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A NEW APPROACH TO HUMAN CAPITAL VALUATION

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Purpose: identifying contemporary approaches to Human Capital Value (HCV).
Design/methodology/approach: systematic review of publications using the PRISMA approach, followed by content analysis.
Findings: several significant new approaches to HCV were identified, most of them based on modification of the valuation metrics system and individual selection of tools for a specific study.
Research limitations/implications: the article is based solely on a qualitative approach to research.
Practical implications: the article can serve as a basis for exploring and systematizing human capital valuation metrics for specific enterprises.
Originality/value: a comprehensive analysis of approaches to human capital valuation since 2018 was conducted.
Keywords: Human Capital, Human Capital Valuation, HCV, valuation methods.
Category of the paper: Conceptual work, Research paper.

1. Introduction

In recent years, human resource management has become more structured, its terminology has evolved, and it has reached a mature stage in the field of knowledge, which has a significant impact on research in the area of HR. Both M. Kasa et al., who emphasize the importance of education in promoting competent and qualified human capital (Kasa et al., 2020), and J. Deng, and R. Long, who consider personnel a strategic resource that significantly contributes to the long-term development of an organization (Jun-Rong, Rong-Rong, 2017), agree that people are the most valuable resource in enterprises (Rakhimzhanova et al., 2024). This approach to human resources as the most important factor in the competitive business environment of HR 4.0, as well as the economic progress from a production-based economy to a service-oriented economy, has led to the development of the following fields of study: human capital (HC); human capital management; human capital as an investment in resources and personnel accounting (Vithana et al., 2023).

The development of the concept and definition of Human Capital has a long history in science, but it was not until the 1960s that the foundations of the theory of investment in employees were presented by the American economist T.W. Schultz (Schultz, 1961), which sparked great interest among academic researchers such as G. Becker (Becker, 1964), R.H. Hermanson (Hermanson, 1964), and J.S. Hekimian and C. Jones (Hekimian, Jones, 1967). The work was continued in the early 1970s by E. Flamholtz (Flamholtz, 1974) and J. Mincer (Mincer, 1974), and the area of research was called HR accounting (Beattie, Smith, 2010). The next stage in the development of the approach to human resources as capital is the research of L.C. Thurow (Thurow, 1970), who expanded the concept to include social, cultural, philosophical, and psychophysical elements (Stuss, 2015).

After a decline in interest, the rejuvenation of research on human capital as part of the broader concept of intellectual capital gained momentum around the beginning of the 21st century (Beattie, Smith, 2010). This was driven by the development of research on all aspects of knowledge in organizations, including employee knowledge, its changes, and its impact on management processes (Bechtel, 2007) in the context of changes within the HR 4.0 concept.

The conducted analyses allowed organizations, especially businesses, to realize that employees, with their experience, education, personality, and behaviour, constitute a significant resource that generates significant value (Makieła, Stuss, 2019). The aim of this study was to identify contemporary approaches to Human Capital Value (HCV) in the conducted research. This issue is particularly important today in connection with the transformations in HR 4.0 processes and the perspective of HR 5.0.

2. Theoretical Background

Human capital was first defined by G. Becker as the knowledge and skills that individuals acquire through education, training, and various other experiences, such as fieldwork (Becker, 1964). Currently, the most commonly used definition of human capital is as the human factor of an organization—that is, the combined intelligence, skills, and expertise that give an organization its unique character (see Table 1).

Human capital has become a key determinant of organizational success in today's knowledge-based economy. Researchers have long recognized that investing in employee knowledge, skills, and abilities can lead to improved organizational performance and innovation capacity (Ray et al., 2023; Vithana et al., 2023).

Table 1.
The concept of Human Capital (Human Capital) – an overview of selected references

Author	Definition
(Johnson, 1999)	Human Capital refers to the knowledge, skills and abilities of employees, as well as the manifestation of intelligence and innovative capacity.
(Bratnicki, 2000, p. 101)	Human Capital is: competence (practical skills, theoretical knowledge, talents); intellectual dexterity (innovativeness of people, ability to imitate, entrepreneurship, ability to change); motivation (willingness to act, personality predispositions, commitment, organizational power, leadership, tendency to ethical behavior).
(Cote, 2001)	Human Capital includes, on the one hand, qualifications and skills (competencies) that are acquired through education and experience, and on the other hand, innate characteristics, i.e. talents and abilities, resulting from psychological, emotional and mental conditions that determine the motivations and forms of behaviour of people, including employees.
(Wang, Chang, 2005)	Human Capital is the knowledge and skills that individuals create, maintain and use, and the employee growth/decline rate is its relevant indicator.
(Baron, Armstrong, 2008, pp. 20-21)	A company's Human Capital is those elements capable of learning, change, innovating, and being creative. When properly motivated, they can ensure the organization's long-term sustainability.
(Fong et al., 2011)	Human Capital knowledge is the insights, interpretations, context, experience, and wisdom that help an organization achieve its goals, mission, and vision, and ultimately increase its value. Organizations should continually invest in their Human Capital to improve their competitive advantage.
(Wronowska, 2012, pp. 14-18)	In this approach, human capital is treated as a company's most valuable asset, a collection of knowledge, skills, experiences, motivation, competencies, responsibility, education, intellectual abilities, and problem-solving skills.
(Kucharcikova et al., 2024)	Human Capital represents individuals who are carriers of knowledge, ideas, and experiences that contribute to increasing the efficiency and competitiveness of a company and society as a whole. Human capital management helps companies achieve their business goals. Human Capital is not the number of employees in a company, but rather their abilities, skills, talents, willingness to share existing knowledge and the effectiveness of investments in it.
(Musaigwa, Swanepoel, 2024)	Human Capital refers to the knowledge, skills and abilities of employees in an organization.
(Ren, Yu, 2025)	Human Capital is a fundamental element of intellectual capital and plays a leading role in corporate innovation. It primarily provides an intellectual guarantee for improving a company's level of innovation through the application of employees' knowledge, experience, and innovative thinking.

Source: own study based on the indicated sources.

A firm's total human capital represents the sum of employees' knowledge and experience. Systematic management of employee knowledge and experience lays the foundation for internal structural capital. This, in turn, can be transformed into a foundation for expanding the firm's infrastructure and enhancing capabilities. Furthermore, at the level of financial structure, establishing a firm's infrastructure relies on long-term capital investments (Han et al., 2017). Therefore, human capital analysis is important for two reasons: first, it enables the logical separation of causes and effects, and second, it provides a theoretical basis for deriving the relationship between human capital and employee innovation performance in any given firm (Rafique et al., 2024). The accumulation of human capital and its subsequent transmission are key aspects of this innovation process. On the other hand, the resource-based view argues that human capital is valuable, limited, difficult to replicate, and non-substitutable (Bos-Nehles

et al., 2017). Research has shown that organizations with better human capital management practices typically experience higher productivity, enhanced innovation, and better financial performance (Gallego, Gutiérrez Ramírez, 2023; Islam, Amin, 2022; Malhotra et al., 2025).

The concept of Human Capital Management (HCM) emphasizes and draws attention to employees' current knowledge, its importance and utilization for the enterprise, and its systematic development and enhancement. In this way, HCM creates a competitive advantage in the market and simultaneously represents the ability to utilize people's potential, both for daily work and to increase quality and innovation (Kucharcikova et al., 2024). Consequently, it should be assumed that human capital management is the comprehensive development of human potential expressed through the value of the enterprise. Therefore, human capital management involves creating organizational value through employees. The conceptualization of strategic human capital valuation as part of an organization's strategic measurement and management system is to help build employee performance (Samson, Bhanugopan, 2022). This is also confirmed by studies showing a significant positive correlation between human capital management practices and organizational performance (Ghouri et al., 2020; Kitchot et al., 2021; Moustaghfir et al., 2020; Patil, Kulkarni, 2024).

Human Capital Management can also be understood as an approach to employees that views them as assets whose present value can be measured and increased through investment. However, because these studies have been approached across multiple disciplines, theoretical areas, and levels, they have led to construct ambiguity in assessing the impact of human capital valuation results at the individual/firm level and the individual level. Universalist, configurational, and contingency theories advocate the utilization of human capital at the individual, managerial, and organizational levels, which generates long-term returns for businesses (Vithana et al., 2023).

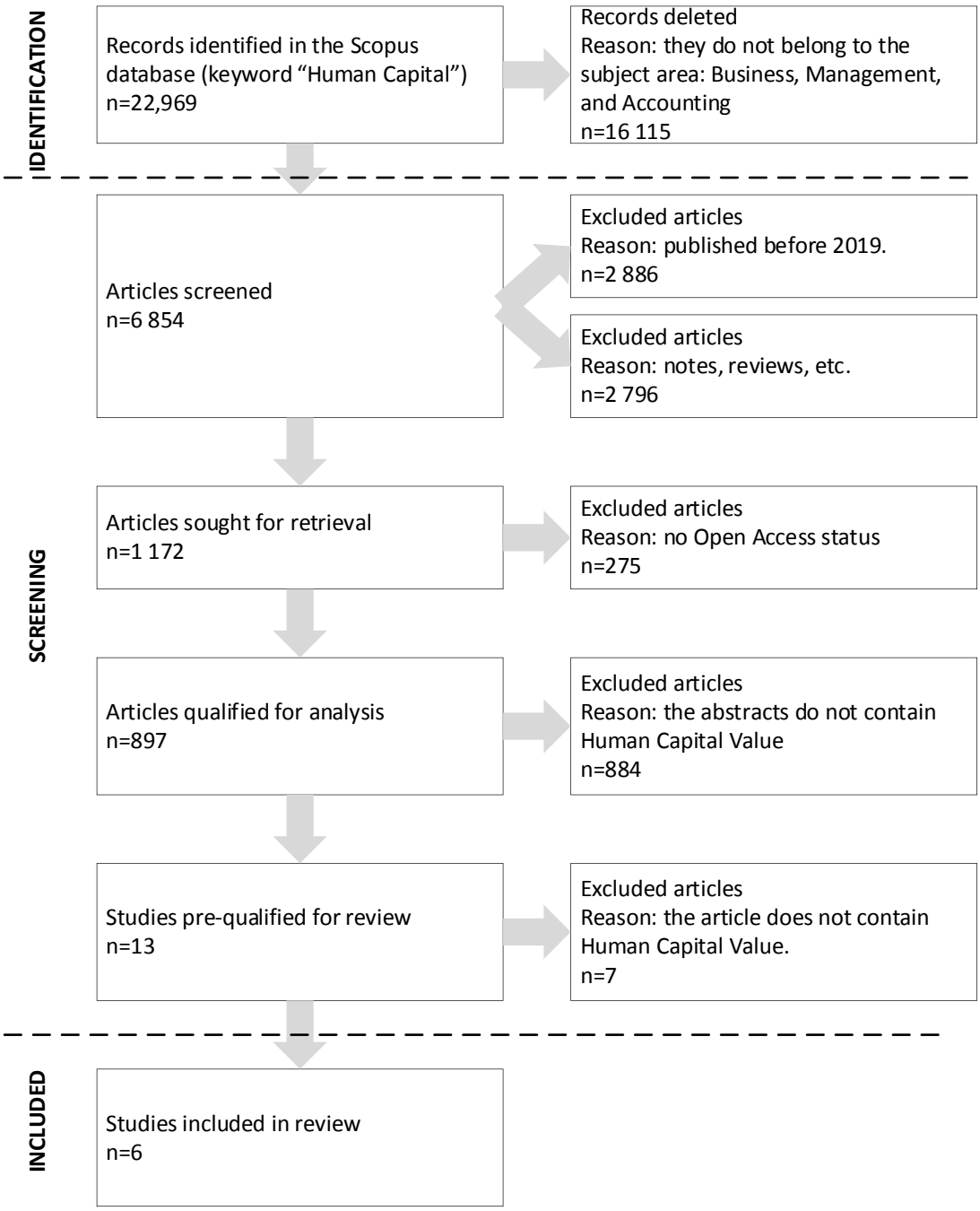

Figure 1. Systematic literature review process.

Source: own study.

3. Research methodology

Seeking answers to the question of how approaches to human capital valuation have changed, a systematic literature review was used. The systematic review was conducted based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) model

(see Figure 1). The adopted search strategy and selection of articles included in the review were defined using the following queries: TITLE-ABS-KEY ("human capital" or "HC").

In the initial phase of the research process, 22,969 studies were identified in the Scopus database. The first stage of selection involved narrowing the results to the "Business, Management, and Accounting" area (n = 6,854). Then, taking 2019 as a reference year (this year the author published a modified and tested version of the new approach to human capital valuation (Makieła, Stuss, 2019) and considering only articles published in peer-reviewed scientific journals (n = 1172) remained. This criterion was intended to ensure high-quality empirical material and reduce the risk of including publications with insufficient methodological reliability or low cognitive value, such as editorial notes, reviews, and other forms of publication that do not meet the criteria for a scientific article.

Additionally, only publications available in the open access model (n = 897) were qualified for the analysis. This requirement stemmed from the need for full access to the content, including both the theoretical part and a detailed description of the methodology used and the presentation of research results, which is a condition for conducting a reliable and in-depth literature synthesis. Based on the analysis of abstracts, 884 publications were then excluded, which did not contain substantive references to the concept of human capital valuation, leaving (n = 13) articles meeting the entry criteria.

Finally, after full-text analysis, six publications were included for the identification and interpretation of key research topics, which aligned with the study's objective: describing contemporary approaches to the value of human capital within HR analytics.

4. Research Results

Human capital valuation is one of the most complex and least structured areas of research in management and economics. Its challenges stem primarily from the intangible nature of human capital, which encompasses knowledge, competencies, experience, attitudes, and employee development potential. The available literature (see: Table 2) demonstrates significant variation in theoretical approaches to the concept of human capital itself, as well as its measurement and valuation methods. This translates into a lack of consistent and universally accepted analytical models.

Table 2.
Selected indicators of human capital valuation

Author	Approach to human capital valuation
(Makieła, Stuss, 2019)	The metrics used in the research process include both quantitative measures (economic value added of human capital, value added of human capital, profitability of investments in human capital, workforce turnover, investments in professional development of employees, indicator of income from human capital) and qualitative measures (data on company efficiency, CSR, demographic data, data on employee development, talent management).
(Vorobyov, 2020)	Human Capital Return on Investment (HC ROI) refers to the value that employees contribute to the production of products or the delivery of services compared to the resources spent on them. This allows for a better identification and understanding of the factors that help or hinder a company's productivity and performance.
(Veselinovic et al., 2021)	To obtain indicators of human capital efficiency, it is necessary to calculate: Human Capital Cost Factor (HCCF). Human Economic Value Added (HEVA), Human Capital Cost Factor (HCCF), Human Capital Market Value (HCMV), Human Capital Value Added (HCVA), Human Capital Return On Investment (HCROI)
(Yarovaya et al., 2021)	Conceive that human capital efficiency (HCE) is the efficacy of knowledge and skills emanating from investment in human capital (I). The knowledge and skills contribute toward the value addition (VA). Based on this, we define human capital efficiency (HCE) achieved through perpetual investments will outdo their peers. Human capital investment refers to various compensations that include payroll, commissions, bonuses, training, development, etc.
(Abdelkhalek, Boccanfuso, 2021)	Human Capital Index (HCI). It combines demographic, education, and health dimensions on a complementary statistical and econometric basis.
(Vithana et al., 2023)	Employee contribution to a firm's value added appears to be one such general measure, demonstrating the importance of reintroducing value-added accounting alongside conventional financial statements. Alternative industry-, sector-, or company-specific measures that can be disclosed in annual reports can also play a significant role in providing information on human capital value creation. Disaggregation's of firm expenditures on human resources, the value added of human capital as a proportion of total value added, firm investments in training and development, and cost or revenue per employee ratios are commonly used as quantitative financial indicators; however, a variety of qualitative indicators can capture the qualitative aspect of human capital value creation. Furthermore, a human capital disclosure framework for communicating human capital value creation should consider the process of using human capital at the individual level to manage human capital resources at the organizational unit or firm level. Therefore, the disclosure framework should include input indicators at the individual level, process indicators at the organizational unit and firm levels, and output and outcome indicators that measure the value creation process and outcome.
(Kucharcikova et al., 2024)	As part of the HCM process, simple metrics are proposed to assess the level of HC utilization. These metrics will take into account key performance indicators, such as sales and specific operational conditions: Metric A: Average sales per employee. Sales depend primarily on employees serving customers, and employees are the carriers of HC. For this reason, it is crucial to know the share of sales per employee—this will determine HC effectiveness, i.e., whether it made sense to invest in HC (education, work environment, health). Efficiency is most often expressed as the ratio of outputs to inputs. By substituting the value of average sales per entry point and the average number of employees (full-time employees + temporary workers) per shift per entry point, we obtain the average sales per employee per shift. Metric B: Average sales per customer per shift. The effective use of employee knowledge, skills, and abilities translates into increased overall sales and competitiveness. The advantage of this metric is greater objectivity, as it is converted to the number of customers. The value of the indicator is obtained as a share of the company's average sales per shift and the average number of customers per shift.

Source: own study based on the indicated sources.

Additional difficulties arise from the practical operation of companies, which still rely on a resource-based approach, focusing on human resource management rather than on viewing employees as strategic assets that create organizational value. Consequently, many companies do not systematically collect data enabling the identification, measurement, and valuation of human capital, limiting themselves to labour cost records. The lack of appropriate information systems and the insufficient linkage between personnel data and the organization's economic performance further complicate the valuation process. Another significant limitation in the development of research on human capital valuation is the low level of formalization of the measures used, which hinders their standardization, comparability of results, and practical application. External conditions, including geopolitical, institutional, and cultural determinants, also play a significant role in this context. Differences in legal systems, labour market models, levels of economic development, and organizational culture mean that human capital valuation methods must be adapted to the specific characteristics of a given country or region. All of this means that human capital valuation remains an area requiring further, in-depth interdisciplinary research, combining theoretical perspectives with the realities of economic practice. The value of human capital is related to the number of employees but is not strictly limited to this number.

However, although the concept of human capital, as previously demonstrated, is long-standing, its valuation was most often based on the belief that it constitutes part of intellectual capital and, in this respect, the market value of the enterprise (Kucharcikova et al., 2024). It's important to remember that some researchers previously explicitly argued that an employee has no value to an organization unless they possess a skill based on which they are paid (Johanson, 1999), as the availability of a well-suited, qualified, efficient, and productive human resource for the company is not properly reflected in financial reporting. Most companies still either never report human capital, as it is usually difficult to value it in monetary terms, or they are unwilling to disclose the costs and value of human capital in their financial statements.

Therefore, the selection of metrics is crucial in valuing human capital. Accurately quantifying the size and effectiveness of human capital is difficult. In any case, when selecting and constructing direct or indirect (auxiliary) metrics, it is important to remember their relationship with the company's key performance indicators.

5. Conclusions

Nowadays, companies are increasingly aware of the value of human capital and have begun to present it in their annual reports, despite the difficulties in measuring the effectiveness of human capital utilization. They primarily seek appropriate metrics that reflect their capital size. As studies emphasize (Gadzhiev et al., 2020; Rong, Karia, 2024; Santa et al., 2022), the quality

of human capital should be the focus of business managers. Moreover, the quality of human capital influences the sustainable economic growth of individual countries.

The human capital management process is influenced by Industry 4.0 and the emerging Industry 5.0. These changes, implemented in companies, can increase the productivity and efficiency of HCM processes. Human capital valuation is currently one of the key, innovative tools supporting strategic human resources management, particularly in the context of the digital transformation characteristic of Industry 4.0. Traditional methods of assessing company value, based primarily on tangible assets, are proving insufficient in an environment where competitive advantage is primarily determined by digital competencies, adaptability, creativity, data literacy, and readiness to collaborate with advanced technologies.

In the HR 4.0 approach, which integrates digital technologies with human resources management processes, human capital valuation serves as a diagnostic and prognostic tool, enabling the precise determination of employee competencies relative to company requirements. This includes, among other things, assessing the level of technical competencies, analytical skills, the ability to collaborate in a hybrid environment, as well as innovation potential and learning capacity. This allows for the identification of competency gaps, assessment of the risk associated with talent shortages, and planning investments in employee development based on data rather than managerial intuition.

As a result, human capital valuation becomes not only a tool supporting operational HR activities but also a key element in building a company's long-term strategy. It enables a better understanding of the degree to which human resources are prepared to implement new technologies, enabling the company to fully leverage the potential of automation, artificial intelligence, and data analytics. Thus, human capital valuation aligns with a new management paradigm, where the integration of knowledge, technology, and people plays a key role.

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