



Vol. 2(2): 100-126 (2025)



Journal of Regenerative Economics

DOI 10.5937/jre2502100J

## BENCHMARKING AS A MECHANISM FOR ENHANCING THE HUMAN CAPITAL PERFORMANCE OF HIGHER EDUCATION INSTITUTIONS

**Milica Jovanović Vujatović**

Faculty of Economics, University of Niš, Serbia

✉ milica.jovanovic@eknfak.ni.ac.rs

ORCID: 0000-0002-6410-0938

**Bojan Krstić**

Faculty of Economics, University of Niš, Serbia

✉ bojan.krstic@eknfak.ni.ac.rs

ORCID: 0000-0003-4597-6819

**Ljiljana Bonić**

Faculty of Economics, University of Niš, Serbia

✉ ljiljana.bonic@eknfak.ni.ac.rs

ORCID: 0000-0003-3877-8400

**Matjaž Hribar**

Faculty of Civil and Geodetic Engineering, University of Ljubljana, Slovenia

✉ matjaz.hribar@fgg.uni-lj.si

ORCID: 0009-0008-2773-1344

**Abstract:** *In an increasingly knowledge-based economy, higher education institutions (HEIs) play a vital role in generating and disseminating intellectual capital. However, many European HEIs continue to exhibit low levels of innovativeness, weak connections with the business sector, and insufficient strategic management of human resources. This paper examines benchmarking as a managerial mechanism for improving the human capital performance of HEIs within the broader framework of intellectual capital management. Drawing on the concept of the Intellectual Capital Report, the study identifies dimensions of human capital performance, each represented by specific measurable indicators. Using a benchmarking analysis of human capital performance across selected HEIs in Serbia, Montenegro, Croatia, and Slovenia, the paper compares outcomes to determine best practices and performance gaps. The results reveal significant interinstitutional differences in academic productivity,*

Original scientific paper

Received: 15.08.2025.

Accepted: 18.12.2025.

*staff structure, and international openness, highlighting areas where managerial interventions are needed to achieve benchmark performance. The findings underscore the importance of benchmarking not only as a comparative tool but also as a continuous learning and improvement process that supports evidence-based decision-making, enhances transparency, and fosters the development of innovative, entrepreneurial academic environments.*

**Keywords:** *Benchmarking, higher education institutions, human capital, performance measurement, indicators.*

## 1. Introduction

Certain European higher education institutions (HEIs) are generally characterized by low level of innovativeness, weak links with the business sector, and insufficient attention to commitment to human resource management and other intellectual resource policies (Krstić & Krstić, 2018). Consequently, there is a growing need to adopt innovation-based approaches. Indeed, certain changes have become inevitable. One such innovation involves the adoption of the concept of intellectual capital management within HEIs by their leadership, along with a transformation of organizational culture - from a traditional, bureaucratic model toward a more entrepreneurial, and innovative organizational culture that facilitates change and innovation in key processes.

In the context of the knowledge-based economy, HEIs play a pivotal role as creators, transmitters, and disseminators of knowledge, skills, and innovation (O'Neill & Bagchi-Sen, 2023). Their capacity to generate value increasingly depends not only on physical or financial resources but also on the effective management of intangible assets—particularly human capital. As universities face growing accountability pressures, global competition, and demands for transparency from governments, students, and the business sector, the measurement and strategic management of their intellectual capital have become essential prerequisites for sustainable institutional development.

However, many HEIs still lack systematic approaches to identifying, evaluating, and reporting on the performance on their intellectual resources (Petković, Krstić, & Rađenović, 2020). The absence of structured frameworks and standardized indicators makes it difficult for policymakers, funding agencies, and institutional managers to assess the effectiveness of knowledge creation and transfer processes within academia. Traditional accounting and reporting systems fail to capture the full spectrum of intangible assets such as competencies, expertise, collaboration networks, organizational culture and many other, that underpin organizational performance and competitiveness. Therefore, the implementation of intellectual capital management models in HEIs has emerged as a crucial innovation in higher education governance and strategic management.

Within the theoretical framework of intellectual capital, human capital is recognized as its core component and the most significant determinant of value creation in HEIs (Golikov et al., 2018; García-Carbonell et al., 2021). The quality,

motivation, labor productivity, and mobility of academic and non-academic staff fundamentally shape an institution's intellectual output and its capacity for innovation, teaching excellence, and societal impact. Consequently, managerial efforts aimed at improving human capital performance in HEIs require the implementation of best practices in continuous analysis (Bucăța & Tileagă, 2023), benchmarking, and the regular preparation of so-called intellectual capital reports. These reports, among other elements, include the presentation of measured human capital performance indicators that serve as a foundation for evidence-based management (Krstić, 2014).

Despite the increasing interest in intellectual capital reporting within the public and academic sectors, empirical research that applies benchmarking methods to evaluate human capital performance in HEIs remains limited, particularly in Central and Southeastern Europe (Krstić, Stanisavljević, & Stanišić, 2014; Krstić, Radivojević, & Stanišić, 2016). This research gap highlights the need for systematic comparative analyses that can identify key areas for improvement and guide the design of targeted managerial interventions.

Accordingly, this paper aims to examine benchmarking as a managerial mechanism for improving the human capital performance of HEIs within the broader framework of intellectual capital management. The study applies benchmarking analysis to identify the key human capital dimensions in which managerial action can enhance institutional performance and align it with the best practices observed among comparable institutions (Faculty of Economics, University of Niš; Faculty of Economics and Business, University of Rijeka; University of Montenegro; Polis University, Tirana, Albania; Faculty of Civil Engineering and Geodesy, University of Ljubljana). By integrating quantitative indicators and qualitative insights, the research seeks to provide a comprehensive understanding of how HEIs can develop more effective strategies for human resource development, knowledge management, and overall organizational learning.

The structure of this paper is as follows. Following the introduction, Section 2 provides the theoretical background and defines the key determinants of intellectual capital and IC reporting in HEIs, with particular emphasis on the role of human capital. Section 3 presents the methodology and data basis for the benchmarking analysis. Section 4 reports and interprets the benchmarking results, while Section 5 discusses managerial implications and strategic recommendations for enhancing the human capital performance of HEIs.

## **2. Theoretical background**

### **2.1. Key determinants of intellectual capital and intellectual capital reporting of HEIs**

The term intellectual capital of higher education institutions (HEIs) is used to encompass all tangible and intangible assets and resources, including their processes, innovation capacities, patents, and the tacit knowledge of their members, as well as their networks of collaborators and contacts. Intellectual capital (IC) is defined as a

combination of intangible resources and activities that “enable an organization to transform a set of material, financial, and human resources into a system capable of creating value for its stakeholders” (Benzhani, 2010). Intellectual capital consists of three fundamental and closely interrelated components: human capital, structural capital, and relational capital (Krstić, 2009; Krstić & Rađenović, 2017; Krstić & Rađenović, 2018; Secundo *et al.*, 2010).

In the context of HEIs, the components of IC can be understood as follows (Krstić & Rađenović, 2018; Krstić & Rađenović, 2019, Pedro *et al.*, 2019): human, structural, and relational.

Human capital refers to the set of explicit and tacit knowledge possessed by HEI staff (professors, researchers, assistants, and non-academic personnel) acquired through formal and informal learning processes and continuous professional development. This knowledge is expressed through teaching, research, administrative, and other academic activities (Krstić & Rađenović, 2019).

Structural capital represents explicit knowledge related to internal processes of dissemination, exchange, and management of scientific and technical knowledge within the organization (Krstić & Rađenović, 2018). Structural capital may be divided into two main categories: 1) Organizational capital, which refers to the operational environment resulting from the interaction between research, management, and organizational processes, including routines, culture, values, internal procedures, and the quality of information systems; and 2) Technological capital, which includes technological resources available at the university, such as bibliographic resources, archives, technical achievements, patents, licenses, software, and databases.

Relational capital encompasses a wide range of economic and institutional relationships between HEIs and their non-academic partners - such as enterprises, non-profit organizations, local and national government institutions, and society at large. It also includes the external perception of HEIs in terms of their image, attractiveness, credibility, and reputation.

Existing accounting standards (e.g., International Accounting Standard 38) limit the recognition and reporting of intangible assets (O’Dwyer, 2010). Only externally acquired intangible assets can be presented as balance sheet items. Consequently, numerous international regulatory bodies, agencies, and academic institutions - aware of the challenges of valuing internally generated intellectual capital recommend the development and publication of intellectual capital reports to make such assets visible and understandable to stakeholders (Krstić, 2014).

Intellectual capital reports should include a set of indicators that enhance the comprehensiveness and quality of available accounting information within organizations. Improving the accounting systems of HEIs can also be achieved through the preparation and presentation of an Intellectual Capital Report as a complement to traditional financial statements (Petty & Guthrie, 2000). A set of intellectual performance indicators contained in such a report provides essential information required by different HEI stakeholders regarding intangible resources. The obligation to prepare and publish intellectual capital reports in higher education represents a key step toward a new management approach in HEIs, achieving a dual objective (Krstić, 2014): a) to identify

and measure the needs related to the management of intangible resources, and b) to provide useful information to stakeholders for decision-making purposes.

In practice, the intellectual capital report represents a specific instrument for the creation and management of intellectual capital (Krstić & Rađenović, 2022) and for the successful implementation of IC development strategies across various sectors (commercial, non-profit, and public). Its main purpose is to help institutions identify and disclose information on strategies, objectives, visions, activities, and resources, based on financial and non-financial indicators (Mouritsen et al., 2004). The management and reporting of intellectual capital thus aim to identify, measure, manage, and control different forms of IC, and to support both managers and external stakeholders in making informed decisions based on relevant information. Information on intellectual capital is not necessarily designed for a comprehensive evaluation of HEI performance, although it can serve that purpose (Leitner et al., 2005). As in any evaluation process, the criteria for assessing HEI performance must be clearly prioritized. Institutional objectives should be explicitly defined and incorporated into IC reports through the selection, measurement, and presentation of relevant indicators, thereby allowing managers and external stakeholders to verify the achieved results.

The main reasons for reporting on the intellectual capital of HEIs include (Dzinkowski, 2000; Krstić & Rađenović, 2019): a) Improving the transfer of best practices among universities through greater transparency in IC reporting; b) Strengthening university -industry linkages, since intellectual capital serves as the connective medium between academia and business; c) Ensuring transparency and objectivity in performance evaluation by selecting appropriate indicators of intellectual performance that reveal - rather than obscure - results across the main dimensions of human, structural, and relational intellectual capital.

Complex institutions such as HEIs - with multiple missions and societal roles - cannot be fully represented through numerical indicators alone (Piber & Pietsch, 2006). The intellectual capital framework, therefore, functions as a communication tool, where individual performance values may have limited meaning without appropriate contextualization. A detailed description is thus necessary to accompany quantitative measures. The purpose of such a framework - which combines indicators with their qualitative interpretation - is to encourage internal reflection on what should be measured, how it should be methodologically measured, and how measurement outcomes can be further developed to enhance organizational value creation.

The evaluation of HEI intellectual capital should therefore be aligned with clearly defined objectives for IC growth and development (Krstić et al., 2021). Moreover, the assessment involves verifying the effectiveness of achieving these objectives (i.e., planned IC performance) by comparing actual HEI performance with predetermined targets over a defined time horizon (e.g., annual or triennial, depending on the nature of the performance dimension).

## **2.2. Human Capital as a Determinant of the Intellectual Capital of HEIs**

Human resources form the foundation of the value referred to as human capital (Krstić, 2007). Human capital is one segment of the so-called invisible intellectual

capital of an organization, alongside structural and relational intellectual capital. It constitutes the basis for creating, enhancing, and developing other intellectual-and even material-resources of the enterprise (Petrović *et al.*, 2025).

The human resources of HEIs consist of all employees-those engaged in teaching and non-teaching positions-who possess professional knowledge (qualifications), skills, work habits, professional experience, levels of training, motivation, commitment to the job/HEI, learning and adaptation abilities, as well as various other performance attributes. Human resources, as a set of employee competencies (knowledge, skills, experience) and commitment, determine the organization's work potential and its innovative (creative) capacity. Human (intellectual) potential can be expressed as (Ulrich, 1998):

$$\textit{Competence} \times \textit{Commitment},$$

meaning that only the simultaneous presence of both competence and commitment can generate strong individual performance and favorable organizational outcomes.

By increasing individuals' knowledge, competencies, commitment, and skills within the organization's workforce, the organization's productive (service) potential grows, positively influencing its overall business success and competitive advantage. The knowledge that all employees must possess and continuously develop includes general knowledge necessary for performing work tasks, typically acquired through formal education systems or work experience. In addition, specific knowledge - unique to particular jobs and/or acquired through specialized training and long-term experience - is also crucial. Beyond knowledge, personal abilities are equally important. Employees may possess various types of abilities: communication, organizational, rapid learning, adaptability, teamwork, knowledge sharing, building personal contacts and social networks, problem-solving, conflict mitigation, and abilities grounded in emotional intelligence, among others.

According to several authors (Pasban & Nojehdeh, 2016; Krstić & Radenović, 2018; Angrist *et al.*, 2019; Deming, 2022), human capital comprises not only individual and organizational knowledge, competencies, employee skills, experience, and commitment, but also the individual characteristics of people in the organization, such as creativity, innovativeness, motivation, diligence, responsibility, perseverance, initiative, critical thinking, learning capacity, flexibility, etc.

Human resources endowed with knowledge, information, and skills that are generally available to the wider public and accessible to any organization - i.e., resources that can be easily acquired or "rented" - represent generic human resources, which do not necessarily have significant strategic value for a given enterprise (Veselinović *et al.*, 2022). In contrast, employees who have developed specific, experience-based, and routine knowledge within the organization-through learning processes, practical problem-solving, accumulation of specific experiences, and interaction among organizational members - represent highly valuable, organization-specific human resources. Their knowledge and skills have strategic

relevance for that particular organization, although they may not hold substantial value for others.

To maximize the value of human resources, it is essential to systematically and continuously apply the concept of knowledge management - both individual and collective, tacit (implicit, uncodified) and explicit (codified) knowledge. Knowledge management emphasizes the conversion of individual tacit knowledge into collective, organizational, explicit, and visible knowledge. In this way, individual knowledge becomes embedded in the so-called organizational memory, remaining available even after employees leave the organization, and forming the basis for the development of structural intellectual capital (Diab, 2021).

Human resources exhibit their own performance outcomes; therefore, the performance of human resources within an enterprise must be measured and controlled. For every successful organization, the productive use of human resources is particularly important, giving rise to the concept of human-resource-use performance, such as the efficiency of utilizing human potential or the productivity of their work (Veselinović et al., 2021). Human potential is also visible and generated through various interaction patterns - among employees, between employees and managers, among managers themselves, and between owners and employees. Consequently, human capital also encompasses employee- manager relationships within the organization. These relationships further determine the financial value of a company's human capital. Such value may be calculated based on total labor-related costs (wages, salaries), investments in employee training and development, and other benefits and compensations provided to employees. Human resources are one of the most important success factors in contemporary circumstances, often described as the knowledge society and knowledge economy. Hence, human resources cannot be viewed merely as a cost factor or expenditure; rather, they must be treated as "human capital" or as "assets" embodied in people (Krstić & Bonić, 2016).

### **2.3. Selecting key performance measurement dimensions of human capital and key human capital performance indicators as a management tool for HEIs**

Most managers in contemporary organizations strive to measure all available resources, provided that such measurement is feasible (Amidon, 2002). Accordingly, the intellectual capital of HEIs should be measured for several key reasons:

- 1) Enhanced transparency of public institutions. - In a knowledge-based economy and society, citizens demand continuous and adequate access to information regarding the allocation and utilization of public funds.
- 2) Facilitation of good-practice transfer. - The exchange and dissemination of good practices among universities could be significantly improved if HEIs have access to accurate and detailed information about their intellectual capital. Strengthening the relationship between academia and the business sector is not possible without establishing a common language for them. Such a framework, grounded in intellectual capital information, allows both parties to develop sustainable and mutually beneficial relationships.

3) Accountability and visibility of performance. - Measuring intellectual capital through clearly defined indicators and standardized reporting methodologies makes it more difficult to conceal poor performance by individual researchers or staff compared with generalized, non-transparent activity reports.

4) Promotion of collaboration and network creation. - The introduction of a common framework derived from measurable intellectual performance can serve as the foundation for creating research networks and consortia across different HEIs.

The measurement of intellectual capital should consider various outputs - both organizational outputs (e.g., publications, training programs) and user or client-related outputs (e.g., problem-solving results). Consequently, intellectual capital measurement serves as a stimulus for enhancing the productivity of knowledge-based work. Such a system should help organizations that rely on intellectual capital to identify which activities yield desired outcomes and which do not.

When designing instruments for intellectual capital measurement, the following potential challenges should be considered (Kannan & Aulbur, 2004; Jurczak, 2008; Dumay, 2009):

1) Complexity and data overload. - Excessive detail or an overabundance of indicators may render the measurement system cumbersome and impractical.

3) Short-term bias. - Indicators that emphasize short-term performance can have unintended long-term consequences, as employees may focus on easily measurable activities while neglecting those that are harder to measure yet strategically significant.

4) Cultural barriers within the organization. - Resistance to measurement, insufficient understanding of the importance of certain indicators, and a lack of appreciation for performance monitoring and control can impede implementation.

5) Insufficient involvement of key personnel. - Limited participation by essential employees across institutional structures can compromise the reliability of measurement.

6) Conceptual ambiguities. - The absence or inconsistency of definitions for key terms, categories, or methodologies may undermine the credibility of the measurement processes.

7) Weak strategic alignment. - Poorly defined or disconnected visions and strategies, and their lack of integration with individual actions, reduces the effectiveness of intellectual capital measurement systems.

HEIs are entities whose capital is predominantly intangible and rely heavily on human resources and the knowledge embedded within them. The role of HEIs is especially significant in national and regional economic systems, as they generate added value, which contributes to broader economic and social development (Krstić & Krstić, 2018).

In the context of knowledge-based economies and societies, advanced universities increasingly recognize the critical role of intellectual capital in institutional development and applying knowledge to industry. Therefore, universities must

actively manage knowledge flows and processes creating and sustain their knowledge-based resources. In doing so, universities must also recognize the need to measure the value of their intangible assets and disclose information about their intellectual performance to key stakeholders.

**Table 1. Dimensions of Human capital performance and measurement indicators in HEIs**

Dimension	Indicator	Formula
Efficiency / productivity	1. Academic productivity in the provision of literature to students in HEI	Formula Total number of books for the subject divided by Total number of professors in HEI*
	2. Total academic productivity of HEI	Formula: Total number of results (papers, articles) divided by the Total number of teaching staff in HEI Note: The total number of papers consists of a number of published articles in SCI impact journals and other journals*
	3. Academic productivity 1 of HEI	Formula: Total number of published articles in SCI impact journals divided by Total number of teaching staff in HEI*
	4. Academic productivity 2 of HEI	Formula: Total number of articles in other journals divided by Total number of teaching staff in HEI*
Structure, characteristics and quality	5. The structure of teaching staff	Formula: The number of teaching staff with permanent employment divided by the total number of teaching staff employed in HEI*
	6. Quality of library and other administrative staff in HEI*	
	7. The structure of staff	Formulae: The number of permanently employed non-teaching staff divided by the number of permanently employed teaching staff
	8. The share of full professors and associate professors	Formula: The number of full professors and associate professors divided by the total number of teaching staff *
	9. The share of assistant professors	Formula: The number of assistant professors divided by the total number of teaching staff*
	10. The share of teaching assistants and teaching fellows	Formula: The number of teaching fellows, teaching assistants, and teaching assistants holding a PhD divided by the total number of teaching staff*

	11. Index of satisfaction of teaching staff	<p>Formula: Methodology for measuring teaching staff satisfaction</p> <p>Note: This methodology is implemented by conducting a survey, in which every teacher answers a question about satisfaction of a particular dimension of satisfaction. One of the models for measuring the satisfaction of the teaching staff is based on the following dimensions of employee satisfaction: 1. Wage; 2. Working conditions in HEI; 3. Satisfaction with adequate equipment for teaching and scientific research activities; 4. Availability of databases and internet services in HEI and through remote access; 5. Timeliness and adequacy of informing all faculty professors about decisions made at university bodies by representatives of faculties in these university bodies; 6. Collaboration between professors and assistants regarding teaching and scientific research activities.</p> <p>The number of dimensions of satisfaction can be bigger than the proposed six in the methodology model for measuring the satisfaction of teaching staff. The essence is in the sum of relative scores that surveyed teaching staff give about particular dimensions of the total satisfaction of teaching staff.</p> <p>Note: This methodology and measurement guidelines would later be elaborated in detail, presented and delivered to consortium partners</p>
	12. Number of employees with PhD*	
	13. Number of additionally educated professors (postdoctoral studies, sub-specializations, etc.)*	
	14. Number of rewards for teaching staff in the area of expertise*	
	15. Number of citations in WOS for all teaching staff in HEI at the end of the year*	
	16. Number of citations in Scopus of all teaching staff in HEI at the end of the year*	
	17. Number of staff who fulfill the roles in scientific journals*	
	18. Number of presentations at scientific conferences (national and international)*	
	19. Professor-Student Ratio	Formula: Number of professors/Number of enrolled students

Teaching competencies and their improvement	20. Number of months of teaching staff specialization	
	21. Number of internally organized education programs for professors and assistants in HEI	
	22. Number of externally organized education programs for administrative staff in HEI	
	23. Number of seminars, workshops, and additional education programs attended by professors and assistants at the HEI	
Teaching staff experience and stability	24. Average length of service (work) of professors (researchers) in the concrete HEI, measured by the number of years	Formula: Sum of the length of service of all professors (researchers) in the concrete HEI/The number of professors (researchers) in the HEI
	25. Total number of years of all academic staff in the academic profession in the HEI	Formula: Sum of the years of all professors (researchers) in the academic profession in the HEI
	26. Average number of years in an academic profession	Formula: The sum of the years of all professors (researchers) in the academic profession/The number of professors (researchers) in the HEI*
	27. Fluctuation of teaching staff	Formula: The number of teaching (research) staff leaving the HEI during the year + the number of teaching (research) staff coming to the HEI during the year*
Openness	28. Number of visiting fellows from other international universities	
	29. Number of PhD students from other universities	
	30. Number of scientific papers with researchers from other universities	
Mobility of professors and researchers	31. Number of visiting professors at foreign universities	
	32. Time spent by visiting professors abroad	

Note: \* This indicator can be disaggregated by gender.

Source: Krstić & Rađenović (2019)

Accordingly, universities must select a set of indicators, drawn from traditional metrics and supplemented with newly developed ones, when necessary, to measure and report on their intellectual capital in a standardized format. In doing so, each university can develop its own intellectual capital measurement and reporting system, which serves as a strategic management tool that supports competitiveness in the higher education and research markets. Such systems of intellectual capital management and reporting enable HEIs to (Sanchez & Elena, 2006): ensure transparency in the use of public resources; present and explain the achievements of academic staff, researchers, continuing education programs, and innovations, as well as their benefits for stakeholders; illustrate the development and growth of the institution's intangible resources; and demonstrate their level of competitiveness within the higher education market.

Indicators describing the intellectual capital of HEIs should be presented as indicators of human, structural, and relational capital. Each dimension represents a key segment of intellectual performance, and comprises several specific domains in which indicators are grouped.

Table 1 presents a comprehensive classification of the human capital performance indicators used for measuring the human intellectual capital of HEIs. Based on the framework proposed by Krstić & Rađenović (2019), the table groups individual indicators into key performance dimensions, each representing a distinct aspect of human capital within HEIs.

The table first lists each dimension of human capital performance - such as human resource efficiency i.e. labor or work productivity, staff structure and quality, teaching competencies, experience and stability of academic staff, openness, and mobility of staff. Within each dimension, the table provides a set of specific quantitative and qualitative indicators designed to measure that aspect of human capital. For every indicator, Table 1 includes a precise formula or methodological guideline describing how the indicator should be calculated or assessed.

### **3. Data basis, Research Questions, and Methodology**

The objective of this study is to identify, through the application of benchmarking analysis, the key areas and dimensions of human capital that the management of a given higher education institution should improve to achieve the highest level of performance - the benchmark. The research conducted in this study encompassed four benchmarking subjects, specifically from Serbia, Montenegro, Slovenia, and Croatia. The participating institutions identified a set of key human capital performance indicators that could be measured based on the framework proposed by Krstić & Rađenović (2019), organized across five measurement dimensions for 2024. The selected, specially designed set of human capital indicators (21 in total) within these dimensions is smaller than the number originally proposed in the Krstić & Rađenović (2019) framework.

The analysis includes the following HEIs:

1) Faculty of Economics, University of Niš (FEUN) from Serbia and is one of the leading higher education and research institutions in the field of economics and business in Serbia. Founded in 1960, it offers undergraduate, master's, and doctoral programs aligned with European educational standards. The faculty is recognized for its strong academic staff, diverse research activities, and active cooperation with national and international universities, businesses, and public institutions, fostering innovation, entrepreneurship, and regional economic development.

2) University of Montenegro (UOM), founded in 1974, is the oldest and largest public higher education institution in Montenegro. It consists of numerous faculties and research institutes offering programs across various disciplines (including economics, law, political science, natural sciences, engineering, medicine, humanities, arts, education, and maritime studies). The university is committed to academic excellence, scientific research, and international collaboration, playing a key role in the country's educational, cultural, and economic development. Due to the complexity of collecting and consolidating the necessary information at the level of the entire University of Montenegro (UoM), the analysis was conducted based on the available information, and the human capital performance indicators were calculated only for one unit of the UoM - namely, the Faculty of Economics in Podgorica.

3) Faculty of Civil and Geodetic Engineering (UL FGG) is a public higher education institute and a member of the University of Ljubljana (Slovenia). Educational and scientific research activities are mainly financed by the Republic of Slovenia. UL FGG is divided into eight scientific areas: geodesy, municipal economics and spatial planning, materials and structures, construction management, traffic and transportation constructions, hydraulic engineering, construction IT and basic subjects. The work is carried out in 21 educational-research units, 2 laboratories and 3 institutes.

4) Faculty of Economics and Business, University of Rijeka (EFRI) from Croatia, is a prominent Croatian institution dedicated to higher education and research in economics, business, and management. Established in 1961, it offers a wide range of undergraduate, graduate, and doctoral programs in accordance with the Bologna Process. The faculty is known for its commitment to academic excellence, international collaboration, and research supporting sustainable economic development and innovation at both the regional and European context.

The application of benchmarking analysis, combined with the examination of qualitative information provided by HEI staff, is intended to provide answers to critical questions regarding enhancement of the effectiveness and efficiency of human capital within HEIs, specifically:

RQ1. What are the factors influencing academic productivity in the observed HEIs?

RQ2. How can the structure, characteristics, and quality of human resources in HEIs be improved?

RQ3. How can teaching competencies be enhanced at the analyzed HEIs?

RQ4. Which aspects within the dimension of openness need to be improved or can be enhanced?

RQ5. What is the mobility of professors and other academic and research staff at HEIs?

These research questions were defined in such a way that each of them places a specific focus on one of the five selected measurement dimensions of human capital in HEIs.

This study employs the benchmarking method (Krstić 2001, 2001 a, 2001 b). The term “benchmark” denotes a standard for comparison - a reference point for measurement, evaluation, and analysis. Benchmarking, therefore, refers to the pursuit of higher standards of organizational performance through contrast with the best-performing entities (Brownlie, 1999).

The primary rationale for HEIs to adopt benchmarking is not merely its significance for assessing and controlling performance; rather, benchmarking should be considered an integral part of the performance management system of HEIs. The motivations and arguments for conducting various benchmarking studies are manifold and can generally be summarized as follows (Tasopoulou & Tsiotras, 2017; Shawyun, 2017; Williams, 2018; Radivojević *et al.*, 2019; Nugroho & Jaqin, 2021; Krstić, 2022)

1. Benchmarking is directly linked to performance improvement initiatives within HEIs.

2. Benchmarking identifies opportunities for improvement across various segments and domains, including educational, research, and so-called “third mission” (entrepreneurial) activities.

3. Benchmarking facilitates and supports HEIs in their efforts to become sector leaders.

4. Benchmarking helps reduce errors and omissions in strategic and operational decision-making by management.

5. Benchmarking contributes to maintaining and enhancing the existing position of HEIs in the higher education market, even in the context of intense or informal competition.

6. Benchmarking addresses specific challenges in HEI development by promoting the principle of learning from other HEIs that perform better in certain dimensions of organizational performance, both financial and non-financial, thereby contributing to the effective formulation of institutional objectives.

#### **4. Benchmarking Analysis and Results**

Benchmarking performance represents a methodological process for improving the performance of an organization, rather than merely a comparison of its outputs (Krstić *et al.*, 2014). Although the essence of benchmarking lies in comparative measurement and analysis, it requires specific preparatory activities prior to

execution and targeted actions after measurement and analysis to achieve meaningful conclusions and improvements (Krstić et al., 2016; Tasopoulou & Tsiotras, 2017; Shawyun, 2017). Benchmarking should be approached either as a discrete project or as a continuous activity; in this study, it is conducted analytically and systematically. Each HEI should develop its own benchmarking model based on its unique understanding, needs, and organizational structure (Krstić, 2022). The principal stages of the benchmarking process applied in this research serves to support managerial efforts aimed at more effective and more efficient decision-making are outlined as follows (Watson, 1993; Krstić, 2022):

1. Planning (design) of the benchmarking process for human capital performance in HEIs.
2. Collection of necessary data to establish an information base.
3. Analysis of data and identification of performance gaps (deviations).
4. Definition of measures and implementation of potential performance improvements.

**Table 2. Selected and specially designed HC performance indicators according to the performance measurement dimension and formulae for calculating HC performance indicators**

Dimensions	Indicators	Formula
Efficiency productivity	1. Total academic productivity of HEI	Total number of scientific/research results (conference papers, articles in journals, monographs, handbooks) divided by the Total number of academic/teaching staff in HEI.
	2. Academic productivity 1 of HEI	Total number of scientific/research results in SCI-indexed journals divided by the Total number of academic/teaching staff in HEI.
	3. Academic productivity 2 of HEI	Total number of scientific/research results in other journals divided by the Total number of academic/teaching staff in HEI.
Structure, characteristics and quality	4. The share of full professors	The number of full professors divided by the Total number of academic/teaching staff in HEI
	5. Non-academic to academic staff ratio	The number of employed non-teaching staff divided by the Total number of employed academic/teaching staff in HEI.
	6. The share of full professors and associate professors	The number of full professors and associate professors divided by the Total number of academic/teaching staff in HEI
	7. The share of assistant professors	The number of assistant professors divided by the Total number of academic/teaching staff in HEI.
	8. The share of teaching assistants, teaching assistants holding a PhD and teaching fellows	The number of teaching fellows, teaching assistants, and teaching assistants holding a PhD divided by the Total number of academic/teaching staff in HEI.
	9. The share of employees with a PhD	The number of employees with a PhD divided by the Total number of academic/teaching staff in HEI.
	10. The share of additionally educated professors and other academic staff (postdoctoral studies, sub-specializations, courses, workshops, etc.)	The number of additionally educated professors and other academic staff divided by the Total number of academic/teaching staff in HEI.

	11. Citations in Scopus of teaching staff in HEI at the end of the year, per teaching staff member	The total number of Citations in Scopus of teaching staff in HEI at the end of the year, divided by the Total number of academic/teaching staff in HEI.
	12. Professor-Student Ratio (at the level of undergraduate courses)	Number of professors divided by the Total number of enrolled students in the undergraduate program
Teaching competencies and their improvement	13. Time spent on specialization of academic / teaching staff (number of days) per employee staff member	Time spent on specialization of academic / teaching staff (number of days), divided by the Total number of academic/teaching staff in HEI.
	14. Number of internally organized education programs for academic/teaching staff in HEI per academic staff member	Number of internally organized education programs for academic/teaching staff in HEI, divided by the Total number of academic/teaching staff in HEI.
	15. Average number of years in the academic profession	The sum of the of years of all academic/teaching staff (full professors, associate professors, assistant professors, teaching assistants holding a PhD, teaching assistants holding an MBA, and teaching fellows holding an MBA) in the academic profession, divided by the Number of academic/teaching staff at the HEI.
Openness	16. Number of visiting fellows from other international universities per academic/teaching staff member of the domestic university/faculty	Number of visiting fellows from other international universities, divided by the academic/teaching staff of the domestic HEI.
	17. The share of students at the undergraduate course coming from other universities	Number of students at the undergraduate program coming from other universities, divided by the Total number of active students at the undergraduate programs.
	18. The share of students at the master's course coming from other universities	Number of students at the master program coming from other universities, divided by the Total number of enrolled students in the master program in one year.
	19. The share of PhD students coming from other universities	Number of PhD students coming from other universities, divided by the Total number of enrolled PhD students over the last four years.
	20. The share of published co-authored scientific papers with researchers from other universities	The number of published co-authored scientific papers with researchers from other universities, divided by the Total number of results (conference papers, journal articles, monographs, handbooks) for one year (2024) for all academic/ teaching staff in HEI.
Mobility of professors and researchers	21. The share of Faculty professors who visited foreign universities	The number of Faculty professors who visited foreign universities, divided by the Total number of academic/teaching staff in HEI.

*Source:* Authors, according to Krstić & Rađenović (2019)

Planning and designing the benchmarking study for the human capital performance of HEIs entails defining the subject of the benchmarking analysis, determining the instrument for measuring and comparing human capital performance indicators, and specifying the procedures and methodologies by which each indicator will be calculated for all benchmarking subjects included in this study (Table 2).

The collection of necessary data to establish an information base for a benchmarking study is the second step. For this study, measured human capital performance indicators were selected and organized as a segment of the Intellectual Capital Report of HEIs. This report also measured the performance of structural intellectual capital, relational intellectual capital, and green intellectual capital within the institutions.

Analysis of data and identification of performance gaps (deviations) is the third step. Table 3 presents the HC performance indicators, that were compared to determine the benchmark HEI, i.e., the institution demonstrating the highest observed performance.

**Table 3. Ranking and benchmark determination of HC performance for FEUN, UOM, ULFGG and EFRI for 2024**

Measurement Dimensions of HC	Indicator (I)	FEUN	Rank of HEI 1	UOM-Faculty of Economics	Rank of HEI 2	ULFGG	Rank of HEI 3	EFRI	Rank of HEI 4
Efficiency - productivity	I1. Total academic productivity of HEI	5,61	1	2	3	3,97	2	1,35	4
	I2. Academic productivity 1 of HEI	0,28	4	0,45	3	0,76	1	0,66	2
	I3. Academic productivity 2 of HEI	1,48	2	0,60	3	1,95	1	0,47	4
Structure, characteristics and quality	I4. The share of full professors	0,66	1	0,42	2	0,20	4	0,32	3
	I5. Non-academic to academic staff ratio	0,49	3	0,67	4	0,29	1	0,40	2
	I6. The share of full professors and associate professors	0,78	1	0,47	3	0,27	4	0,58	2
	I7. The share of assistant professors	0,03	4	0,27	1,2	0,27	1,2	0,11	3
	I8. The share of teaching assistants, teaching assistants holding a PhD and teaching fellows	0,18	3	0,27	2	0,10	4	0,38	1
	I9. The share of employees with a PhD	0,86	1	0,82	3	0,85	2	0,79	4
	I10. The share of additionally educated professors and other academic staff (postdoctoral studies, sub-specializations, courses, workshops, etc.)	0,28	3	0,47	2	0,11	4	0,81	1
	I11. Citations in Scopus of teaching staff in HEI at the end of the year, per teaching staff member	5,68	4	109,31	1	9,69	3	9,91	2
	I12. Professor-Student Ratio (undergraduate level)	0,024	4	0,030	3	0,080	1	0,050	2
Teaching competence	I13. Time spent on specialization of academic / teaching staff (number of	5,54	3	8,8	2	12,04	1	0,03	4

	days) per employee staff member								
	I14. Number of internally organized education programs for academic/teaching staff in HEI per academic staff member	0	4	0,11	1	0,07	2	0,03	3
	I15. Average number of years in the academic profession	22,65	3	19,49	4	32,38	2	43,14	1
Openness	I16. Number of visiting fellows from other international universities per academic staff member of the domestic university/faculty	0,35	3	0,51	1	0,03	4	0,47	2
	I17. The share of students at the undergraduate program coming from other universities	0,0004	4	0,014	3	0,06	1	0,030	2
	I18. The share of students at master program coming from other universities	0	3,4	0	3,4	0,38	1	0,16	2
	I19. The share of PhD students coming from other universities	0	4	0,025	3	0,079	2	0,92	1
	I20. The share of published co-authored scientific papers with researchers from other universities	0,17	3	0,29	2	0,62	1	0	4
Mobility	I21. The share of Faculty professors who visited foreign universities	0,015	4	0,155	2	0,04	3	0,40	1

Source: Authors

The definition of measures and the implementation of potential performance improvements constitute the core of benchmarking studies. All preceding phases of the benchmarking process must be fully realized through the benefits that benchmarking is expected to generate for HEI management - specifically, through more effective and efficient human resource management, as the most important resource of HEIs which function as educational, creative, innovative, and intellectual organizations.

## 5. Discussion and implications for HEIs' management

Table 4 presents the critical human capital performance indicators for the observed HEIs, classified according to three levels of priority for improvement (first, second, and third), as well as the indicators on which each institution already achieves benchmark performance. In this way, the table simultaneously identifies the key areas where managerial intervention is most urgently needed and the dimensions in which individual HEIs can serve as models of good practice for others.

**Table 4. Critical human performance indicators of HEIs according to priority levels and benchmark**

HEI	The first priority for human performance improvement	The second priority for human performance improvement	The third priority for human performance improvement	Benchmark	Total number of critical human capital performances
1	2	3	4	5	6
FEUN	I2, I7, I11, I12, I14, I17, I18, I19, I21	I5, I8, I10, I13, I15, I16, I20	I3	I1, I4, I6, I9	17
UOM – Faculty of Economics - Podgorica	I5, I15, I18	I1, I2, I3, I6, I9, I12, I17, I19	I4, I8, I10, I13, I20; I21	I11, I14, I16	18
UL FGG	I4, I6, I8, I10, I16	I11, I21	I1, I9, I14, I15, I19	I2, I3, I5, I12, I13, I17, I18, I20	13
EFRI	I1, I3, I9, I13, I20	I4, I7, I14	I2, I5, I6, I11, I12, I16, I17, I18	I8, I10, I15, I19, I21	16

*Source: Authors*

In addressing RQ1, Table 5 presents the measures for improving the efficiency–productivity dimension of HEIs.

**Table 5. Measures for improving the efficiency–productivity dimension of HEIs**

HEIs	Measures
FEUN	Stimulative measures for increasing the number of publications indexed in the SCI list
UOM – Faculty of Economics – Podgorica	Stimulative measures for increasing outputs indexed in the SCI list and for enhancing scientific/research results in other journals, conference papers, monographs, and handbooks
UL FGG	Stimulative measures for increasing research outputs in terms of conference papers, monographs, and handbooks
EFRI	Stimulative measures for increasing scientific/research results in other journals, as well as conference papers, monographs, and handbooks

*Source: Authors*

In addressing RQ2, Table 6 presents the measures for improving the (a) structure and (b) characteristics and quality of human resources in HEIs.

**Table 6. Measures for improving the (a) structure and (b) characteristics and quality of human resources in HEIs**

HEIs	Measures
FEUN	(a) Measures to increase the share of assistant professors within the total number of academic staff and enabling the career advancement of young scholars in associate positions after obtaining their doctoral degree; measures for rationalizing the number of administrative staff; measures for recruiting young professionals - teaching fellows - and engage teaching demonstrators in instructional activities.

	(b) Incentive measures for academic staff to publish in SCI-indexed journals in order to increase citation impact; measures for improving the Professor–Student Ratio through the recruitment of additional academic staff and the engagement of teaching demonstrators.
UOM – Faculty of Economics – Podgorica	(a) Measures for improving the ratio between academic and non-academic staff, including the rationalization of administrative positions; the high share of full and associate professors may indicate a need for more effective human resource management with respect to the age structure of the academic workforce, particularly through the recruitment of younger staff; incentive measures for the professional development of non-academic staff aimed at increasing their competencies and enabling them to obtain a doctoral degrees. (b) Measures for improving the Professor-Student Ratio through the recruitment of additional academic staff and the engagement of teaching demonstrators in instructional activities.
UL FGG	(a) Measures for improving the age structure of academic staff by increasing the number of young scholars, specifically through the recruitment of teaching fellows. (b) Measures for increasing the share of additionally trained and professionally upgraded professors and other academic staff (postdoctoral studies, sub-specializations, courses, workshops, etc.); incentive measures for academic staff to publish in SCI-indexed journals to increase citation impact.
EFRI	(a) Incentive measures for the professional development of non-academic staff aimed at increasing their competencies and enabling them to obtain a doctoral degrees; measures for improving the age structure of the workforce, particularly through generational rejuvenation.

Source: Authors

In addressing RQ3, RQ4, and RQ5, Table 7 presents the measures for improving the (a) structure and (b) characteristics and quality of human resources in HEIs.

**Table 7. Measures for improving the (a) teaching competencies, (b) openness, and (c) mobility of human resources in HEIs**

HEIs	Measures
FEUN	(a) Measures for implementing internally organized education and training programs for academic/teaching staff, as well as measures for increasing the time spent on the specialization and professional development of academic/teaching staff. (b) Measures for attracting students to undergraduate, master's, and PhD programs from other universities; measures for increasing the share of co-authored scientific papers published with researchers from other universities. (c) Incentive measures for increasing the share of faculty members who conduct visits to foreign universities.
UOM – Faculty of Economics – Podgorica	(b) Measures for attracting students to undergraduate, master's, and PhD programs from other universities; measures for increasing the share of published co-authored scientific papers with researchers from other universities.
UL FGG	(b) Measures for increasing the number of visiting fellows from other international universities. (c) Measures for increasing the share of faculty professors who have visited foreign universities.
EFRI	(a) Measures for implementing internally organized education and training programs for academic/teaching staff, as well as measures for increasing the time spent on the specialization and professional development of academic/teaching staff. (b) Measures for increasing the share of co-authored scientific papers with researchers from other universities.

Source: Authors

The benchmarking analysis of human capital performance conducted for the observed HEIs in 2024 enables their comparison and ranking according to:

(a) *Indicators on which each institution already achieves benchmark performance.*

As shown in Table 4, column 5, it can be observed that all HEIs have achieved at least some indicators that meet benchmark performance standards. Based on this criterion, the HEI with the highest number of benchmark indicators is UL FGG (8), followed by EFRI (5), FEUN (4), and UOM - Faculty of Economics, Podgorica (3).

(b) *Critical indicators that require the implementation of stimulating and corrective measures, as well as the specific human capital (HC) dimensions to which they belong* (Table 4, column 2). According to this criterion, the best-performing institution is UL FGG, which has only 13 first-priority indicators requiring improvement. It is followed, with minor differences, by EFRI (16) in second place, FEUN (17) in third place, and UOM – Faculty of Economics - Podgorica (18) in fourth place.

Furthermore, the benchmarking analysis allowed the identification of stimulating and corrective measures (presented in Tables 5, 6, and 7) that each HEI can implement within its critical performance areas to enhance human resource management in the upcoming year.

## **5. Conclusion**

This paper has shown that benchmarking, when embedded within the broader framework of intellectual capital management, is a useful managerial mechanism for identifying strengths, weaknesses, and development priorities in the human capital performance of higher education institutions. By applying a set of specially designed human capital performance indicators across four HEIs in Serbia, Montenegro, Slovenia, and Croatia, the study confirms substantial inter-institutional differences in academic productivity, staff structure and quality, teaching competencies, openness, and mobility. These differences reveal clear performance gaps, as well as concrete opportunities for targeted managerial intervention.

First, regarding to efficiency–productivity, the analysis indicates that HEIs need to systematically increase the volume and quality of scientific outputs, particularly in SCI-indexed journals and other recognized outlets. This requires not only stronger individual effort but also institutionalized incentive schemes and supportive research environments. Second, in the dimension of structure, characteristics, and quality of human resources, the results point to structural imbalances: in some HEIs, an excessive share of full and associate professors is combined with a low proportion of younger staff and assistant professors, as well as suboptimal ratios of academic to non-academic personnel. Third, the dimension of teaching competencies and their improvement reveals an insufficient level of internally organized education and specialization programs for academic staff, as well as a need for more systematic investment in lifelong learning. Fourth, the dimensions of openness and mobility demonstrate underutilized potential for internationalization, both in terms of incoming and outgoing academic flows and co-authored outputs with external partners.

Based on these findings, several action-oriented guidelines and recommendations for HEI management can be formulated:

- Institutionalize human capital benchmarking as a regular management tool.
- HEIs should not treat benchmarking as a one-off exercise but as a recurring component of their performance management system.
- Human capital indicators should be integrated into strategic and operational plans, annual reporting, and internal evaluation processes (e.g., as part of an Intellectual Capital Report).
- Strengthen research productivity and impact through targeted incentives.
- Design and implement stimulative schemes (both financial and non-financial) for publishing in SCI-indexed and other high-quality journals, as well as for producing monographs, handbooks, and conference papers.
- Link part of academic promotion and evaluation criteria to demonstrable improvements in human capital performance indicators (e.g., academic productivity, citations, co-authorship with external partners).
- Rebalance the structure and age profile of both academic and non-academic staff.
- Gradually increase the share of assistant professors and early-career academics by recruiting teaching fellows and junior researchers, while ensuring succession planning for an ageing professoriate.
- Optimize the non-academic to academic staff ratio by rationalizing administrative positions and upgrading non-academic staff competencies, including support for doctoral studies where relevant.
- Monitor staff structure indicators (Professor–Student Ratio, share of PhD holders, share of additionally educated staff) and use them as triggers for corrective action in recruitment and promotion policies.
- Invest in teaching competencies and continuous professional development programs.
- Systematically develop and deliver internally organized education and training programs for academic staff (pedagogy, digital skills, research methods, project management, etc.).
- Increase time and resources dedicated to staff specialization (postdoctoral studies, sub-specializations, courses, workshops), treating them as strategic investments in human capital rather than costs.
- Enhance openness and international integration of human resources.
- Introduce concrete measures to attract students from other universities and countries at all levels of study (undergraduate, master's, and PhD).

- Support and reward co-authored publications with researchers from other universities, using this indicator as a key proxy for external integration and engagement.
- Increase both incoming and outgoing mobility by expanding the number of visiting fellows, faculty exchanges, and short-term research stays at foreign universities, with clear institutional targets for the share of staff participating in such activities.
- Align human capital management with broader intellectual capital strategies.
- Human capital initiatives should be explicitly linked to the development of structural and relational capital (e.g., improved processes, digital infrastructures, and long-term partnerships with industry and public institutions).
- Results from human capital benchmarking should feed into strategic dialogues on university mission, positioning in the higher education market, and contribution to national and regional development.
- Use benchmarking results to prioritize interventions and allocate resources.
- Classifying indicators of indicators into priority levels (first, second, and third priority) provides a clear basis for sequencing reforms and focusing limited resources where they can generate the greatest marginal improvements.
- Each HEI should translate identified critical indicators into institution-specific action plans with defined timelines, responsible units, and measurable targets.

Finally, this study has certain limitations that open avenues for future research. The analysis is based on a relatively small number of HEIs, with data for Montenegro limited to a single faculty. Moreover, the benchmarking analysis conducted is static in nature, as it refers exclusively to the year 2024. This allowed only for the assessment of the current performance levels of the HEIs in achieving HC outcomes for this year and their comparison, accompanied by the identification of stimulating and corrective measures within critical areas of human resource management.

In addition, substantial differences were observed among the HEIs included in the study: they operate in different countries; they are governed by different regulatory frameworks; they have different organizational structures; they vary in their academic staff profiles, qualification structures, study programs, and administrative units responsible for supplying the data used in this research. All these factors made it particularly challenging to develop a unified framework for measuring HC performance indicators and to consolidate it into a set of 21 indicators.

Despite these limitations, the findings provide a robust empirical basis for HEI managers and policymakers who seek to enhance human capital as the central pillar of intellectual capital and to build more innovative, open, and competitive academic institutions.

## References

- Amidon, D. (2002). The Innovation Super Highway–Mobilizing Intellectual Assets. *Mednarodna konferenca Intelektualni kapital–Od potenciala do ustvarjene vrednosti*, 1-14.
- Angrist, N., Djankov, S., Goldberg, P., & Patrinos, H. A. (2019). Measuring human capital. Available at SSRN 3339416.
- Bezhan, I. (2010). Intellectual capital reporting at UK universities. *Journal of Intellectual Capital*, 11(2), 179-207.
- Brownlie, D. (1999). Benchmarking your marketing process. *Long Range Planning*, 32(1), 88-95.
- Bucăța, G., & Tileagă, C. (2023). THE ROLE OF HUMAN CAPITAL IN THE UNIVERSITIES' MANAGEMENT EFFICIENCY PROCESS. *Land Forces Academy Review*, 28(2), 136-147.
- Deming, D. J. (2022). Four facts about human capital. *Journal of Economic Perspectives*, 36(3), 75-102.
- Diab, Y. (2021). The concept of knowledge sharing in organizations (studying the personal and organizational factors and their effect on knowledge management). *Management Studies and Economic Systems*, 6(1/2), 91-100.
- Dumay, J. C. (2009). Intellectual capital measurement: a critical approach. *Journal of intellectual capital*, 10(2), 190-210.
- Dzinkowski, R. (2000). The measurement and management of intellectual capital. *Management accounting*, 78(2), 32-36.
- García-Carbonell, N., Guerrero-Alba, F., Martín-Alcázar, F., & Sánchez-Gardey, G. (2021). Academic human capital in universities: Definition and proposal of a measurement scale. *Science and public policy*, 48(6), 877-888.
- Golikov, A., Kudaka, M., Sergeev, V., Sergeeva, I., Tishin, P., & Tumakova, E. (2018). Human capital as a basis for the development of a modern university. In *MATEC Web of Conferences* (Vol. 193, p. 05059). EDP Sciences.
- Jurczak, J. (2008). Intellectual capital measurement methods. *Economics and organization of enterprise*, 1(1), 37-45.
- Kannan, G., & Aulbur, W. G. (2004). Intellectual capital: Measurement effectiveness. *Journal of intellectual capital*, 5(3), 389-413.
- Krstić, B., Stanisavljević, N., & Stanišić, T. (2014). Generic benchmarking in the aim of improving clusters' performances in Serbia. *Industrija*, 42(3), 79-100.
- Krstić, B., (2001) Benčmarking - menadžment alat za povećanje efikasnosti poslovanja (I), *Poslovna politika*, jun, 46-52.
- Krstić, B., (2001a) Benčmarking - menadžment alat za povećanje efikasnosti poslovanja (II), *Poslovna politika*, jul-avgust, 45-51.
- Krstić, B., (2001b) Benčmarking - menadžment alat za povećanje efikasnosti poslovanja (III), *časopis Poslovna politika*, septembar, 32-38.
- Krstić, B. (2007). УПРАВЉАЊЕ ПЕРФОРМАНСАМА ЉУДСКИХ РЕСУРСА КАО ДЕТЕРМИНАНТА КРЕИРАЊА ВРЕДНОСТИ И КОНКУРЕНТСКЕ ПРЕДНОСТИ ПРЕДУЗЕЋА. *Теме-Часопис за друштвене науке*, 2, 315-328.
- Krstić, B. (2009). Управљање интелектуалним перформансама предузећа. *Економске теме*, 47(2), 59-72.
- Krstić, B. (2014). *Upravljanje intelektualnim kapitalom preduzeća*. Niš: Ekonomski fakultet.

- Krstić, B., & Bonić, L.J. (2016). EIC: A new tool for intellectual capital performance measurement. *Prague economic papers*, 2016(6), 723-741.
- Radjenovic, T., & Krstic, B. (2017). Intellectual Capital in the Theory of the Firm. *Ekonomika*, 63(4).
- Krstić, B., & Krstić, M. (2018). Higher education as a factor of Serbian national economy competitiveness. In: *Improving the competitiveness of enterprises and national economies*. Niš, Serbia: Faculty of Economics, 1-28.
- Krstić, B., & Rađenović, T. (2018). *Strategijsko i operativno upravljanje intelektualnim kapitalom preduzeća*. Niš: Ekonomski fakultet.
- Krstić, B., & Rađenović, T. (2019). *Intelektualni kapital – mikro i makro aspekt*. Niš: Ekonomski fakultet.
- Krstić, B., & Rađenović, T. (2020). Performance Evaluation System as a Base for Designing the Intellectual Capital Report: The Case of Serbian Public Universities. In *Handbook of Research on Enhancing Innovation in Higher Education Institutions* (pp. 261-286). IGI Global.
- Krstić, B., Rađenović, T., & Jovanović, M. (2021). KLJUČNE DETERMINANTE UPRAVLJANJA INTELEKTUALNIM KAPITALOM UNIVERZITETA. *Proceedings of Faculty of Economics Brcko/Bornik Radova Ekonomskog Fakulteta Brčko*, 15(1), 47-54.
- Krstić, B., Radivojević, V., & Stanišić, T. (2016). Determinants of CEE countries' tourism competitiveness: A benchmarking study. *Management: Journal of Sustainable Business and Management Solutions in Emerging Economies*, 21(80), 11-22.
- Krstić, B., (2022). *Upravljanje poslovnim performansama*, Kragujevac: Ekonomski fakultet
- Leitner, K.-H., Schaffhauser-Linzatti, M., Stowasser, R., & Wagner, K. (2005). Data envelopment analysis as method for evaluating intellectual capital. *Journal of Intellectual Capital*, 6(4), 528-543.
- Mouritsen, J., Nikolaj Bukh, P., & Marr, B. (2004). Reporting on intellectual capital: why, what and how?. *Measuring Business Excellence*, 8(1), 46-54.
- Nugroho, B. H., & Jaqin, C. (2021). Implementation of benchmarking method for higher education institution: A literature review. *IJIEM (Indonesian Journal of Industrial Engineering & Management)*, 2(2), 81-93.
- O'Dwyer, B. (2005). User needs in Sustainability Reporting: a perspective from stakeholders in Ireland. *European Accounting Review*, 14(4), 759-787.
- O'Neill, M., & Bagchi-Sen, S. (2023). Public universities and human capital development in the United States. *GeoJournal*, 88(1), 733-751.
- Paloma Sánchez, M., & Elena, S. (2006). Intellectual capital in universities: Improving transparency and internal management. *Journal of Intellectual Capital*, 7(4), 529-548.
- Pasban, M., & Nojededh, S. H. (2016). A Review of the Role of Human Capital in the Organization. *Procedia-social and behavioral sciences*, 230, 249-253.
- Pedro, E., Leitão, J., & Alves, H. (2019). The intellectual capital of higher education institutions: Operationalizing measurement through a strategic prospective lens. *Journal of intellectual capital*, 20(3), 355-381.
- Petrović, B., Krstić, B., Vujatović, M. J., & Popović, S. (2025). Eco-innovations as a segment of green intellectual capital with the aim of strengthening the business sustainability. *Economics of Sustainable Development*, 9(2), 53-63.
- Petty, R., & Guthrie, J. (2000). Intellectual capital literature review: measurement, reporting and management. *Journal of intellectual capital*, 1(2), 155-176.

- Piber, M., & Pietsch, G. (2006). Performance measurement in universities: The case of knowledge balance sheets analyzed from a new institutionalist perspective. *Performance Measurement and Management Control: Improving Organizations and Society Studies in Managerial and Financial Accounting*, 16, 379-401.
- Radivojević, V., Krstić, B., Krstić, M., & Petković, M. (2019). Benchmarking agricultural and other environmental performances of Central and East European countries. *Економика пољопривреде*, 66(2), 471-484.
- Rafiee, M., Mosavi, M., & Amirzadeh, M. (2010). Formulating and Elaborating a model for the recognition of intellectual capital in Iranian Universities. *World Applied Science Journal*, 10(1), 23-28.
- Secundo, G., Margheritam, A., Elia, G., & Passiante, G. (2010). Intangible assets in higher education and research: mission, performance or both? *Journal of Intellectual Capital*, 11(2), 140-157.
- Shawyun, T. (2017). INTERNAL BENCHMARKING SYSTEM FOR HEIS' PERFORMANCE EXCELLENCE. *Journal of Institutional Research South East Asia*, 15(1), 63-80.
- Tasopoulou, K., & Tsiotras, G. (2017). Benchmarking towards excellence in higher education. *Benchmarking: An International Journal*, 24(3), 617-634.
- Ulrich D., (1998). Intellectual Capital = Competence x Commitment. *Sloan Management Review*, Winter, 15-26.
- Veselinović, N., Krstić, B., & Rađenović, T. (2022). The impact of human capital value on human capital efficiency and business performance. *Facta Universitatis, Series: Economics and Organization*, 013-026.
- Veselinović, N., Krstić, B., & Veselinović, M. (2021). Measuring the efficiency of human capital. *Economics of sustainable development*, 5(2), 1-17.
- Watson, H.G. (1993). *Strategic Benchmarking - How to Rate Your Company's Performance Against the World's Best*. John Wiley and Sons, Inc.
- Williams, R. (2018). Comparing and benchmarking higher education systems. In *Research Handbook on Quality, Performance and Accountability in Higher Education* (pp. 178-188). Edward Elgar Publishing.

#### **Acknowledgement:**

Funded by the European Union, under the GA101136834 - CROSS-REIS. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them. This work is the result of research based on the obligations under the Agreement in 2024 (No. 451-03-65/2024-03), concluded between Ministry of Science, Technological Development and Innovation of the Republic of Serbia and Faculty of Economics, University of Niš.

## **BENČMARKING KAO MEHANIZAM UNAPREĐENJA PERFORMANSI HUMANOG KAPITALA INSTITUCIJA VISOKOG OBRAZOVANJA**

**Apstrakt:** U ekonomiji koja je sve više zasnovana na znanju, visokoobrazovne institucije imaju ključnu ulogu u stvaranju i širenju intelektualnog kapitala. Ipak, mnoge evropske visokoškolske institucije i dalje pokazuju nizak nivo inovativnosti, slabe veze sa poslovnim sektorom i nedovoljno strateško upravljanje ljudskim

*resursima. Ovaj rad koristi benčmarking kao menadžerski mehanizam za unapređenje performansi humanog kapitala visokoškolske institucije u okviru šireg koncepta upravljanja intelektualnim kapitalom. Polazeći od koncepta Izveštaja o intelektualnom kapitalu, istraživanje identifikuje dimenzije performansi humanog kapitala, od kojih je svaka predstavljena specifičnim merljivim indikatorima. Korišćenjem benčmarking analize performansi humanog kapitala na odabranim visokoškolskim institucijama u Srbiji, Crnoj Gori, Hrvatskoj i Sloveniji, rad upoređuje rezultate performansi radi utvrđivanja najboljih praksi i identifikacije razvojnih razlika. Rezultati ukazuju na značajne međuinstitucionalne razlike u akademskoj produktivnosti, strukturi osoblja i stepenu međunarodne otvorenosti, ističući oblasti u kojima su neophodne menadžerske intervencije radi dostizanja ciljnog nivoa performansi. Rezultati naglašavaju značaj benčmarkinga, ne kao instrumenta za komparaciju, već i kao alata za proces kontinuiranog učenja i unapređenja koji podržava donošenje odluka zasnovanih na dokazima, povećava transparentnost i podstiče razvoj inovativnog i preduzetničkog akademskog okruženja.*

**Ključne reči:** *Benčmarking, institucije visokog obrazovanja, humani kapital, merenje performansi, indikatori.*