifying examined entities made with the use of multidimensional comparative analysis
- Analysis of changes in enterprises' value in the population
- Analysis of changes in enterprises' value in selected typological Groups

Personnel function vs. object value

The literature assumes that market value estimates well real value of enterprises, therefore this value is allocated to other assets. In this context, intellectual capital of an enterprise is difference between market value of entities' assets and financial capital, net value gained from a sale of exchangeable assets (Edvinsson, Malone, 2001, p. 18). Also cf. (Dobija, 2000); (Jurek, 2002); (Białasiewicz, 2002); (Zielińska, 2000).

Chart 1. Structure of enterprise value

market value	book value
	intellectual capital

Source: own compilation

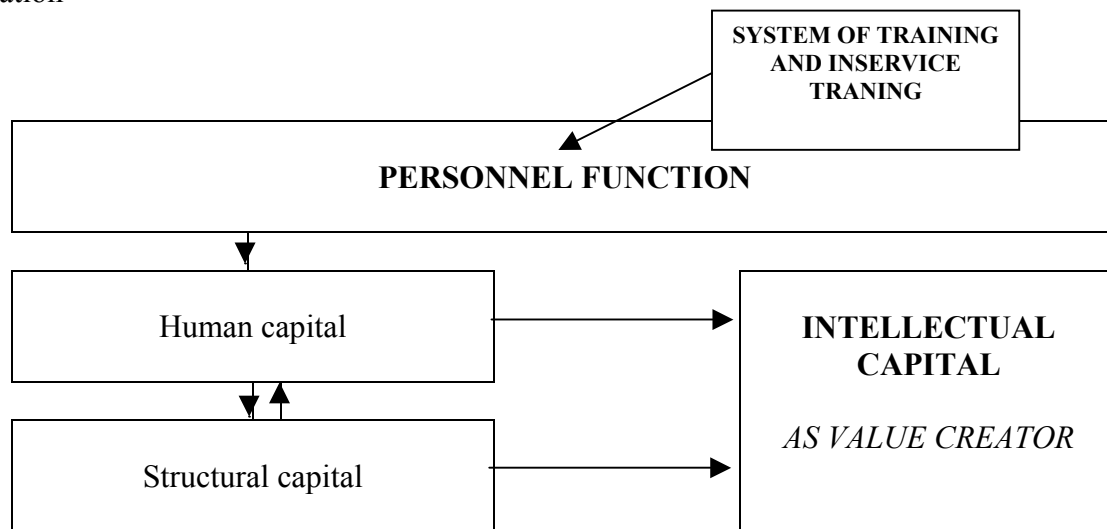
Results of numerous researches indicate that discrepancy between market and book value of the entities quoted on the world stock exchanges is continuously growing, indicating a growing role of IC as enterprise value creator. (Quinn, 1992) described market and book value in proportion 3:1. Research conducted by the Gartner Group confirmed this proportion as well, what's more, it occurred that market value depends greatly on a sector enterprise belongs to. (Handy, 1995) estimated that market value is more than four or five times higher than asset value in the majority of enterprises.

However, factors creating value that are playing more and more important role in enterprises aren't taken into account in traditional balance sheets, growing investments in intangible assets including expenditures on trainings and inservice training of employees aren't reflected in book value.

The fact that IC has many dimensions results in difficulty of controlling this process mainly due to the network of connections among structural elements (Bratnicki, 2000, p. 13); (Osbert-Pociecha, 2000, p. 16). However it should be stated that human resources are the main source of IC and personnel function is kind of a service centre for customers (both internal and external) of an enterprise that aims to increase its value by creating IC.

According to Poczowski there are two main directions of affecting personnel function on enterprise IC and creating new quality that guarantee gaining profits and increasing market value in the future (chart 1). The first one is based on building human capital, the second one on transforming human capital into structural one (resource leverage effect) (Poczowski, 2000, p. 63); also cf. (Edvisson, 2000, pp. 12-16).

Chart 2. Input of personnel function and system of training and inservice training into value creation



Source: own compilation based on (Pocztowski, 2000, p. 60).

In the context of discussion made so far, an answer to question if expenditures in human resources will be regarded as costs decreasing financial results or maybe investments increasing financial results in the future by permanent strengthening competitive advantage and increasing entity's market value should be precise and unequivocal. Expenditures on human resources (e.g. personnel development) will be always regarded as costs if there aren't any tools assessing return on invested capital.

Therefore making analysis taking the above reasons into account is necessary as well as setting and using new measures (intangible ones, too).

The further part of this article focuses on the result of the empiric research conducted to achieve the main goal of the article.

Classifying entities using the comparative analysis method

Applying procedures of comparative analysis allowed to a linear arrangement of the examined entities taking into account the intensity of investments in human capital.

The diagnostic variables are the following indices:

- x_1 – percentage of trained employees,
- x_2 – training investment index,
- x_3 – changes in median education level,
- x_4 – percentage of employees being trained.

Adopted diagnostic features are spatially variable enough and provide information that diversifies examined companies, they aren't strongly correlated, comply with a postulate of significance, hardly reach high value and all of them are stimulants. The procedure of unitarization was used to standardization of statistic variables. Then the data was aggregated with the use of the nonstandard method. All calculating methods resulted in setting a ranking of entities made according to criterion of decreasing synthetic standard value.

Then pursuant to calculated synthetic standard value, the entities were aggregated into four heterogeneous typological Groups of enterprises:

- very good (Group I),
- good (Group II),

- weak (Group III),
- very weak (Group IV)

due to the level of examined phenomena cf. (Nowak, 1990); (Bał, 1999); (Bijak, Smętek, 2002); (Pluta, 1986); (Ostasiewicz, 1998); (Borys, 1978). The thresholds of variable intervals were calculated on the basis of arithmetic mean and standard deviation of synthetic standard.

Group I comprised 17,4 % of the examined entities, entities of Group II represented 23,9 % of total, Group III was the biggest one as it comprised 43,5 % of examined entities while Group IV was the smallest one (15,2 % of entities).

Comparative analysis made at the level of distinguished typological groups indicates existing apparent discrepancies in terms of investments in employee's intellectual capital (table 1).

Table 1. Median values of diagnostic variables

Group	1998	1999	2000	2001	2002	2003
x_1 – percentage of trained employees						
Group I	1,01	1,26	1,51	1,79	2,03	2,75
Group II	0,69	0,76	1,15	0,81	0,82	0,91
Group III	0,35	0,4	0,42	0,39	0,39	0,54
Group IV	0,16	0,17	0,15	0,11	0,11	0,14
x_2 – training investment index						
Group I	536,7	694,6	1047,5	1087,9	1096,9	1349,5
Group II	351,7	363,7	393,9	440,3	409,3	411,3
Group III	149,2	163,7	178,7	153,8	162	183,4
Group IV	61,2	61,6	63	55,5	56,6	68,2
x_3 – changes in mean education level						
Group I	-	0,021	0,025	0,018	0,019	0,018
Group II	-	0,012	0,013	0,023	0,019	0,019
Group III	-	0,007	0,01	0,006	0,007	0,007
Group IV	-	0,005	-0,001	0,01	0,004	0,009
x_4 - percentage of employees being trained						
Group I	2,9	3,2	3,4	3,6	3,9	4,1
Group II	2	2,7	2,5	2,7	3,2	2,5
Group III	1,4	1,5	1,6	1,7	1,5	1,4
Group IV	0,7	0,8	0,9	1	1,1	1

Source: own compilation based on the research results.

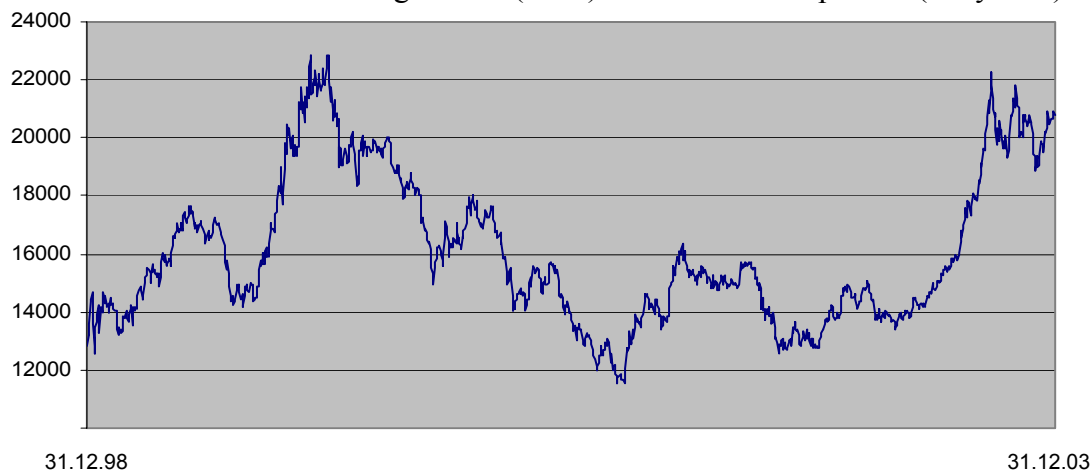
The classification of examined entities laid the foundation to making a comparative analysis of time series of indices and standards selected to further discussion, this way it determined a level, direction and dynamics of changes in each group comparing them with trends in the population which were identified before.

Analysis of changes in enterprises' value in the population¹

¹ Assuming conducting a full scope research in the population all efforts were made to take into account data concerning all the companies quoted on the Warsaw Exchange Stock. Eventually the data on 180 companies

The best synthetic measurement of changes in market value of entities listed on exchange stocks is so-called stock exchange index, changes in the Warsaw Stock Exchange Index (WIG – chart 1 and table 2) were analyzed.

Chart 1. The Warsaw Stock Exchange Index (WIG) in the examined period (daily data)



Source: own compilation based on <http://www.parkiet.com.pl/>

Table 2. The Warsaw Stock Exchange Index (WIG) in the examined period as on December 31

	1998	1999	2000	2001	2002	2003
WIG	12 795,6	18 083,6	17 830,84	13 823,51	14 373,77	20 811,87
% change	-	29,2	-1,4	-29	3,8	30,9

Source: own compilation based on <http://www.parkiet.com.pl/>

The WIG Index increased its value from 12795,6 points (as on the last trading session in 1998) to 20811,87 points (as on the last trading session in 2003) in the examined period.

However, a significant increase in the stock exchange index didn't reflect all trends as only in case of 54 % of entities quoted on the Warsaw Stock exchange analogous period finished with increase in market value, the remaining companies (46 %) finished with decrease in market value. Median² rate of return gained by companies quoted on the exchange stock within the examined period amounted to 8,79 %. The industrial sector that was mainly underestimated by investors before attracted their interest. Described above trends were accompanied by share increase in total structure of entities, valuation which took IC into account (market value surplus), particularly the ones where market value is over two times higher than book value of assets.

conforming to 188 criterion was collected. The data base didn't include such companies as: Atlantis, Elkop, Garbarnia, Irena, ŁDASA, Polna TU Europa, Warta.

Analysis of the data in selected groups of entities was made on 49 companies in the population which made available the data essential to conduct the research.

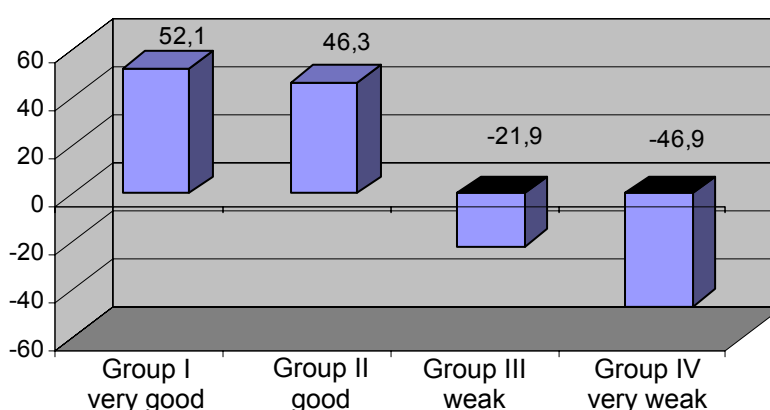
² Mean level of each index and standard in the population and selected groups was calculated based on median.

Analysis of changes in enterprises' value in the typological groups

Is it possible to identify differences in valuation of enterprises' market value classified to four typological Groups? The results shown in the chart prove it without a shadow of a doubt. Calculated for „very good” and „good” groups median rates of return in the examined period amounted to 52,1 % and 46,3 % respectively (significantly below analyzed before dynamics rate for the entire market (8,79 %), the threshold was reached by 75 % of entities of the Group I and 60 % of Group II – significantly more that in Groups III and IV), hence a significant market value growth took place. Therefore it can be stated that the way of management tangible and intangible resources in the first two groups was noticed and valued by investors what reflect in-plus changes in market valuation of the entities, it was significantly higher in comparison with remaining companies (market index).

The majority of entities classified as “weak” and “very weak” reached negative rates of return what is proved by the median level of changes in market value assessed by median rate of return that reached negative values (57,9% of entities in Group III and 85,7% of Group IV reached a lower rate of return than median market) while at the same time increase in the stock exchange index was observed. Moreover, in “weak” enterprises decrease in median market value was observed (by 21,9%) while in the second mentioned group market value decreased by half (at the same time enterprises of Groups I & II increased market value by half). Hence, changes in these enterprises received a negative market valuation and didn't attract investors.

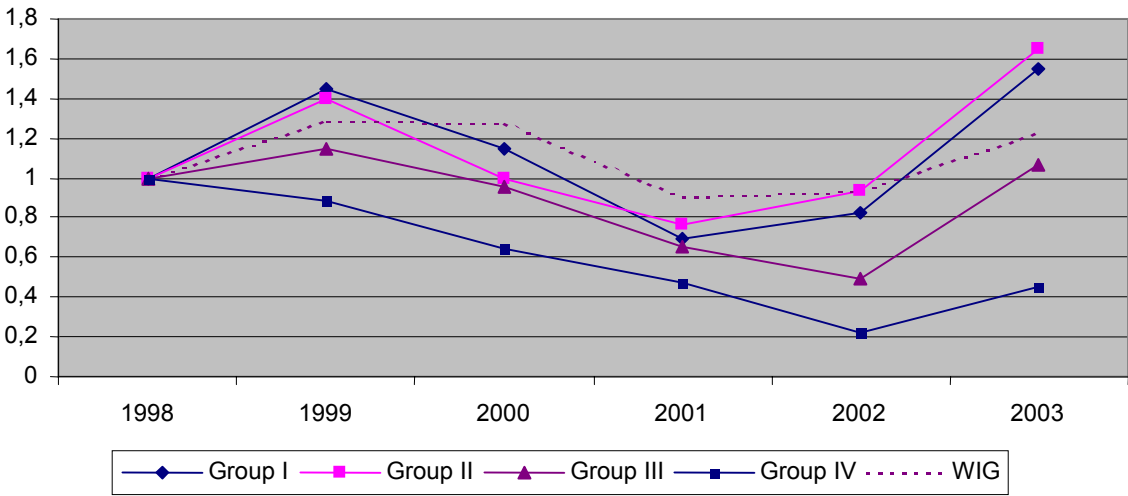
Chart 2. Median rates of return in the examined period in the selected Groups.



Source: own compilation based on the research results.

The data, concerning market value in 1998 shown in the chart, on changes in market value in all groups has the common base (1) and it shows dynamics of changes in median annual rates of return in the selected groups. The common base was set in order to reflect discrepancies in changes in market valuation of the entities in the examined period. The pace of changes in their market value is the same as the pace of changes on the stock (changes in the WIG index are shown by dotted line). However, the thesis on Group I & II dominance in the same conditions was proven again and the processes leading to such discrepancies were intensified particularly at the end of the examined period. The changes shown in chart 3 resulted in increase in market value of entities of the Group I & II respectively by 54,8 % and 65,1 % while in Group III & IV- insignificant increase by 6,1 % and significant decrease by 54,8 %.

Chart 3. Median annual rates of return in the Groups (base value=1) between 1998 and 2003



Source: own compilation based on the research results.

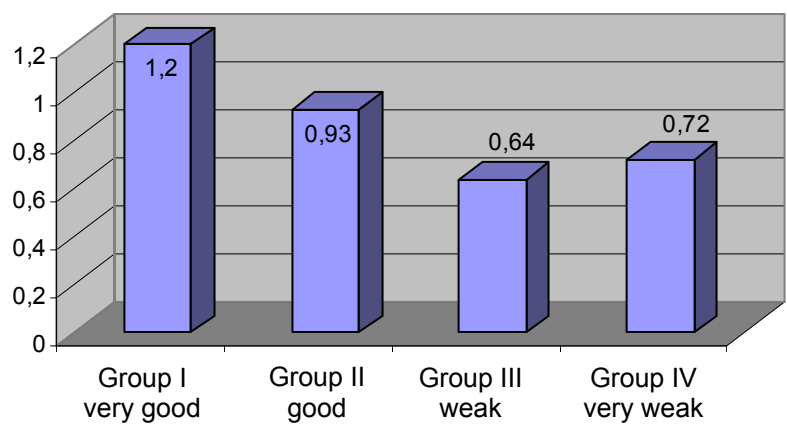
Did changes in market value accompanied changes in ratio reflecting discrepancies between market and book value (MV/BV) of entities?

The research results prove that surplus of market value was observed in the examined period in the majority of “very good” and “good” enterprises. Hence, investors more often took IC into account in valuation of these entities and median MV/BV ratio proves it (Group I- 1,2 and Group II- 0,93). Also a percentage of cases when the ratio was below 1 was determined for each Group. In the Group I & II it respectively amounted to 56,3 % and 43,6 % of such cases.

The thesis made above is proved by lower indices in the Groups III & IV. In the companies these groups comprise surplus was rather rare i.e. it occurred in 29,1 % and 32,4 % entities respectively. As a result median MV/BV ratio was significantly below 1- 0,64 in Group III and 0,72 in Group IV.

Median ratio of market to book value in selected Groups is shown in chart 4 below:

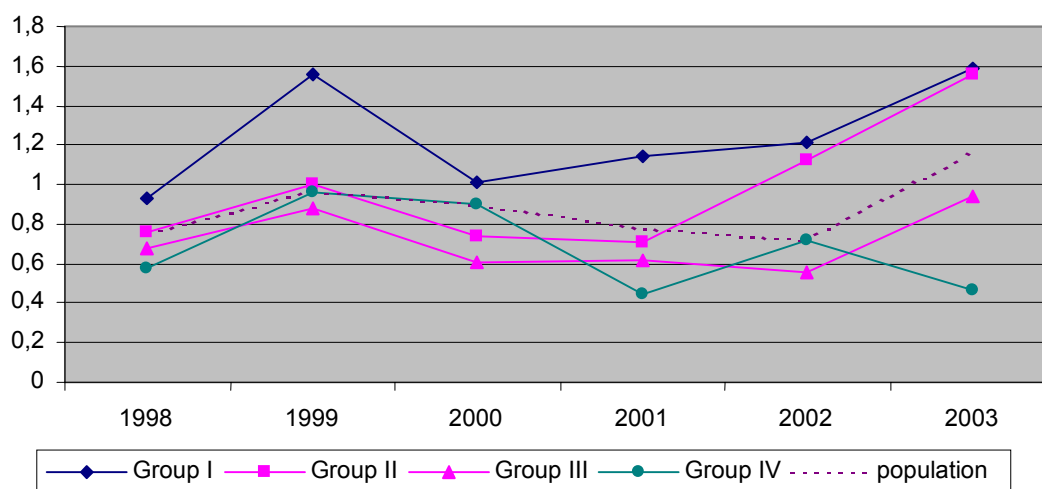
Chart 4. Median ratio MV/BV in selected Groups



Source: own compilation based on the research results.

Changes in median MV/BV ratio in selected Groups between 1998 and 2003 in reference to market trends are shown in chart 5 and table 3.

Chart 5. Median ratio MV/BV in selected Groups



Source: own compilation based on the research results.

Table 3. Median ratio MV/BV in selected groups

Group	1998	1999	2000	2001	2002	2003	dynamika	Above average (%)	
								Median of changes in dynamics	Index for population
Group I	0,93	1,56	1,01	1,14	1,21	1,59	71	62,5	41,7
Group II	0,76	1	0,74	0,71	1,12	1,56	105,3	60	48,3
Group III	0,68	0,88	0,61	0,62	0,56	0,94	38,2	47,4	32,5
Group IV	0,58	0,96	0,9	0,45	0,72	0,47	-19	28,6	33,3
population	0,8	1	0,9	0,8	0,7	1,2	50	-	-

Source: own compilation based on the research results.

Analysis of data in table 3 proves the observation made before. Entities of I and II Group more frequently (respectively 41,7 % and 48,3 %) in comparison with the remaining Groups (III – 32,5 %, IV – 33,3 %) reached MV/BV ratio above the population level.

Moreover, analyzing dynamics of changes was a significant issue, that's why median dynamics of changes was calculated as it describes median changes in the examined population. It amounted to +30,6 % in the examined groups and in case of the entire population it amounted to + 50 % so there is imbalance (in-plus) in dynamics of changes in “very good” and “good” enterprises comparing to the others as well as the population. Few facts prove the thesis:

- high changes dynamics indices (Group I – 71 %, Group II – 105,3 %) they are significantly higher than median index for the population (50 %) and for remaining groups (Group III – 38,2 %, Group IV – 19 %),
- high percentage of entities with higher dynamics than the median for the population (62,5 % in Group I and 60 % in Group II), higher than the respective indices in the remaining Groups (47,4 % in Group III and 28,6 % in Group IV).

Intensified positive changes were observed particularly at the end of the examined

period when investors took IC into account in majority of entities, median MV/BV ratio in „very good” and „good” enterprises amounted above 1 in 2002 and 2003 (respectively 1,21 and 1,12 in 2002 as well as 1,59 and 1,56 in 2003), however, such a situation didn't take place in the Groups III and IV (at end-2003: Group III - 0,94 and Group IV – only 0,47) and the changes were significantly less dynamic.

Summary

It should be stated that enterprises of Groups I & II investing in their human capital were noticed and valued by stock investors what resulted in aboveaverage increase in their market value, this way IC was taken into account what is proven by bigger surplus of market value in these Groups. Moreover, positive changes in this scope were highly dynamic (in case of the trends in the population as well). Majority of entities belonging to the „weak” and „very weak” groups finished the examined period with negative rates of return, their IC was taken into account while valuation to a lesser extent (it was regarded as surplus of market value) and changes were less dynamic comparing to the market trends. Therefore a positive relationship³ between a scale of investments in human capital (training and inservice training) and changes in entities' market value can be identified.

Comprehension check

After having read this article answer the following questions:

1. Why do market value of some entities is valued few times higher comparing to book value than the others? In your opinion do tangible or intangible value creators determine it? Justify your answer.
2. Which structural element of IC contributes mainly to obtaining competitive advantage? Why?
3. Do you think that market value is a good estimator of entity's real value? Justify your answer
4. In your opinion is allocation of aboveaverage expenditures on human resources justified as well as recruitment and motivation of employees in enterprises? Can they be regarded as investments bringing rates of return or maybe they are simply costs which enterprise has to bear however it should minimize them. In another words, is a personnel department a profit centre or cost generator?
5. What is „resource leverage effect”?
6. Make a comparative analysis and evaluate actions taken by entities of Group I & II in the scope of human capital development from a perspective of mentioned in this article indices of enterprises in the EU (EU-15, new Member States).

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³ While conducting the research awareness that many determinants influence entity's market value was present.

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