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Sustainability of Human Capital Efficiency in the Hotel Industry: Panel Data Evidence

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Abstract: The COVID-19 pandemic resulted in significant changes to business operations, particularly addressing human resources and their role within the firm. This study aims to assess the sustainability of human capital efficiency in the hotel industry, including the early effects of the COVID-19 pandemic. In accordance with the value-based approach, the human capital efficiency (HCE) coefficient was calculated on a sample of 157 hotels in a five-year period, including the year in which the pandemic was declared. We employed a quantitative methodology based on the VAIC^{TM} method of assessing human capital efficiency and Annual Compounded Growth Rate (ACGR) to evaluate the trend of human capital efficiency. The research results showed a change in the trend of human capital efficiency in the hotel industry in 2020, as well as a change in the mean value of the HCE coefficient. Hotels with a higher category demonstrated a better ability to create value using human capital. The contribution of this work is represented in the quantification of the sustainability of human capital efficiency in the observed period and the early impact of the COVID-19 pandemic on the value-added efficiency of human capital in the hotel industry.

Keywords: human capital; human capital efficiency; annual compounded growth rate; value creation; hotel industry

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1. Introduction

The COVID-19 pandemic marked the beginning of numerous challenges for state authorities, economic entities, and society as a whole. There is no question that the challenges brought about in this way affected almost all facets of the economy. As a direct consequence of this, the hospitality sector was also influenced. The implications for hotel firms were dramatic and had an impact on practically all elements of business. In contrast, a significant number of businesses were in the position to withdraw from the market or transform their business models since they were forced to compete in new circumstances [1]. All the changes that occurred during that period also affected the way companies in the hotel industry will operate in the future [2]. The consequences of the pandemic crisis should not be viewed only from the negative side. Still, the stated outcomes should be perceived as opportunities for radical changes and the formulation of a sustainable business strategy, while human capital is designated as the central pillar [3]. According to [4], the accumulation of intangible resources and knowledge constitutes the basis for the accomplishment of strategic goals.

The trend of emphasizing the importance of intangible assets has been identified in hotel companies [5,6], and the influence of human capital on the business performance of companies in this industry is undoubted [7,8]. The development of human resources is of utmost importance for this economic branch since the hotel business represents a collection of activities where "people deal with people" [9], and the usage of human capital is a key source of producing differentiated services [9]. As service industries, such

as the hotel industry, need extremely specialized knowledge and skills, the endurance of these industries is contingent on the availability of considerable quantities of human resources [10]. The intangible "hotel product" is created by the employees, who also serve as representatives for the hotel's values and culture when they interact with guests. The knowledge, skills, and abilities of the staff play a significant role in the guest's overall perception of the service because they are the hotel's representatives.

Efficiency encompasses a notion that outlines how efficiently a company creates value using human capital [11]. Management that leads to the achievement of established goals also requires knowledge of how the company uses its resources, independently of how much it has [11]. As a result, it is crucial to evaluate how much human capital is efficiently utilized as one of the most important resources in the hotel industry, as well as the year-to-year trend of this use. This paper's study is centered on the hotel industry, which is regarded to be labor-intensive and in which human resources are the critical distinction between hotels. According to Eurostat data from 2021 [12], the number of employees in the accommodation sector in the Republic of Serbia has increased steadily over the past few years, indicating the growing significance and role of human resources in the hotel industry and providing an additional argument for using this industry for the analysis and generalization of the results. Respecting the importance of intangible assets in the hotel industry, the subject of research in this paper is the measurement of the efficiency of the hotel's human capital using a value-based approach. Analogously, the primary objective is to determine the impact of the COVID-19 pandemic on the efficiency of human capital based on the coefficient of human capital efficiency (HCE) and its annual compound growth rate (ACGR). Starting from the structure of the sample (3-star, 4-star and 5-star hotels), a comparison of different categories of hotels will be made according to the obtained values of the human capital efficiency coefficient.

The review of relevant literature revealed the following research gaps. First, in the existing literature, the phenomenon of human capital in the hotel industry has been studied, but with the objective of determining whether and to what extent this component of the company's intangible assets affects the performance of hotel companies in given economic contexts [13–15]. However, the conducted studies did not analyze the efficiency of the use of human capital. Efficient utilization of human resources is crucial to generate high-quality products/services [16], value creation [10,17,18], achieving high business performance [19], and sustainable competitive advantages [20]. As a result of this, it is necessary to analyze how effectively human capital is used and whether it contributes to the creation of value in companies [11]. Second, the hotel industry is regarded as a "people industry" [21] due to the fact that employees are the most important resource for designing and providing hotel services; hence, it is suited for assessing the efficacy of human capital. The assumption is that through leveraging the use of human resources, companies may improve performance while reducing production costs (via cost advantage) and increasing product/service distinction [16,22]. Third, the efficiency of human capital in our study was evaluated through the application of the HCE coefficient. Similar research methodologies were primarily employed in studies conducted in other economic sectors, such as the banking industry [23]. Fourth, in the literature, a particular tendency of companies to invest in physical assets has been observed, while the development of human resources is not given the attention it deserves [19]. The knowledge economy cannot support such a gap, so it is necessary to increase the value of human capital by analyzing and improving the value of the human capital efficiency coefficient. Finally, previous research has proven that human capital has a significant impact on company performance before the crisis but not during the crisis [4]. Previous research investigating the efficiency of human capital during the COVID-19 outbreak within the financial sector dominates [24,25], but evidence from the hotel industry is missing.

The study aims to answer the following research questions:

1. What is the human capital efficiency in the hotel industry throughout the observed period?

2. Has the COVID-19 pandemic affected the efficiency of human capital in the hotel industry, and has the trend changed?
3. Is there a difference in human capital efficiency between hotels of different categories?

The contribution of the conducted research is reflected in verifying the importance of human capital within the sustainability strategy of hotel companies. Based on the results of the statistical analysis, significant practical implications can be determined, which primarily refer to the provision of guidelines to managers of hotel companies for improving the efficiency of human capital, as well as drawing a conclusion about the existence of a correlation between the efficiency of the hotel's human capital and its growth rate in the observed period. Second, the research was conducted in the hotel industry, which is recognized as a growing industry in terms of employment. The study also provides an answer to the question of whether the growing trend of employment in the hotel industry is accompanied by growth in the efficient use of human capital. Third, this research can be a good starting point for conducting future research, which could analyze in more detail the cause of the identified trend of human capital efficiency in the hotel industry in the years after the proclamation of the COVID-19 pandemic.

After the introductory remarks, the first part of the paper is dedicated to the literature review in the field of human capital to present its role in the hotel industry and the methods of measuring intangible assets and their human dimension. Special emphasis is placed on the method of determining the efficiency of the use of human capital and its contribution to the value creation process. In the next section, the methodology of the conducted research will be presented, and the sample and method of data collection will be described. Research results, discussion, and limitations are then presented, from which conclusions and directions for further study are made.

2. Literature Review

2.1. Human Capital in the Hotel Industry

People's knowledge, skills, and experience can be viewed as a form of human capital [26]. Human capital was originally defined by Adam Smith as the skills, dexterity, and judgment of an individual [27,28]. The concept of human capital began to be explored in academic studies in the early 1960s [27], and the human capital theory was a theoretical basis. According to this theory, education is one of the possible investment alternatives that can bring future benefits to employees [27]. The essence of the theory is that investing in the education and training of employees is an investment in individuals [29] from which returns are expected in the form of increased productivity and not consumption. [26]. The key assumption of the theory is that education increases earnings and productivity through the employees' knowledge, skills, and way of analyzing problems [27]. Investing in human resources provides numerous benefits that require analysis of how efficiently human capital is used.

The management of companies in the hotel industry faces challenges as a result of changing demographics, technology, business model innovations, and the nature of the relationship between employers and employees. These factors call for radical departures from previous approaches as well as solutions used by rivals [30]. Such solutions are developed by talented people, who are also part of the human capital that is the most important asset for the hotel industry. Human capital depends on employees, their competence, commitment, motivation, and loyalty [31], and as such, it becomes a source of innovation and restructuring strategy for the company [32]. Human capital is also an important driver of productivity and business performance [33]. Therefore, managers are expected to focus on knowledge management and establishing infrastructure for the successful functioning of human capital [34]. The importance of human capital for an organization is supported by numerous theoretical approaches (economic, human capital theory, resource-based theories, human resource management, organizational learning, and knowledge management) [16,35], which additionally indicates the need to analyze and monitor the development of this capital in hotel companies.

Employees are the basis of a company's human capital [36] since they are the ones who complete their work tasks with the deployment of their knowledge and skills [37,38]. According to [39], human capital also includes people who are not employees of the organization, such as customers and suppliers. Employees' knowledge, experience, reasoning ability, relationships, intellect, expertise, creative and problem-solving capacity, entrepreneurial and managerial abilities, and values are all forms of human capital that have been acquired and developed through the learning process [32,33,36]. Schooling, training, and professional programs are all parts of the learning process that allow people to acquire new knowledge and apply it to be more productive [33]. It is important to keep in mind that investing in an employee's education or training is an investment in their human capital since a person cannot be separated from the knowledge, skills, and competencies he or she possesses. In this way, a crucial aspect of human capital is underlined, namely that it is not owned by the company [31,32]. Employee turnover causes the loss of corporate intellectual abilities and the "leakage" of knowledge from the company, which represents a risk to the competitiveness and sustainability of the company [32].

Human capital development is critical to achieving high labor productivity and organizational performance in hotels [14]. In a knowledge-based economy, the success, growth, and development of hotels are significantly dependent on workers' knowledge since they are directly involved in the production and consumption of services [15]. Knowledge may be obtained via education and work experience, and it has a direct impact on the performance of hotel employees, enabling them to generate economic value [14]. Authors [33] discuss the significance of employee education in the process of acquiring knowledge, demonstrating that hotels with structured and established employee training plans distinguish themselves from the competition and that these programs also influence employee motivation. Understanding the strategic practices that managers in the hotel industry should adopt is essential to increase employee engagement, productivity growth, and financial performance [33]. This implies that hotel companies must change their focus from the traditional approach of human resource management (which focuses on limiting costs) to strategic human resource management with more advanced employee management practices [40].

Based on the results of previous research on the importance of human capital in the hotel industry, it is possible to identify several important conclusions about the impact of human capital and its relationship to other components of intangible assets. Authors [38] stated that there is a strong relationship between human and structural capital in the observed hotel companies, whereby the high value of human and structural capital in hotels determines the growth of profits. Authors [7] concluded that the constant development of employees' knowledge, the attraction of prospective employees, and the motivation and creativity of employees should be the focus of managerial activities to encourage the development of high-quality hotel products. Therefore, additional investments in the development of human capital in hotels in Slovenia should be made. Human capital may be improved by additional investment in education and training, enhanced employee engagement, and the acquisition of talented, growth-oriented employees. Author [41] found that human capital development deficiencies in the Nigerian hotel industry are the consequence of an inadequate education system, a lack of a supportive environment for employing graduates, inadequate hospitality knowledge and skills of employees, and poor government involvement in the development of the hotel industry. Authors [42] provided evidence for the impact of human capital on the competitiveness of hotels in Serbia. In an additional study, the same authors [15] revealed a direct effect of human capital on the non-financial performance of hotels in Serbia, as well as an indirect impact on financial performance via non-financial performance.

2.2. Measuring Human Capital

Although most managers emphasize the importance of human resources for operating their companies, only a few of them have tried to present the value of human capital

on their balance sheets [43]. The development of suitable benchmarks and the measuring of resources (both tangible and intangible) are essential steps for keeping track of their consumption and confirming how they affect the achievement of company goals. Author [44] noted that there are certain measures of human capital that, when applied, provide managers with useful insights into the functioning of the company and the use of human resources. Key measures that help to identify human resource management activities that contribute the most to maximizing business performance are designated as such. The complexity of measuring human capital is conditioned by numerous dimensions, making it difficult to determine which aspects should be measured and monitored over time. Author [45] argued that the nature of human capital, which encompasses intangible characteristics and attributes, is the primary reason for its poor measurement. Measurement of human capital is challenging for two reasons, according to [44]. The issue with defining human capital itself comes first. While some academics support considering people as assets, others are of the view that human capital should be viewed as a "live" type of capital. Second, measuring human capital involves more than simply assessing contributions to productivity or skills; it moreover involves measuring how effectively the knowledge is converted into organizational value.

Numerous authors suggest the use of non-financial indicators to measure and control a company's performance drivers in lieu of frequently used financial ratios. Authors [46] considered human capital metrics as a component of a new set of non-financial and non-traditional performance indicators. The mentioned authors have established two sets of human capital measurements: one that evaluates the efficiency of employees' work and cost monitoring (efficiency indicators), and the other that measures employees' entrepreneurial and innovative abilities (innovativeness indicators). Author [44] distinguished three categories of human capital measures: measuring the effectiveness of the HR function, measuring the effectiveness of human resources processes, and measuring the impact or rate of return on investments in key human resources processes. In the literature, there are a number of perspectives on human capital measurement [47], such as the cost approach, market-value approach, accounting approach, value-added approach, and human resource indicator approach. Each of the aforementioned perspectives provides a solid theoretical foundation for establishing a consistent method for measuring human capital. Still, they also have some limitations that restrict their applicability when the presuppositions are not satisfied. Accordingly, different authors develop their own metrics in an attempt to create a measuring system that would be applied practically and to a high degree of universality.

Some authors view human capital through a set of different dimensions, so [38] value human capital through competencies, attitudes, and intellectual agility. Competencies encompass an employee's skills and education, whereas attitude refers to their behavior on the job. Intellectual agility involves engaging employees in developing innovative ways to solve problems. Authors [7] observed human capital similarly through the competence of employees, attitudes of employees toward work, and innovative activities of employees. Author [48] assessed human capital according to various variables that may be classified into three factors: leadership and motivation, qualifications, and employee satisfaction and innovation. Human capital, according to [20], is constituted of components like genetic heritage, education, expertise, and attitudes, while [49] argues that human capital is composed of training, know-how and entrepreneurial spirit.

2.3. Human Capital Efficiency Coefficient

In spite of the various arguments that emphasize the importance of using non-financial measurements to calculate the value of human capital, financial indicators continue to be the most prevalent in practical applications. Thus, the value of human capital may be determined by summarizing the salaries paid to employees [50]. However, this information is not particularly useful. To determine the contribution of human resources to value creation, it is necessary to define a criterion that will meet this requirement. A solution is

the application of the human capital efficiency (HCE) ratio, which evaluates how effectively human capital adds value to the company [50].

The HCE coefficient is an indicator of the value-added efficiency of human capital [31,51], and it shows how much value was created per unit of capital invested in human resources [39]. It is calculated as the ratio of value added to the value of human capital [18,50]. Human capital represents the sum of employees' salaries [50] and other investments in employees. The added value represents the difference between the output and input of the business [52]. Considering the importance of human capital for business operations, [18,53] concludes that the human capital efficiency coefficient has the greatest influence on wealth creation. Authors [54] indicated the importance of calculating and monitoring the HCE coefficient because it shows the extent to which investment in the health and safety of employees, relationships between employees, education, and training of employees, new methods, ideas, issues related to the commitment of employees, etc., result in improving the company's performance.

Numerous studies have explored the importance of the human capital efficiency coefficient for business operations. Authors [54] concluded that the HCE ratio drives productivity growth in the banking sector. Author [53] stated that the potential to generate value is mostly attributable to the HCE coefficient, suggesting that investing in human capital yields a greater return than investing in physical or structural capital. It has been confirmed by [55] as well as by [56] that the creation of value is directly dependent on HCE. Authors [31] concluded that the market value of the observed companies is positively related to the intellectual abilities of employees, including the HCE coefficient. The mentioned authors also concluded that HCE is positively related to the observed financial indicators. The positive impact of HCE on business performance was proven in their research [57–59]. Authors [57] found that the HCE ratio has an indirect effect on the relationship between intellectual capital and the market value of the company. They believe that there must be a constant relationship between HCE and structural capital efficiency in order to create value, as individuals would be unable to act on their ideas without a structure to support their activities. Authors [60] concluded that HCE has a significant and inverse effect on cost inflexibility, while [18] proved the presence of a significant and positive relationship between the audit committee and HCE. Authors [51] concluded that HCE has a negative and significant effect on banks' risk-taking and that bank management must deploy human capital more efficiently to decrease credit risk and enhance financial stability. Authors [61] noted that enhancing HCE can decrease the credit risk of a bank. The same authors also demonstrated the positive impact of HCE on solvency, which suggests that banks may increase their solvency by deploying their employees more effectively.

3. Materials and Methods

3.1. Materials

The formation of the sample was accomplished using a multi-step procedure. August 2022 marked the beginning of sampling and assumption development for conducting research. The initial step referred to the identification of the units constituting the sample, whereby the hotel was designated as the unit of observation. In August 2022, we obtained from the Ministry of Trade, Tourism, and Telecommunications' website an up-to-date database named "Categorized objects of Serbia", including a list of active hotels in Serbia. Key information needed to determine the complete sample was available after acquiring the aforementioned database. The next step included a test of the hotel's independence from related activities and the submission of financial statements. This approach excludes from the sample hotels that are part of large business groups and whose primary business is not in the hotel industry, and who do not release independent financial reports. The final step in the formation of the sample was the elimination of hotels with 1 or 2 stars due to the fact that these categories of hotels frequently failed to meet the criteria of the independence test and the assumption that their human resource management practices were not supported by a strategic approach aimed at enhancing human capital, as a result

of the mentioned previous steps, a sample consisting of hotels categorized with 3, 4, and 5 stars that are actively operating as independent legal entities were formed. The procedure for collecting the required data for statistical analysis, which is contained in the official financial reports, was initiated on the basis of the sample that was formed. The newly formed database was used to identify hotels inside the online database of the Agency of Economic Registers, which contains financial reports. The values of the respective items contained in the financial statements are marked and used to calculate the HCE coefficient for the observed hotels.

In compliance with current legal norms, the aforementioned agency produces and provides official financial reports with a two-year lag. Therefore at the time of data collection, in September 2022, we had access to data for 2020, as the last one available. Based on our intention to study the required indicators over a five-year period, the download of official financial reports began in 2016. The final sample was comprised of three-, four-, and five-star hotels that submitted and published their annual financial reports from 2016 to 2020. Additionally, hotels whose balance sheets incorporate the effect of performing operations within other activities or who publish consolidated balance statements annually were excluded from the sample. Moreover, 18 hotels were excluded from the sample because they were in a financial blockade during the evaluation period or were deactivated from the register. The data on their operations were not transparent for the observation period, as well as nine hotels that were established during the specified time period, for which financial reports were not available for all years covered by the survey. According to the restrictions imposed, the complete sample size is 157 hotels. At the time of conducting the research, there were 426 active hotels in Serbia, so our research included 36.8% of that number. According to the classification, the sample consists of 6 five-star hotels, 71 four-star hotels, and 80 three-star establishments.

3.2. Measures and Methods

A value-based approach was used to calculate the efficiency of human capital. Since the focus is on the human component of intellectual capital, the Human Capital Efficiency coefficient has a special significance and answers the question of how much value is created per 1 unit of money invested in human capital, whereby a higher efficiency coefficient of engaged human capital indicates a greater ability of employees to create added value [62]. The formula for calculating the above coefficient reads:

$$\mathrm{HCE} = \frac{\mathrm{VA}}{\mathrm{HC}} \tag{1}$$

whereby HC is not based on a subjective assessment of human capital components, but information on salaries and other expenses for employees is taken from financial reports. Since the VAIC model [63] is based on the calculation of Value Added (VA), the amount of the VA indicator represents the difference between output and input, that is, total sales realized on the market and all company operating costs, minus the amount of all expenditures for employees. The data for calculating the mentioned indicators and the implementation of statistical analyses were obtained from official financial reports.

A composite growth rate was utilized to assess the trend of the human capital efficiency coefficient of the hotels evaluated. This benchmark is frequently used in the agricultural sector [64,65] and the banking industry [23] to monitor the movement of relevant indicators within a given sector of the economy, thereby allowing for the formation of conclusions and the creation of future projections. Below is the formula for determining the composite growth rate [66]:

$$\mathrm{CGR} = [(\mathrm{t})(\mathrm{dYt}\ \mathrm{dt})] \tag{2}$$

where t is the observation period, and Yt is an indicator whose trend is tracked during the observation period. The aforementioned statement is multiplied by 100 to yield a Compound Growth Rate that is represented as a percentage. Considering the frequent

use of the mentioned indicator in order to determine the return for individual assets and investment portfolios, the calculation procedure can be as follows:

$$CGR = \left(\left(\frac{V_n}{V_0} \right)^{\frac{1}{n}} - 1 \right) \times 100 \quad (3)$$

where V_n is the ending value, V_o is the beginning value, and n is the number of periods.

In this particular context, the Annual Compounded Growth Rate (ACGR) is determined using the following formula:

$$ACGR = \sqrt[n-1]{\frac{HCE_{yn}}{HCE_{y1}}} \quad (4)$$

where n is the number of years during which the movement of the HCE coefficient is observed, y1 is the first year of the monitored period, and yn is the final year of the analyzed period.

4. Results and Discussion

The SPSS v. 23 statistical package for social sciences was employed to process statistical data. The first phase involved descriptive statistical analysis, including the computation of minimum and maximum values, the arithmetic mean, and the standard deviation of the HCE and ACGR coefficients (Table 1).

Table 1. Descriptives.

	Minimum	Maximum	Mean	Standard Deviation
ACGR	0	1.8369	0.8628	0.4043
HCE_{2016}	−62.3916	4.1468	0.2756	7.1095
HCE_{2017}	−6.9889	7.9397	1.1217	1.4475
HCE_{2018}	−5.0951	4.2466	1.1873	1.1787
HCE_{2019}	−4.0154	6.1210	1.1854	1.3550
HCE_{2020}	−5.4388	5.3370	0.9607	1.2004

According to the obtained mean values for HCE, which range from 0.2756 to 1.1873, a maximum of 1.1873 EUR of value is created on average for each EUR invested in human capital. The HCE coefficient's highest values in the observed time period vary from 4.14 to 7.93, confirming their considerable contribution to wealth creation [53] for particular hotels in the sample and their importance for business operations [18]. The notion that the mean value of HCE in 2020 is lower than the mean value of several previous years can be observed in the aforementioned Table 1, demonstrating that the COVID-19 pandemic had an impact on reducing the efficiency of human capital. Additionally, the HCE coefficient's mean value in 2019 is nearly identical to the HCE coefficient's mean value in 2018, which can be seen as a sign of changes to come in the following year. However, it should be noted that only the fourth quarter of 2019 was negatively impacted by the COVID-19 pandemic.

The movement of the average human capital efficiency values for the sampled hotels during the observed five-year period, which ends in 2020, is depicted graphically below (Figure 1). The trend of increasing human capital efficiency was noticed in 2017, and following a period of stagnation in 2019, a fall in the HCE coefficient's value was recorded in 2020. Significant growth in human capital efficiency in 2017 can be attributed to higher employee productivity in the accommodation and food service sectors. Labor productivity in 2017 was higher by 8.02% compared to 2016, which is the highest increase during the 2016–2020 timeframe measured [67–71]. During the observed period (2016–2020), the number of employees, gross earnings, and overnight stays in the accommodation and food service sector grew approximately the same proportion each year [67–71].

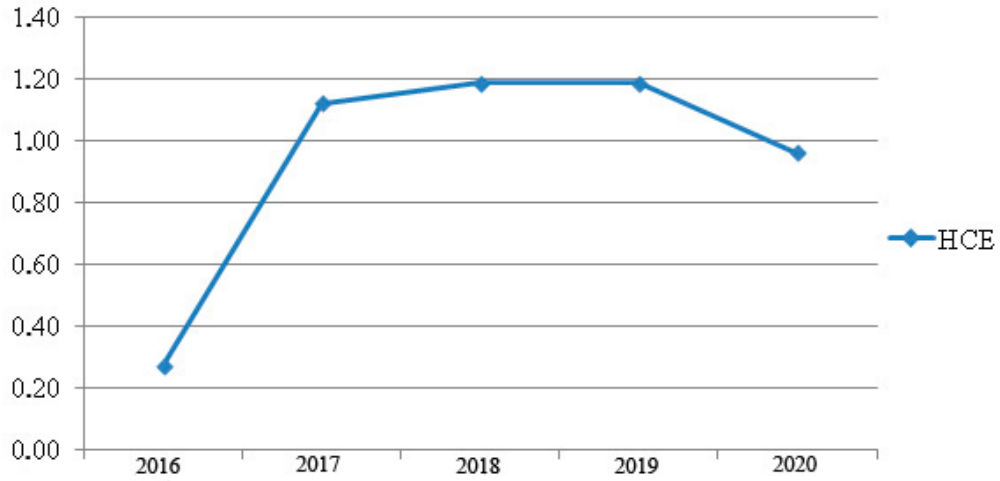

Figure 1. Summary of panel data for HCE.

The authors [23] conducted a similar study of the HCE coefficient by years in the banking sector of India. They concluded that the ACGRs of public banks are greater than those of private banks, indicating that public banks have made significant efforts to compete with private banks. In addition, the authors [8] studied the value of HCE in the Austrian hotel industry and noticed an upward trend of this coefficient until 2008, when the financial crisis occurred. The authors [72] evaluated the resource utilization of banks from 2007 to 2018 to determine their efficiency. They concluded that in the observed period, average productivity, efficiency, and technological changes achieved growth after the global financial crisis, but the average banks' efficiencies hardly increased. Crisis periods have an unfavorable effect on the efficiency of the used human capital, which can also be observed in the value of HCE in 2020. The lower human capital efficiency in 2020 suggested inefficient utilization of human capital and low value-added in relation to salaries [59].

Considering that the beginning of 2020 was characterized by the announcement of a pandemic, which had a substantial impact on the hotel industry, the outcome was not unexpected [2,73,74]. This result supports the assumption that the possible decline in the human capital efficiency of hotels was caused by the situation that arose as a result of the declaration of a pandemic, in which business operations were performed under different conditions that had a strong impact on human resources. The stated trend of a decrease in the mean value of the HCE coefficient over the observed period is not a positive signal; therefore, the monitoring of this coefficient over time is of particular importance, as it may indicate a decrease in the number of investments in the health and safety of employees or in the education and training [54]. The fact that formal and established training programs could not be implemented due to the need to maintain social distance may provide a real justification for the reduction of investments in the education of employees. Over time, organizations adapted to the new circumstances. They adopted an online learning approach that permitted potentially maintaining the required level of human capital investment, however, with a certain time lag compared to the beginning of the pandemic. The reduction of investments in the health and safety of employees during the pandemic is implausible and unacceptable, but it was possible due to the fact that a considerable number of employees worked from home and remote work became the predominant form of work for administration employees. Thus, prospective company investments in the health and safety of employees are turned into individual employee costs.

Estimating Spearman's correlation coefficient, which explains the monotonic relationship between two variables, was the next step in the analysis. Its application is suitable in situations when (1) assumptions of normality of distribution are not met, (2) ordinal

data are used, and (3) it is relatively robust to outliers [75]. Table 2 shows the results of the correlation analysis.

Table 2. Correlation matrix.

	ACGR	HCE_{2016}	HCE_{2017}	HCE_{2018}	HCE_{2019}	HCE_{2020}
ACGR	1					
HCE_{2016}	0.708 **	1				
HCE_{2017}	0.572 **	0.736 **	1			
HCE_{2018}	0.547 **	0.593 **	0.758 **	1		
HCE_{2019}	0.471 **	0.505 **	0.590 **	0.756 **	1	
HCE_{2020}	−0.255 **	−0.078	−0.112	0.021	0.313 **	1

Notes: **: Correlation is significant at level 0.01 (2-tailed).

The significant and positive values shown in the previous table indicate the existence of a moderate and strong correlation between the values of the HCE coefficients in the observed years. A moderate, positive, and significant correlation was established between ACGR and HCE coefficients in all years except 2020. A weak, negative, and significant correlation was noted between ACGR and HCE. Thus, the results of the correlation analysis confirmed a change in trend and a decline in the efficiency of human capital during the year 2020, which may be attributed to the effects of the COVID-19 pandemic.

The following stage involved comparing the formed groups of hotels based on their categorization (3, 4, or 5 stars). ANOVA was performed to evaluate the statistically significant difference between the observed groups of hotels in the sample (Table 3). Almost all the estimated p values are less than 0.1, resulting in the conclusion that there is a significant difference between hotels of different categories in terms of the movement of the HCE and ACRG coefficient values. In the pandemic year 2020, there was no statistically significant difference between hotels of various categories.

Table 3. Results of ANOVA test for multiple comparisons.

Variable	F	*p* Value
ACGR	2.602	0.077
HCE_{2016}	0.813	0.445
HCE_{2017}	3.249	0.042
HCE_{2018}	7.729	0.001
HCE_{2019}	6.997	0.001
HCE_{2020}	1.443	0.239

A Post-hoc Scheffe test was used to conduct a more extensive analysis and determine between which groups a significant difference occurs (Table 4). This test has been used in previous studies [76–78]. When comparing groups of 3-star hotels to groups of 4-star hotels, the *p* value is significant. On the premise of the obtained results, it can be inferred that the HCE coefficient is higher in 4- and 5-star hotels compared to 3-star hotels, which is an expected result considering that higher categorized hotels are anticipated to have a higher human capital efficiency.

Table 4. Post-hoc Scheffe test.

Variable	Groups within Identified Difference	Difference in Means	*p* Value
ACGR	Group 1–Group 2	0.13969	0.089
HCE_{2017}	Group 1–Group 2	−0.57994	0.042
HCE_{2018}	Group 1–Group 2	−0.57846	0.003
HCE_{2019}	Group 1–Group 3	−1.09704	0.046
HCE_{2020}	Group 1–Group 2	−0.74254	0.003

Notes: Group 1: 3-star hotels, Group 2: 4-star hotels, Group 3: 5-star hotels.

However, when it comes to the growth rate of the HCE coefficient, the positive difference favors hotels of a lower category, i.e., in the observed period, 3-star hotels had a higher growth rate (ACGR) of the human capital efficiency than 4-star hotels, which may indicate their greater flexibility and mobilization in the area of better management of the human capital and improvement of existing human resource management practices.

From the hotel's viewpoint, all employee expenditures should be viewed as an investment, not a cost; this is also the underlying assumption of the method used to measure human capital. The implementation of this method can contribute to the encouragement and increased engagement of employees in providing constructive suggestions for the enhancement of the value creation process, particularly if the improvement of performance indicators is achieved through an incentive system. In addition, this approach is a precise management tool that enables determining the success of implemented activities. Considering the changes in the labor market, it is evident that additional measures are required to counteract the negative consequences of the pandemic settings. Along the process, assessing human capital may be advantageous because a more effective measurement system and higher-quality data can have a favorable impact on defining guidelines and developing an action plan for decision-makers in the field of human capital management.

5. Conclusions

The commencement of the pandemic heightened the significance of fundamental concepts, such as the education and health of employees, which are the foundation of human capital. The development of human capital and the improvement of human resource management practices are potential solutions to the current economic crisis, aiming to increase labor productivity via improving employee competencies and attitudes.

The importance of this component of an intangible asset is recognized in the hotel industry, considering that human resources are directly involved in the production and delivery of hotel services. The conducted research indicates a significant potential for improving the efficiency of the use of human capital in the hotels included in the sample, especially if the maximum and mean values of the HCE coefficient are compared during the observed period. A significant correlation of the HCE coefficient with the annual growth rate (ACGR) was also identified, meaning that the ranks of these two series of data are aligned. In addition, a significant difference in terms of human capital efficiency was identified between different categories of hotels. Higher efficiency of the use of human capital in the process of value creation is recorded in hotels that are better categorized. In contrast, the growth rate (ACGR) of human capital efficiency is higher in hotels with 3 stars.

In summary, it can be generally concluded that the COVID-19 pandemic affected the efficiency of human capital. The reversal in trend and first stagnation of the growth of the HCE coefficient is in 2019, followed by a decline in the HCE coefficient in 2020, emphasizing the need for additional analyses with data that will become available in subsequent years. In addition to this, it is essential since it allows for the monitoring of investments in the employees' healthcare and educational developments [54]. The aforementioned investments are an essential precursor for the improvement of human capital and the establishment of conditions for a higher contribution of human capital in the creation of added value. This improvement will not be possible without these investments.

6. Practical Implication

The obtained results have important practical implications for hotel managers. In this way, managers become aware of the significance of investing in human resources and the deficiencies in human capital management encountered by hotels. The values of the HCE coefficient indicate that investments in human resources are still undervalued, and that additional investments are required. The contribution of the research is based on sustainability in the creation of an incentive for hotel managers to engage in the field of organizing training and development programs in order to increase the value of human capital as well

as its efficiency. In addition to employee training and development, significant incentives that can add value to human capital are appropriate compensation systems, psychological value, social value, and interest value for employees. Considering that personnel is in direct contact with service recipients and that guest-employee relationships have a considerable effect on overall service satisfaction, the following recommendations are of special relevance for the sector under consideration.

When measuring human capital, the professional community faces particular difficulties and hurdles. In the process of evaluating human capital, its intangibility, one of its core attributes, presents an obstacle. Due to the fact that intellectual capital and its components lack a "hard" form and a monetary value, it is difficult to assess its economic value. For this reason, the HCE ratio can be a useful tool to analyze intangible assets such as human capital since it in the calculation includes value-added, an indicator of business success, and the ability of a firm to create value in the knowledge economy [79].

The inability of the company to own human capital is another issue that has arisen as a result of the problem. The fluctuation of key employees can lead to a loss of intellectual abilities as well as a reduction in the knowledge base, both of which are reflected in the competitiveness of the company as well as its business performance. In order to circumvent the issue of intangibility, the human capital efficiency coefficient was employed, which offers information on the ratio of new value generated to the amount of capital invested in human resources.

7. Research Limitations

The first limitation is associated with the HCE indicator and its calculation method. This indicator is classified as a tool for assessing the current state of a company's human capital because of its static nature. To achieve a considerably more useful dynamic analysis, it is required to calculate the HCE coefficient for the same sample for several successive periods. Through this form of panel analysis, it is feasible to obtain insight into the movement of human capital efficiency over time. Still, the underlying causes of a positive or negative trend will remain hidden. Consequently, it is recommended to integrate it with other in-depth techniques for assessing and managing intellectual and human capital, such as interviews with managers and employees or scale-based structured questionnaires. In addition, an important limitation of the human capital efficiency coefficient is the impossibility of breaking it down into its component constituents, i.e., this indicator does not provide an insight into the contribution of individual components of human capital to the creation of value. Finally, an important disadvantage of the employed method is that the provided coefficient can only be determined for the annual calculation period, making it difficult to determine the efficiency of human capital for a half-yearly or quarterly period. In addition to the mentioned disadvantages, the use of HCE provides a system for monitoring the efficiency of business activities of employees, whether their ability is directed towards creating or destroying value [17].

Second, the availability of the data included in the analysis is also a potential limitation of this study. Due to the existing legal norms governing the disclosure of financial reports, the results of the study are based on data up to the year 2020, which marks the beginning of the COVID-19 pandemic. This represents a limitation of the study in assessing the overall effects of the COVID-19 pandemic on human capital efficiency. Despite the fact that the findings from 2020 indicate a trend for the HCE coefficient to decline, it is important to include two further years in the future study in order to determine the full effects of the COVID-19 pandemic. This is a constraint if one considers the necessity to continue the examination of the movement of the HCE coefficient and its growth rate (ACGR) for the following two years, during which the consequences of the COVID-19 pandemic may accumulate, particularly in the hotel industry.

8. Directions for Future Research

Future research should be directed towards the inclusion of other components of intellectual capital and the calculation of their efficiency, given that the dynamic nature of intangible assets is emphasized in the literature. Consequently, an answer to the question of which of the incorporated components of the company's human assets contributes the most to value creation will be provided. The presented shortcomings of the HCE coefficient could be overcome by implementing other methods for measuring human capital, which would enable comparison of the obtained results. Given that a decline in the efficiency of human capital was identified during 2020, future research should enable the identification of potential causes and whether this trend has an important impact on hotel performance in the years after 2020. The same sample of hotels and data from 2021 and 2022 would be used for this kind of study. On this basis, the trend of the HCE coefficient prior to and during the COVID-19 pandemic would be established, as well as the overall impact of the pandemic on the efficiency of human capital. Additional analyzes based on the questionnaire technique for data collection and the inclusion of new research variables that include different components of human capital would enable filling the existing gap in the literature, which would be important for the wider scientific and professional public to create a detailed plan of action in order to overcome the consequences of the crisis.

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