

## THE IMPACT OF HUMAN CAPITAL VALUE ON HUMAN CAPITAL EFFICIENCY AND BUSINESS PERFORMANCE

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**Abstract.** *In the knowledge economy era, human capital is a part of intellectual capital and a significant factor in enterprise competitiveness. The importance of human capital is often diminished due to the accounting expression of investments in human resources in the income statement as a cost (expenditure) component. This paper points to the fact that the cost of human resources is an investment that affects the growth of the business performance of an enterprise. Hence, the aim of this paper is to examine the impact of human capital value on human capital efficiency and business performance indicators, such as sales revenue (SR), earnings before interest and taxes (EBIT), and EBIT margin (EBITM). To examine this impact, empirical research is conducted on a sample of 24 companies with the highest brand value for the period 2012-2019. The regression analysis results show that sales revenue and EBIT grow by 0.77% and 1.1% respectively as human capital value grows by 1%. Additionally, findings reveal that the growth of the human capital value negatively affects the values of human capital efficiency indicators and EBIT margin in the sample of examined enterprises.*

**Keywords:** *human capital value, human capital measurement, efficiency*

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## 1. INTRODUCTION

In the knowledge-based economy, contemporary enterprises that possess a high share of intellectual resources in total assets are focused on the efficient management of intangible assets with the aim to improve economic efficiency, effectiveness, and competitive advantage (Debrulle & Maes, 2014). Nowadays, to build sustainable and profitable enterprises, the management of those enterprises should use human competencies, skills, and talents, which are considered valuable intangible assets (Wright et al., 2001). Human capital is a term that refers to human resources and is a part of intellectual capital together with structural and relational capital (Bontis & Fitz-enz, 2002; Vejchayanon, 2005; Phillips, 2005; Jovanović et al., 2021). Intellectual capital is an outstanding source of establishing and maintaining a competitive advantage in the contemporary competitive environment in the information or digital era (Krstić, 2007). Managers decide to invest in intellectual capital components (structural, relational, and human capital) in order to boost the value and performance of the enterprise. Managers have a responsibility to devote more time and effort to measuring and managing human and other intellectual resources in order to improve human capital efficiency, which contributes to the total economic efficiency of an enterprise. The purpose of this paper is reflected in the recommendations to managers to change their attitude toward investing in employees and turn to improving the knowledge, skills, and abilities of employees, due to the significant impact of human capital on the business performance of enterprises.

## 2. HUMAN CAPITAL: COST VS. INVESTMENT IN HUMAN RESOURCES?

Human capital research has grown in popularity over time. Human capital research has an interdisciplinary trait because the formation of human capital eventuates simultaneously under the influence of external factors, such as investments, information, education, healthcare, and internal factors, such as specific capabilities, creativity, and self-education. People have different levels of education, knowledge, skills, and talents, as well as job expectations. More educated and better-trained employees in any workplace can deliver a higher value for their employers (McConnell et al., 2009, p. 85). Education and training, according to Schultz (1960), represent an investment in human capital. In the knowledge economy era, the importance of human resources has outweighed the importance of physical and financial resources.

Investing in a worker's education and training is analogous to investing in capital goods. Such wise investments increase work productivity and profit and are associated with considerable start-up expenses. Back in 1960, Schultz coined the phrase "human capital". It refers to its economic value further defined by human potentials that may be improved via suitable investments. Becker (1993, p. 412) broadened the definition of efficient human capital by adding a person's health and behavior. Higher wages of more educated employees are viewed as superior in terms of returns on investments in the employees' promotion (Schultz, 1960; Becker, 1962). According to Bowen (1977, p. 507), human capital is comprised of people's accumulated knowledge and skills, utilized for the creation of customer-friendly goods and services. Even then, human capital was recognized in science. However, the measurement of its value is still complex due to the specific intangible nature of human capital.

The intangible aspect of human resources, which contains knowledge, skills, abilities, and other characteristics of employees, is represented by human capital. Human capital focuses on the knowledge, skills, and abilities of employees that create value for the enterprise.

Consequently, employees can successfully perform work tasks and achieve the business goals of the enterprise (Edvinsson & Malone, 1997). Human resources management generally and exclusively deals with work done by all employees and managers, regardless of whether they contribute to value creation or not. Mayo (2000) states that human capital management treats people as an asset (capital), while human resources management treats people as an expense. The necessity to create and implement an integrated and strategic approach to people management is something that both approaches have in common. On the other hand, Meyer et al. (2009) report a large number of differences between human resource and human capital management.

Three approaches to defining human capital were recognized by Chen and Lin (2004). The transaction cost theory is the first method by which enterprises can hire new employees from within or outside the organization. Since both choices involve expenses, businesses will always select the less expensive option, representing the most efficient method. The second approach is the resource-based view of the firm, in which the human competencies that are vital and provide a competitive advantage must be fostered within the organization. The human capital theory is the third approach, in which enterprises decide whether or not to invest in human capital by weighing anticipated future benefits.

Hendricks and Schoellman (2017) developed a process model for human capital cost management that considered the stages of the investment process for human capital formation and renewal. Kassouf (2017) proposes integrating investment and cost techniques to display staff costs by employing the reflection method in human capital cost accounting related to stages of reproduction. Lagakos et al. (2018) established an organizational methodology for human resource accounting as an accounting category for businesses. In actual practice, there are two main methods of human capital accounting and assessment: the Asset Model (Novas et al., 2017) and the Utility Model (Hilorme et al., 2019).

According to Stiles & Kulvisaechna (2003, p. 15), on the onehand, human capital measurement is necessary to quantify the impact of human capital interventions and highlight areas for further upgrading. On the other hand, measurement is a complex topic in this field. In this field, return on investment (ROI), is still seen as a useful metric and its use is increasing worldwide (Phillips, 2005). As stated by Guest (1997), some consulting companies assess human capital investment using financial metrics, production and/or products and service metrics, such as units produced, customer satisfaction, number of mistakes, and time metrics like lateness and absence. According to Mayo (2012), human capital must be quantified by workforce analytics, consisting of labor turnover rate, absenteeism, staff rotation and vacancies, job type, grade, gender, ethnic origin, and views of human capital: temporary, subcontract, and consultant resources.

While enterprises in the industrial economy depended primarily on tangible assets to create value, intangibles have become increasingly essential in the growing knowledge economy. Many conceptual frameworks have been developed to measure intellectual performance in the knowledge economy (Abeysekera & Guthrie, 2004). The discrepancy between the market value and the book value, as defined by Brooking (1997), is typically explored in three components: internal (structural) component, external (relational) component, and human component that facilitates interaction between internal and external components in order to create value. Human capital, as described by Stewart (1998) as the skills, abilities, and competencies of individuals and groups, is not viewed as a legal entity owned by businesses. As a result, it may also refer to the knowledge of employees that they take with them when they depart the enterprise (MERITUM, 2002).

In general, there are two types of human capital measurement: monetary measurement, which expresses the value of human capital (HC) in monetary terms, and non-monetary measurement, which includes the usage of Likert-type scales (Chen & Lin, 2004), as well as other non-financial indicators of human performance. According to Guest (1997), to quantify human capital, an enterprise must assess the attitude and behavior of employees, internal and external performance indicators, for example, product and service quality, productivity, sales, and other financial performance.

Additionally, Thomas et al. (2013) presented a technique for measuring human capital – three kinds of measurement, and utilizing human capital dashboards for monitoring. The first kind of measurement includes collecting and measuring all possible data on headcounts, turnover, promotions, and other data from the HR information system. The second one includes the simplification of measurement by emphasizing a few key indicators, substantially enhanced data quality, data from human resource information system (HRIS), and other HR databases (e.g. recruiting, payroll). The third one includes operational data integrations, which include information from non-HR sources like finance, marketing, and quality control, as well as derived metrics like revenue per employee, the value created per employee, etc.

Human capital encompasses the economic worth of human performances such as education level, the training volume, intellect, skills, talents, health, etc. (Jovanović, 2018, Veselinović et al., 2020). Given that all investments and costs for workers (salaries, non-monetary benefits, education, training, etc.) may be represented as total investment in human resources, more precisely, the value of human capital, the human capital (HC) formula is the following (Krstić & Bonić, 2016):

$$Hc = Pe + Si \quad (1)$$

$Pe$  denotes personal expenses, whereas  $Si$  denotes the total amount of stimulating incentives. Furthermore,  $Pe$  includes employee or management salaries (net salary + payroll taxes), as well as costs for human resource development, such as education, training, and other costs (Veselinović et al., 2020).

The literature mentions numerous approaches to assessing human capital, such as cost, income, and market approach (Merriman, 2017). The cost approach is founded on the economic concept of substitution, which correlates the worth of human capital to the cost of creating a comparable substitute workforce. The income approach uses the economic principle of anticipating future benefits of employees and considers it as human capital. According to the economic concept of substitution, the market approach calculates the value of human capital based on the selling price of equivalent assets.

Given that there are available and transparent internal data (financial statements) on investment in employees (excluding training costs), the cost approach can be applied in the research model of this study, as total investments in managers and other employees can be estimated. On the other hand, the income approach is difficult to apply due to the lack of other necessary data and the influence of other factors that affect the income of an enterprise, especially other intellectual assets. Since the market approach relies on the economic principles of competition and equilibrium, and since in our sample there are companies from different industries and markets, it was impossible to apply this approach.

### 3. HUMAN CAPITAL EFFICIENCY MEASUREMENT

Human capital efficiency measurement includes traditional and modern measurement models (Veselinović et al., 2020). The traditional human capital measurement model includes: a) human capital efficiency indicators (i.e. labor productivity indicators) as non-financial and financial measures and b) many non-financial performance indicators of people in a business organization. Labor productivity is an efficiency measure of how well an enterprise uses its human capital or the labor of its workers, measured by the number of provided products (Q) and services by them.

A basic indicator of labor productivity is defined as the ability to accomplish a particular output volume (Q) with the lowest possible labor inputs (L) (Krstić & Sekulić, 2020):

$$P = \frac{Q}{L} \quad (2)$$

This is a non-financial indicator of labor productivity. Multidimensionality and complexity of Q and L, as an element of productivity measure, lead to methodological challenges in measuring the labor productivity indicators. In addition, the production volume (Q) might be expressed in monetary (financial) terms, such as sales revenue, revenue, expenses, accounting profit (earnings), economic value added (EVA), and net cash flow. With this in mind, both non-financial (natural) and financial indicators of labor productivity measurement can be analyzed.

The financial aspect of measuring labor productivity implies that categories defined in monetary terms are used, and data from the balance sheet and income statement are used as a data source (Veselinović et al., 2020). The rationale for this is to overcome the limitations of non-financial indicators of labor productivity measurement. Regarding the financial aspect of labor productivity measurement, there are different financial indicators (Veselinović et al., 2020) or ratios:

- Operating revenue ( $R_o$ ) per employee;
- Sales revenue ( $SR$ ) per employee;
- Expenses ( $E$ ) per employee;
- Earnings before interest and taxes ( $EBIT$ ) per employee;
- Operating profit ( $P_o$ ) per employee;
- Net profit ( $P_n$ ) or net profit attributable to shareholders per employee;
- Economic value added ( $EVA$ ) per employee or Human Economic Value Added ( $HEVA$ );
- Net cash flow ( $C_f$ ) per employee.

Efficiency is defined as the ratio of achieved outputs to inputs (Kucharková et al., 2015). Human capital efficiency is evaluated as the quotient of an economic results volume (output) and human capital value (input). Human capital efficiency (HCE) is described by Borowski (2015) as the rate of efficiency in the use of human capital, which indicates human capital relevance in terms of added value to the organization.

The modern human capital efficiency measurement model includes several human capital efficiency indicators. Some of them are human capital market value –  $HCMV$  (Drábek et al., 2017; Lindenberg & Ross, 1981), human capital value added –  $HCVVA$  (Fitz-enz, 2000; Drábek et al., 2017), human capital return on investment –  $HCROI$  (Fitz-enz, 2000; Drábek et al., 2017), and efficiency in the use of human capital –  $EHC$  (Krstić & Bonić, 2016) (see Table 1).

Within the labor productivity indicators, there are indicators of productivity (efficiency) of human capital that use labor consumption, costs, or the number of employees in their denominator. On the other hand, modern indicators of human capital efficiency include

additional categories of costs that represent investments in human capital: benefits, incentives, training costs, etc. In modern indicators of human capital efficiency, the main focus is on people who represent capital and create value for the enterprise.

**Table 1** Human capital efficiency indicators

Indicator	Definition and formula
Human capital market value	<p>Drábek et al. (2017, p. 123) define human capital market value (<i>HCMV</i>) as the net market value of an enterprise per employee. The following formula is used to calculate the market value of human capital (Drábek et al., 2017, p. 123; Lindenberg &amp; Ross, 1981):</p> $HCMV = \frac{Mc \cdot As}{\text{Number of employees}}$ <p>Market capitalization is denoted by <i>Mc</i>, while total assets are denoted by <i>As</i> on the balance sheet.</p>
Human capital value added	<p>Human capital value added (HCVA) is a metric for determining human capital productivity that explains productivity in terms of profitability (Fitz-enz, 2000, p. 50). The full-time equivalent in value added (Drábek et al., 2017, p. 123) represents the economic efficiency of human capital in an enterprise. The human capital value added is computed as follows (Fitz-enz, 2000, p. 50):</p> $HCVA = \frac{\text{Revenue} - (\text{Expenses} - \text{Pay and benefits})}{\text{Full-time equivalent}} \quad \text{or} \quad HCVA = \frac{\text{EBIT} + \text{HC}}{\text{Number of employees}}$
Human capital return on investment	<p>Drábek et al. (2017, p. 123) define human capital return on investment (<i>HCROI</i>) as an indicator illustrating the link between human capital and profitability. This metric shows the profit generated from the money spent on employee salaries and benefits as a return on investment in human capital (Fitz-enz, 2000, p. 50). The return on investment in human capital is computed as follows (Fitz-enz, 2000, p. 50):</p> $HCROI = \frac{\text{Revenue} - (\text{Expenses} - \text{Pay and benefits})}{\text{Pay and benefits}} \quad \text{or} \quad HCROI = \frac{\text{EBIT} + \text{HC}}{\text{HC}}$
Efficiency in the use of human capital	<p>Efficiency in the use of human capital (<i>EHC</i>) is a measure of productive human capital usage in an enterprise (Krstić &amp; Bonić, 2016). This indicator is calculated in the following way (Krstić &amp; Bonić, 2016):</p> $EHC = \frac{ICVA}{\text{HC}}$ <p>This indicator is calculated by adjusting earnings before interest and taxes (<i>EBIT</i>). The amount of newly generated value per monetary unit spent on visible intellectual capital is the <i>intellectual capital value added (ICVA)</i> (Dženopoljac, 2013, p. 134). The following is how ICVA is obtained (Krstić &amp; Bonić, 2016):</p> $ICVA = \text{EBIT} + Dfa + Amia + Iml + Pe \quad \text{or} \quad ICVA = \text{EBITDA} + Pe$ <p><i>Dfa</i> stands for depreciation of fixed or long-term assets, whereas <i>Amia</i> stands for amortization of intangible assets having a defined lifespan. A reduction in the value of intangible assets having an indeterminate lifespan is referred to as <i>Iml</i> (goodwill). Earnings before interest, taxes, depreciation and amortization are referred to as <i>EBITDA</i>.</p>

Source: Authors' presentation

#### 4. CONCEPTUAL FRAMEWORK AND METHODOLOGY OF EMPIRICAL RESEARCH

Data used in this empirical research are from the financial statements of 24 companies covering the period 2012-2019. Due to the global Coronavirus (COVID-19) pandemic, 2020 is not included in the research. The sample includes the following companies: Accenture, Amazon, American Express, Apple, Cisco, Citi, Coca Cola, Disney, eBay, General Electric,

Honda, HSBC, IBM, Intel, JP Morgan, McDonald's, Microsoft, Nike, Oracle, Philips, Samsung, SAP, Toyota, UPS. The sample includes companies that are on the top 50 Interbrand list of the most valuable brands. One of the essential criteria for the selection of companies is their ranking on the list for the entire analyzed period 2012-2019. By applying this criterion and observing the brand's value at the global level in the analyzed period, the sample is reduced to 36 companies and 36 brands, respectively. Finally, the final sample includes 24 brands because we had to exclude 12 brands from the analysis due to the unavailability of financial data.

The aim of the research is to determine the impact of the human capital value on the human capital efficiency of an enterprise. *Human capital (HC)* represents an independent variable in our model and the sum of investments in human resources. Given the unavailability of data on investment in the training and development of employees, the human capital value contains the salaries of employees and managers and the total amount of stimulating incentives. On the other hand, we have 9 dependent variables, which include various business performance and efficiency (productivity) indicators:

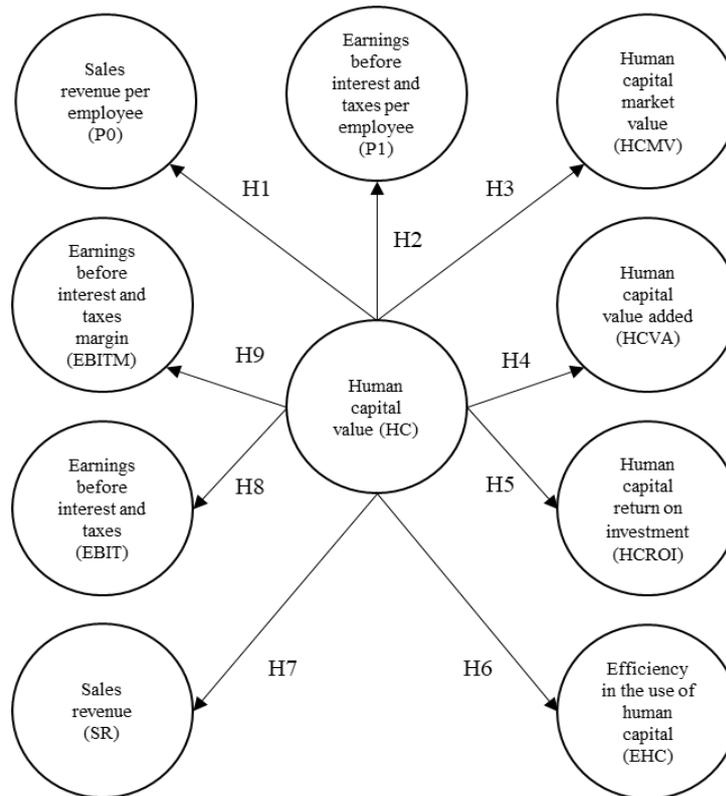
- Sales revenue (*SR*);
- Sales revenue per employee (*P0*);
- Earnings before interest and taxes (*EBIT*);
- Earnings before interest and taxes per employee (*PI*);
- Earnings before interest and taxes margin (*EBITM*);
- Human capital market value (*HCMV*);
- Human capital value added (*HCVA*);
- Human capital return on investment (*HCROI*);
- Efficiency in the use of human capital (*EHC*).

Sales revenue (*SR*) and earnings before interest and taxes (*EBIT*) were chosen as dependent variables because we wanted to see the impact of the value of human capital on the results achieved without the influence of financial and tax factors that can significantly change the research results. In addition, we wanted to observe the impact of the value of human capital on the productivity (*P0*, *PI*) and profitability (*EBITM*) indicators associated with them. We have included in the study all modern indicators of human capital efficiency that are in the literature, except for the Human capital cost factor (*HCCF*), because its value in our research coincides with the value of human capital.

In order to explore the impact of key variables and verify the defined hypotheses, secondary data were used, collected from the websites and annual financial statements (the balance sheet, income statement, cash flow statement, statement of changes in equity, notes to the financial statements) of selected companies for the period 2012-2019. Based on one independent and 9 dependent variables, the following hypotheses were formulated:

- H1: The increase of human capital (HC) has an impact on the decrease of sales revenue per employee indicator (P0).*
- H2: The increase of human capital (HC) has an impact on the decrease of earnings before interest and tax per employee indicator (PI).*
- H3: The increase of human capital (HC) has an impact on the decrease of human capital market value (HCMV).*
- H4: The increase of human capital (HC) has an impact on the decrease of human capital value added (HCVA).*
- H5: The increase of human capital (HC) has an impact on the decrease of human capital return on investment (HCROI).*

- H6: The increase of human capital (HC) has an impact on the decrease of the efficiency in the use of human capital (EHC).
- H7: The increase of human capital (HC) has an impact on the increase of sales revenue (SR).
- H8: The increase of human capital (HC) has an impact on the increase of earnings before interest and tax (EBIT).
- H9: The increase of human capital (HC) has an impact on the decrease of EBIT margin.<sup>2</sup>



**Fig. 1** The conceptual framework  
Source: Authors' presentation

With the purpose to test the validity of hypotheses, correlation and regression analysis methods were used in this empirical research. We have in total 192 observations in the sample.

<sup>2</sup> *Earnings before interest and taxes margin (EBITM)* measures the earning potential from the operating activities of an enterprise (Krstić & Sekulić, 2020). The operating activities are the primary source of cash flow for the enterprise, and a rise in *EBITM* from one quarter to the next is considered an indication of a strong, expanding business. The *EBIT margin* is a measure of the managerial ability and operational efficiency of the enterprise. It assesses the capacity of the enterprise to convert revenues into profit before interest and taxes. It is a metric for comparing a competitive position of the enterprise to that of others in the same industry. The following formula is used to calculate the *EBIT margin* (Krstić & Sekulić, 2020):  $EBITM = EBIT : SR$ .

## 5. RESULTS OF EMPIRICAL RESEARCH

### 5.1. Results of descriptive statistics

The descriptive statistics are presented in Table 2. The average human capital (HC) in the analysed companies is 15,400 million \$. The minimum value of 1,716 million \$ is recorded in eBay in 2013, while the maximum value of 109,111 million \$ is recorded in Amazon in 2019. The average sales revenue (SR) in the analyzed companies is 79,709 million \$, while the minimum value of 8,257 million \$ is recorded in eBay in 2013 and the maximum value of 280,522 million \$ is recorded in Amazon in 2019. The average value of human capital return on investment (HCROI) in the analyzed companies is 2.4469, while the minimum value of 0.74 is recorded in General Electric in 2018 and the maximum value of 10.94 is recorded in Apple in 2012. The average value of efficiency in the use of human capital (EHC) in the analyzed companies is 2.9159, while the minimum value of 0.87 is recorded in General Electric in 2018 and the maximum value of 11.53 in Apple in 2012.

**Table 2** Descriptive Statistics

Variable	Mean	Std. Dev.	Minimum	Maximum
HC	15,400.45	14,641.91	1,716.16	109,111.60
P0	0.4822	0.3760	0.06	2.12
P1	0.1014	0.1160	-0.05	0.73
HCMV	0.0000162	0.0000231	0.0000002	0.001589
HCVA	0.1859	0.1301	0.03	0.8
HCROI	2.4469	1.5593	0.74	10.94
EHC	2.9159	2.0260	0.87	11.53
SR	79,709.89	64,417.66	8,257	280,522
EBIT	14,698.78	13,967.04	-12,999	71,230
EBITM	0.2076	0.1127	-0.11	0.51

*Source:* Authors' calculations

### 5.2. Results of correlation analysis

Correlation analysis is performed to investigate the relationship between variables and the results are presented in Table 3. According to the results, there is a positive correlation between HC and SR, HC and HCVA, and HC and EBIT. Results show that the positive correlation between HC and EBIT is moderate and statistically significant (0.2605), while the correlation between HC and HCVA is low and insignificant (0.1106). The strongest positive correlation is between HC and SR (0.5304). The correlation between HC and other variables is negative and statistically significant. A strong negative correlation exists between HC and HCROI (-0.5258), HCMV (-0.5238), and EHC (-0.5165). A moderate negative correlation is present between HC and P1 indicator (-0.2201), while a low negative correlation exists between HC and P0 indicator (-0.1768), and EBITM (-0.1513).

**Table 3** Correlations

	HC	P0	P1	HCMV	HCVA	HCROI	EHC	SR	EBIT	EBITM
HC	1									
P0	-0.1768*	1								
P1	-0.2201*	0.6882*	1							
HCMV	-0.5238*	0.2532*	0.3251*	1						
HCVA	0.1106	0.6820*	0.8232*	0.3634*	1					
HCROI	-0.5258*	0.4569*	0.6915*	0.1972*	0.2789*	1				
EHC	-0.5165*	0.4977*	0.6558*	0.1687**	0.2400*	0.9788*	1			
SR	0.5304*	0.4853*	0.1544**	-0.4924*	0.2039*	0.1477**	0.1983*	1		
EBIT	0.2605*	0.3355*	0.6068*	-0.3182*	0.3937*	0.6401*	0.6157*	0.6193*	1	
EBITM	-0.1513**	-0.0457	0.5991*	0.1699**	0.3725*	0.6206*	0.5464*	-0.2105*	0.5522*	1

Note: \* Correlation is significant at the 0.01 level (2-tailed),

\*\* Correlation is significant at the 0.05 level (2-tailed)

Source: Authors' calculations

### 5.3. Results of regression analysis

The results of diagnostic tests (Table 4) reveal that the random effect model (REM) is appropriate for fitting data in eight models, while the fixed effect model (FEM) is appropriate for model 8, and regression results are presented in Table 5.

**Table 4** Diagnostic tests

Model	F-test	Breusch-Pagan LM	Hausman
	<i>H<sub>0</sub>: Pooled, H<sub>1</sub>: FEM</i>	<i>H<sub>0</sub>: Pooled, H<sub>1</sub>: REM</i>	<i>H<sub>0</sub>: REM, H<sub>1</sub>: FEM</i>
Model 1 (ln HC → P0)	213.67 (0.0000)	622.14 (0.0000)	0.10 (0.7531)
Model 2 (ln HC → P1)	115.67 (0.0000)	583.84 (0.0000)	0.15 (0.6962)
Model 3 (ln HC → HCMV)	28.02 (0.0000)	392.76 (0.0000)	0.09 (0.7587)
Model 4 (ln HC → HCVA)	97.89 (0.0000)	562.09 (0.0000)	2.66 (0.1027)
Model 5 (ln HC → HCROI)	53.23 (0.0000)	496.63 (0.0000)	1.15 (0.2843)
Model 6 (ln HC → EHC)	82.79 (0.0000)	553.25 (0.0000)	0.19 (0.6648)
Model 7 (ln HC → ln SR)	250.32 (0.0000)	622.26 (0.0000)	2.52 (0.1123)
Model 8 (ln HC → ln EBIT)	42.48 (0.0000)	439.20 (0.0000)	10.00 (0.0016)
Model 9 (ln HC → EBITM)	31.16 (0.0000)	412.55 (0.0000)	0.17 (0.6818)

Note: p values are given in ( )

Source: Authors' calculations

All models presented in Table 5 analyze the impact of human capital (HC) on the human capital efficiency indicators and business performance (sales revenue, EBIT, and EBIT margin). The models revealed a statistically significant impact of HC on the human capital efficiency indicators and business performance (sales revenue, EBIT, and EBIT margin).

The impact on the human capital efficiency indicators and EBIT margin is negative, while the impact on sales revenue and EBIT is positive.

**Table 5** Regression results

	P0	P1	HCMV	HCVA	HCROI	EHC	ln SR	ln EBIT	EBITM
Constant	1.4331 [5.10] (0.000)	0.4144 [3.75] (0.000)	0.0002 [6.10] (0.000)	0.6224 [4.64] (0.000)	11.8642 [6.46] (0.000)	13.2838 [6.47] (0.000)	3.7939 [7.98] (0.000)	-1.0055 [-0.66] (0.510)	0.5712 [3.61] (0.000)
ln HC	-0.1021 [-3.52] (0.000)	-0.0336 [-2.90] (0.004)	-0.00002 [-5.58] (0.000)	-0.0468 [-3.32] (0.001)	-1.0108 [-5.20] (0.000)	-1.1128 [-5.14] (0.000)	0.7720 [15.82] (0.000)	1.0965 [6.71] (0.000)	-0.0390 [-2.32] (0.020)
$\theta$	0.9331	0.9090	0.8152	0.9008	0.8657	0.8925	0.9380		0.8247
$\rho$	0.9653	0.9374	0.7795	0.9264	0.8719	0.9144	0.9701		0.7978
$R^2$	0.0667	0.0457	0.1064	0.0756	0.1300	0.1214	0.5959	0.8618	0.0250
$\bar{R}^2$								0.8418	
$F$ (FEM); Wald (REM)	12.40 (0.0004)	8.43 (0.0037)	31.11 (0.0004)	11.02 (0.0009)	27.00 (0.0000)	26.45 (0.0000)	250.38 (0.0000)	44.99 (0.0000)	5.39 (0.0203)

Note: p values in ( ), z values in [ ] for REM models, and t values in [ ] for FEM model

Source: Authors' calculations

*Model 1* analyses the impact of HC on sales revenues per employee (P0) and obtained results show a negative and statistically significant impact. If HC increases by 1%, the sales revenue per employee decreases by \$1,021. The estimated model is statistically significant, as confirmed by the Wald statistics. The individual specific error can explain 96.53% of the entire composite error variance.

*Model 2* analyses the impact of HC on earnings before interest and taxes per employee (P1) and obtained results show a negative and statistically significant impact. If HC increases by 1%, the earnings before interest and tax per employee indicator decreases by \$336. The estimated model is statistically significant, as confirmed by the Wald statistics. The individual specific error can explain 93.74% of the entire composite error variance.

*Model 3* analyses the impact of HC on human capital market value (HCMV) and obtained results show a negative and statistically significant impact. If HC increases by 1%, the human capital market value decreases by 0.0000002. The estimated model is statistically significant, as confirmed by the Wald statistics. The individual specific error can explain 77.95% of the entire composite error variance.

*Model 4* analyses the impact of HC on human capital value added (HCVA) and obtained results show a negative and statistically significant impact. If HC increases by 1%, the human capital value added decreases by 0.000468. The estimated model is statistically significant, as confirmed by the Wald statistics. The individual specific error can explain 92.64% of the entire composite error variance.

*Model 5* analyses the impact of HC on human capital return on investment (HCROI) and obtained results show a negative and statistically significant impact. If HC increases by 1%, the human capital return on investment decreases by 0.0101. The estimated model is statistically significant as confirmed, by the Wald statistics. The individual specific error can explain 87.19% of the entire composite error variance.

*Model 6* analyses the impact of HC on the efficiency of the use of human capital (EHC), and obtained results show a negative and statistically significant impact. If HC increases by 1%, the efficiency of the use of human capital decreases by 0.0111. The estimated model is statistically significant, as confirmed by the Wald statistics. The individual specific error can explain 91.44% of the entire composite error variance.

*Model 7* analyses the impact of HC on the sales revenues (SR) and obtained results show a positive and statistically significant impact. If HC increases by 1%, the sales revenue increases by 0.77%. The estimated model is statistically significant, as confirmed by the Wald statistics. The individual specific error can explain 97.01% of the entire composite error variance.

*Model 8* analyses the impact of HC on earnings before interest and taxes (EBIT), and obtained results show a positive and statistically significant impact. If HC increases by 1%, the earnings before interest and taxes increase by 1.1%. The estimated model explains 86.18% change in EBIT and is statistically significant, as confirmed by the F test.

*Model 9*, finally, analyses the impact of HC on the EBIT margin (EBITM) and obtained results show a negative and statistically significant impact. If HC increases by 1%, the EBIT margin decreases by 0.0004. The estimated model is statistically significant, as confirmed by the Wald statistics. The individual specific error can explain 79.78% of the entire composite error variance.

## 6. DISCUSSION AND CONCLUSION

Based on the results of the empirical research in this paper, it can be concluded that human capital has a significant statistically positive impact on sales revenues and EBIT and a significant statistically negative impact on other efficiency and productivity indicators. Hence, this implies that all the hypotheses are confirmed. The value of human capital in the era of the knowledge economy has an impact on the business results of enterprises in terms of increasing sales revenue and earnings before interest and taxes. This indicates that additional investment in human resources would lead to higher revenue.

Since investments in human resources are treated as costs in the income statement, managers often refuse to increase salaries and incentives for employees because they are afraid of increased costs and reduced profits (earnings). On the other hand, they often reduce business costs at the expense of employees, in terms of reducing salaries and benefits. Financial reporting standards should find an adequate solution for recording intangible assets, especially human capital. Human resources entail costs that represent investments with a specific rate of return, which is reflected in the increase in revenue.

By looking at the impact of the human capital value on the human capital efficiency indicators and EBIT margin, the logical conclusion can be driven, verified through conducted empirical research, that such an impact is caused by the structure of formulas that have in their denominator either the number of employees or human capital value. Since the human capital value includes the costs of salaries, benefits, incentives, employee training, etc., it will have a negative impact on the human capital efficiency indicators and EBIT margin with the growth of the human capital value.

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## UTICAJ VREDNOSTI LJUDSKOG KAPITALA NA EFIKASNOST LJUDSKOG KAPITALA I POSLOVNE PERFORMANSE

*U eri ekonomije znanja ljudski kapital je deo intelektualnog kapitala i glavni faktor razvoja preduzeća. Značaj ljudskog kapitala se često umanjuje zbog računovodstvenog izražavanja ulaganja u ljudske resurse u bilansu uspeha kao troškovne komponente. Ovaj rad ukazuje na činjenicu da troškovi za ljudske resurse predstavljaju investicije koje utiču na rast poslovnih performansi preduzeća. Otuda, cilj ovog rada je da se istraži uticaj vrednosti ljudskog kapitala na efikasnost ljudskog kapitala i neke poslovne performanse, kao što je prihod od prodaje, dobit pre odbitka kamata i poreza, i marža dobiti pre odbitka kamata i poreza. Da bi se ispitaio ovaj uticaj, sprovedeno je empirijsko istraživanje na uzorku od 24 preduzeća s najvećom vrednošću brenda za period 2012 - 2019. Rezultati regresione analize pokazuju da prihod od prodaje i EBIT rastu za 0,77%, odnosno 1,1% s rastom vrednosti ljudskog kapitala za 1%. Takođe, rezultati pokazuju da rast vrednosti ljudskog kapitala negativno utiče na vrednosti pokazatelja efikasnosti ljudskog kapitala i marže dobitka pre odbitka kamata i poreza u istraživačkom uzorku preduzeća.*

Ključne reči: *vrednost ljudskog kapitala, merenje ljudskog kapitala, efikasnost*