THE IMPACT OF INTELLECTUAL CAPITAL ON THE MARKET VALUE AND PERFORMANCE OF THE COMPANY

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Abstract: *Intellectual capital as a driver of growth and development of technically and technologically intensive companies in the era of knowledge economy is the basic generator of creating superior company performance. The conditions of the "new economy" influenced the change of the business model of modern companies, whereby the identification, measurement, reporting, control and exploitation of the intellectual capital of the company became important in order to maximize the value of owners and other stakeholders of the company. The subject of this paper is to examine the impact of intellectual capital components on the financial and market performance of enterprises. This paper aims to show the degree of connection and direction of movement of financial and market performance of companies in relation to the concentration of intellectual capital in companies.*

Keywords: *Financial performance, Market performance, Expenditure R&D.*

1. INTRODUCTION

One of the decisive factors for the success of companies in the era of the "knowledge economy" is the degree of concentration of intellectual capital within the organization itself. Technical-technological progress, development and improvement of communication systems and expansion and networking of knowledge bases have contributed to the change of modern companies' system and business philosophy. The so-called "Knowledge companies" in which the fundamental business element is represented by people with their specific knowledge, skills and abilities from which innovations arise, thus switching from a capital-intensive business system to a knowledge-based business concept. The dominance of individuals' particular expertise as part of companies' intellectual capital over the means of work, land and capital is particularly pronounced in the IT sector and the pharmaceutical industry, so according to the needs of the research, companies from these sectors are included.

In order to survive in a modern, dynamic and highly turbulent environment, companies must identify their current positions, clarify their goals and act most effectively and efficiently possible. Performance measurement systems make this possible. Neely et al. (1995, 81) define a performance measurement system as "a set of metrics that allows the quantification of both efficiency and effectiveness of actions." An effective performance measurement system allows a company to assess whether goals have been achieved and whether progress has been made as a whole (Lebas, 1995), identifying position, clarifying goals, and illuminating areas for improvement while enabling reliable predictions (Neely et al., 1995). An effective performance measurement system allows a company to measure and control performance following a defined strategy. Accordingly, measures of intellectual capital performance have been developed over time. There is a consistent view of a large number of theoreticians and practitioners such

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as Sveiby (1997), Edvinsson (1997), Steward (2001), Roos (2005), who have been dealing with the subject of intellectual capital since the 1990s, that intellectual capital can be divided into three groups: human, structural and relational capital. The differences among theoreticians are fundamentally terminological, but most agree that intellectual capital can be classified into the three categories mentioned above.

2. THE IMPACT OF INTELLECTUAL CAPITAL ON COMPANY PERFORMANCE IN THE MODERN ENVIRONMENT

There are numerous definitions of intellectual capital. One of them describes intellectual capital as a set of knowledge owned by the organization and has a decisive influence on creating higher value for owners and increasing competitive advantage (Marr, Schiuma, 2001). Common to all definitions is that intellectual capital is primarily associated with the knowledge of highly educated professionals who use it to increase the efficiency of business processes in the company. The above definition highlights the category of human capital that is the "source of innovation" of the company. In the era of the knowledge economy, the "innovation wars" among companies is not foreign, and the primary weapon in the fight for the market are employed highly specialized individuals in relevant fields. Due to the increasingly sophisticated requirements of consumers and the desire and efforts of companies to constantly increase the coefficient of customer loyalty, one of the critical functions in the company is Research and Development (R&D). Only innovation (radical and incremental) can achieve this goal in the modern business environment.

The difference between the market and book value of a company is considered to arise through investment in R&D, creating intellectual capital that is not included in the balance sheet. In an effort to fully capture intellectual capital, Joia (2000) based his research on the confirmed hypotheses of several intellectual capital experts (Edvinsson and Malone (1997); Roos et al., (1997); Sveiby (1997); and Stewart (1997) and as a final product of his study derives the following formula:

$$BV + IC = MV$$

Where:

MV = Market Value
BV = Book Value = (MC + PC)
MC = Monetary Capital
PC = Physical Capital
IC = Intellectual Capital = (HC+IVC+RC+SC)
HC = Human Capital
IVC = Innovation Capital
RC = Relationship Capital/Customer Capital
SC = Structural Capital/Process Capital

Numerous studies testify to the positive impact of IC on the market and the companies' financial performance. A study by Erickson and Rothberg (2009) that included companies in the field of IT concluded that adequate and efficient knowledge management in the organization has an impact on increasing the market performance of companies.

Market capitalization as one of the performance indicators represents the total market value of the company, which is obtained by multiplying the total issued shares of the company and the

stock price on the stock exchange. One of the indicators of companies' investment in intellectual capital is the cost of investing in R&D.

Accordingly, in this paper, we will show the impact of investing in R&D on the market value of world-leading companies in the pharmaceutical industry and IT sector.

3. STATISTICAL ANALYSIS OF THE IMPACT OF RESEARCH AND DEVELOPMENT COSTS ON THE MARKET VALUE OF COMPANIES

Statistical analysis of the interdependence of the costs of R&D as part of the intellectual capital and market capitalization of 7 world-famous listed companies were conducted in the statistical program (IBM SPSS) based on variables that the authors consider relevant for a given evaluation of interdependence. Before interpreting the analysis, it is necessary to note that intellectual capital is presented in the light of investing in R&D based on various professional training and sub-specializations of highly educated staff that can improve company performance through numerous achievements and innovations.

It should also be said here that the analysis was conducted in the five-year period from 2016-2020. Examination of interdependence tr. R&D and market capitalization of the company was conducted based on correlation analysis – Pearson's coefficient.

The statistical model and the conducted analysis are based on the previously set hypotheses of the model on the interdependence of two variables:

H0 – There is a statistically significant correlation of tr. R&D and market capitalization as indicators of a company's market performance

H1 – There is no statistically significant correlation of tr. R&D and market capitalization as indicators of a company's market performance

The coefficient of simple linear correlation, as a relative measure, takes values from -1 to +1. If it takes positive values, the correlation between the phenomena is direct or positive (both phenomena show DC variations). In the case when r <0, the relationship is inverse or negative (when one phenomenon increases, the other decreases, and vice versa). If there is a functional connection between the observed phenomena (all empirical points are exactly on the straight line), we are talking about a perfect (perfect) correlation. Then the correlation coefficient takes the value -1 (if the connection is inverse) or +1 (if the connection is direct). The closer the absolute correlation coefficient is to the unit, the stronger the correlation between the phenomena. In contrast, the closer to zero, the weaker the linear relationship. In the following tables (Tables 1 and 2), the degree of connection between tr. R&D and market capitalization of companies.

Table 1. The normality of the data distribution

Test of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
R&D costs (mil. $)	.194	35	.002	.821	35	.000
Market capitalization (mil. $)	.174	35	.009	.840	35	.000

a. Lilliefors Significance Correlation

Source: The result of the author's research

If the number of observations in the sample is greater than 30, then each empirical distribution, according to the central boundary theorem, tends to be normal, so each empirical distribution, for n> 30, can be approximated by normal (Jovetić, 2015).

Table 2. Correlation analysis

		R&D costs (mil. $)	Market capitalization (mil. $)
R&D costs (mil. $)	Pearson Correlation	1	.609**
	Sig. (2-tailed)		.000
	N	35	35
Market capitalization (mil. $)	Pearson Correlation	.609**	1
	Sig. (2-tailed)	.000	
	N	35	35

** Correlation is significant at the 0.01 level (2-tailed)

Source: The result of the author's research

From this example, based on the significance levels (Sig. = 0.000), the null hypothesis is accepted, i.e., the assumption that there is a strong correlation between the given variables. There is a statistically significant link between companies' investment in R&D and their market capitalization. Given that the correlation coefficient is 0.609, we conclude a strong positive correlation between the movement of investment in R&D and the market capitalization of companies.

Especially during this research, a trend of significant investment in R&D in pharmaceutical companies since 2019, which are now producers of vaccines against COVID 19 and the dizzying growth of their stock prices in the last 2 years, was noticed.

4. CONCLUSION

The growth of intellectual capital affects the creation of added value, i.e., finding new ways to create added value, which in the modern world is possible only through innovation. This increases the company's competitiveness and the ability to create superior market and financial performance. As we have seen, based on the previously performed analysis, investing in R&D enables the growth of market performance of companies and increases the value of companies for a part of intellectual resources that were not included in the balance sheet but are very well-identified on stock exchanges. Given that innovation is the path to success of modern companies, leading macroeconomists see the development of an economy based on knowledge and innovation as a priority, investing heavily in the scientific funds of the world's leading powers. In this way, innovation and intellectual capital contribute to the creation of new competitive advantages and the development of hitherto undiscovered potentials. A stable base of intellectual resources that produces high-quality personnel with their proper selection enables smooth economic and economic endeavours.

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