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PERFORMANCE RESEARCH: A BIBLIOMETRIC
MAPPING AND CONCEPTUAL SYNTHESIS**Wang Xinyue¹, Mohd Ridwan Abd Razak^{2*}¹Faculty of Management and Economics, Universiti Pendidikan Sultan Idris, Malaysia p20231000764@siswa.upsu.edu.my <https://orcid.org/0009-0003-0071-5962>^{2*}Faculty of Management and Economics, Universiti Pendidikan Sultan Idris, Malaysia mridwan@fpe.upsu.edu.my <https://orcid.org/0000-0001-7223-8104>

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Abstract:

This study examines research on the relationship between human capital (HC) and organizational performance (OP). It aims to map the knowledge structure of the field and address conceptual fragmentation in HC, variation in OP measurement, and the limited integration of theoretical explanations. Bibliometric mapping and conceptual synthesis were applied to 1,135 English articles and reviews indexed in Scopus from 2010 to 2025. The bibliometric analysis examined annual scientific production, co-citation structure, keyword co-occurrence, and the temporal overlay of author keywords. The conceptual synthesis compared HC definitions, levels of analysis, and OP measures. The results show that publication output increased from 23 articles in 2010 to 164 in 2025, representing an annual growth rate of 13.99%. The knowledge base draws mainly on the resource-based view, strategic management, dynamic capabilities, and intellectual capital research. The temporal overlay identifies artificial intelligence, digital transformation, green innovation, and sustainability as relatively recent research directions. Based on this evidence, the study develops the Conceptual Evolution and Classification Framework of Human Capital. It distinguishes individual HC, collective HC, strategic HC, HC as a component of intellectual capital, and HC in specific contexts. The Hierarchical Framework of OP in HC Research first distinguishes financial from nonfinancial performance. It then divides nonfinancial performance into market, operational, innovation, social and sustainability, and competitive domains. An integrative figure also presents possible links among HC forms, potential organizational mechanisms, and OP domains without treating them as established causal paths. The study provides a structured basis for defining HC constructs, selecting suitable OP measures, and improving comparison across studies.

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Organizational Performance; Performance Measurement

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Introduction

In business environments shaped by knowledge, rapid technological change, and increasing competition, human capital (HC) is commonly understood as the knowledge, skills, abilities, and other characteristics that individuals can use productively to create economic value (Aziegbe-Esho, 2025). HC is widely regarded as an important foundation for organizational knowledge, innovation, adaptability, and strategic capability. Many previous studies have used direct effect models to examine the relationship between HC and organizational performance (OP). However, these studies mainly explain whether HC is related to OP. They provide less systematic explanation of how HC at the individual level is converted into performance at the organizational level. Employee knowledge, skills, experience, and abilities may be directly associated with organizational performance. However, their organizational contribution may also depend on how these attributes are integrated, configured, and applied. Relevant mechanisms include human resource management systems, knowledge sharing, organizational learning, innovation activities, and resource allocation (Bos-Nehles et al., 2023; Singh et al., 2021; Peng et al., 2023). Understanding the relationship between HC and OP therefore requires attention to the forms of HC involved, the organizational mechanisms through which they are applied, and the performance outcomes associated with this process.

A major challenge in the literature is the conceptual fragmentation of HC. Classical human capital theory mainly adopts an individual level perspective and views HC as productive capacity developed through education, training, knowledge accumulation, and work experience (Schultz, 1961; Becker, 1964; Mincer, 1974). Later management research extended HC to the team, business unit, and organizational levels. It explains how individual capabilities can become collective capabilities and organizational resources through interaction, coordination, and integration (Ployhart & Moliterno, 2011; Nyberg et al., 2014; Ray et al., 2023). Strategic management and intellectual capital research have further connected HC with capabilities that are specific to a firm, strategic talent, structural capital, relational capital, and organizational knowledge. Research has also examined digital, artificial intelligence, green, and sustainability related capabilities. These concepts are related, but they differ in their levels of analysis, theoretical foundations, and roles in value creation. Treating them as a single form of HC may reduce conceptual clarity and limit the comparability of research findings.

A related problem is the heterogeneity of OP measurement. Some studies use financial indicators such as profitability, return on assets, sales growth, and market value. Others examine productivity, operational efficiency, customer satisfaction, innovation output, market position, competitive advantage, corporate social responsibility, or sustainability performance.

These indicators reflect different aspects of organizational value creation and may represent different processes and time horizons (Crook et al., 2011; Subramaniam & Youndt, 2005; Surroca et al., 2010). Financial performance generally reflects realized economic outcomes, whereas operational, market, innovation, and sustainability performance may represent different stages or domains of value creation. Studies may therefore claim to examine the same relationship between HC and OP while using different HC constructs and different dimensions of OP. This conceptual and measurement variation may help explain why previous studies have produced different findings.

Theoretical explanations of the relationship between HC and OP also remain insufficiently integrated. Human capital theory emphasizes the productive value of investment in people. The resource-based view explains how valuable, rare, and difficult to imitate human resources may support competitive advantage. Strategic human resource management focuses on how organizations develop, motivate, and deploy employee capabilities. The knowledge-based view and intellectual capital research examine how HC interacts with structural capital, relational capital, and organizational knowledge systems. These perspectives explain different parts of the relationship between HC and OP, but they are often applied separately. Bibliometric analysis can identify the knowledge base, influential literature, and conceptual structure of a research field, but it cannot by itself clarify conceptual boundaries or establish causal relationships. Conceptual synthesis can address these issues, but it requires systematic and transparent evidence from the literature. Combining bibliometric mapping with conceptual synthesis can therefore support both structural analysis and conceptual clarification.

Based on this logic, the study examines 1,135 journal articles and reviews indexed in Scopus from 2010 to 2025. Bibliometrix and VOSviewer are used to analyse annual scientific production, cited reference co-citation, author keyword co-occurrence, and the temporal overlay of author keywords. The search focuses on literature that connects human capital with organizational, firm, financial, corporate, and business performance. These terms identify the central body of research on HC and OP. The conceptual synthesis then examines the definitions, levels of analysis, and performance indicators used in the selected studies. This process allows more specific domains of market, operational, innovation, social and sustainability, and competitive performance to be identified from the included literature. These domains are therefore derived from the conceptual synthesis rather than from an assumption that the search terms directly cover every dimension of OP.

The study uses bibliometric analysis to examine the development, knowledge foundations, and core conceptual relationships of research on HC and OP. It then uses conceptual synthesis to clarify the meanings, levels of analysis, and boundaries of different forms of HC. This analysis leads to the Conceptual Evolution and Classification Framework of Human Capital. The study also reorganizes the diverse OP indicators used in previous research. It first distinguishes financial from nonfinancial performance and then organizes the main domains of nonfinancial performance. This analysis leads to the Hierarchical Framework of OP in HC Research. By connecting bibliometric evidence with these two frameworks, the study supports clearer definitions of HC, more appropriate selection of OP indicators, and greater comparability across future studies.

Literature Review

Human Capital: From Individual Attributes to Organizational Resources

The classical theory of human capital mainly explains human capital at the individual level. It believes that education, training, knowledge and work experience are productive investments, which can improve personal productivity and economic returns (Schultz, 1961; Becker, 1964; Mincer, 1974). In this tradition, human capital refers to the knowledge, skills, abilities, experience and other characteristics of economic value possessed by individuals (Aziegbe-Esho, 2025). This perspective lays the foundation for human capital research. However, it only provides a limited explanation for how the ability among employees is transformed into organizational resources and promotes organizational performance.

Since then, management research has extended human capital from the individual level to teams, business departments and even the whole organization. Ployhart and Moliterno (2011) pointed out that individual knowledge, skills, abilities and other characteristics can develop into human capital resources at the unit level through interaction and coordination. Nyberg et al. (2014) also divided individual human capital and collective human capital resources in a similar area. Therefore, organizational human capital is not just a simple superposition of employee attributes. Human capital developed when individual capabilities are shared, coordinated and integrated. The resource-based view further points out that when employee capabilities are scarce, difficult to imitate, enterprise-specific, and in line with organizational processes, human capital may become a valuable strategic resource (Barney, 1991; Wright et al., 1994; Coff & Kryscynski, 2011). However, professional knowledge does not automatically create organizational value. Its contribution depends on how the organization uses collaborative relationships, management systems and resource allocation to mobilize this knowledge (Hitt et al., 2001; Jiang et al., 2012; Bos-Nehles et al., 2023).

The study of intellectual capital places human capital in a broader system of organizational intangible resources. From this perspective, human capital represents the knowledge and ability of employees, and its application in the organization partly depends on structural capital, relational capital and organizational knowledge system (Bontis, 1998; Bontis et al., 2000; Youndt & Snell, 2004). Employee knowledge can be transformed into organizational resources when retained, shared and applied through organizational structure, workflow, information system and collaborative relationships. This perspective links individual abilities with organizational conditions that support their collective use.

Recent studies have also explored human capital in the context of digital environment and sustainable development. Digital skills, data capabilities and artificial intelligence-related capabilities have been found to be closely related to organizational adaptability and innovation in the digital environment (An et al., 2024; Meena & Santhanalakshmi, 2025). Environmental knowledge, green skills and sustainable development capabilities are related to green innovation and sustainable performance (Cabral & Dhar, 2019; Munawar et al., 2022; Pratiwi et al., 2025). These situational abilities show that the performance and relevance of human capital may vary depending on the technology, environment and strategic environment. At the same time, the increasingly widespread use of different labels and analytical levels blurs the boundaries between individual attributes, collective resources, intellectual capital elements and abilities in specific situations. This conceptual diversity makes it necessary for us to clarify the

evolutionary process, connotation and analytical boundaries of different human capital concepts.

Organizational Performance: Dimensions and Measurement Approaches

Organizational performance is a multidimensional construct that reflects the extent to which an organization achieves its objectives and creates value. It includes financial results and nonfinancial outcomes related to markets, operations, innovation, social responsibility, sustainability, and competitive position (Venkatraman & Ramanujam, 1986; Richard et al., 2009). The selection of performance dimensions is particularly important in research on human capital and organizational performance. Different indicators represent distinct aspects of value creation and may reflect different organizational processes and time frames. Treating them as equivalent measures may therefore obscure important differences among the outcomes examined in previous studies.

Financial performance is commonly measured through profitability, return on assets, return on equity, sales growth, market value, and shareholder returns. These indicators reflect realized economic outcomes and facilitate comparisons across firms. They have been widely used to examine the relationships among human capital, intellectual capital, and firm performance (Crook et al., 2011; Youndt & Snell, 2004; Paeleman & Vanacker, 2015). However, financial indicators often represent outcomes at a relatively late stage of value creation and are affected by many organizational and environmental factors. Nonfinancial indicators provide a broader perspective by capturing outcomes such as productivity, service quality, process improvement, innovation output, customer responses, social responsibility, and sustainability practices (Subramaniam & Youndt, 2005; Surroca et al., 2010; Georgakakis et al., 2017). These outcomes have different theoretical meanings and should not be combined into a single nonfinancial performance construct without further distinction.

Measurement heterogeneity is further complicated because some indicators may belong to more than one performance domain. Sales growth may represent either a financial outcome or market performance. Organizational reputation may reflect both market and competitive performance, while green innovation may represent both innovation and sustainability performance. Indicators should therefore be classified according to their primary conceptual meaning, measurement purpose, and theoretical function, while their possible relevance to other domains should also be recognized. Existing research lacks a consistent structure that distinguishes broad performance categories, specific performance domains, and individual indicators. Organizing organizational performance across these levels provides a clearer basis for developing a hierarchical framework.

Integrating Bibliometric Mapping and Conceptual Synthesis

Existing HC and OP research faces three related limitations. HC has been examined at individual, collective, organizational, strategic, and context specific levels. These perspectives are related but are not always directly comparable (Ployhart & Moliterno, 2011; Nyberg et al., 2014; Ray et al., 2023). OP has also been measured through diverse financial and nonfinancial indicators, which makes comparison across studies more difficult (Crook et al., 2011; Subramaniam & Youndt, 2005; Surroca et al., 2010). In addition, human capital theory, the resource-based view, strategic human resource management, intellectual capital research, and

the knowledge-based view explain different parts of organizational value creation but remain insufficiently integrated.

These limitations indicate a need for conceptual integration. Bibliometric mapping identifies the intellectual foundations, representative publications, and conceptual relationships of the field, but it cannot independently define construct boundaries or establish causal relationships. Conceptual synthesis complements this evidence by comparing definitions, levels of analysis, performance indicators, and theoretical explanations. This study therefore combines both approaches to develop an HC classification framework and an OP hierarchical framework.

Methodology

This study combines bibliometric mapping and concept synthesis to examine the research in the fields of human capital (HC) and organizational performance (OP). The study traces the evolution of knowledge base, development trajectory and conceptual structure in this field. Specifically, bibliometric mapping analyses publishing trends, keyword associations and co-citation structures; at the same time, conceptual synthesis clarifies the main forms of human capital and integrates the diversified indicators of organizational performance into a systematic framework.

The literature data was obtained from Scopus on April 8, 2026. Scopus provides extensive coverage and structured metadata covering the fields of business, management, economics and social sciences. The search query is carried out for the document title, abstract and author's keywords through the following search strings:

TITLE-ABS-KEY ("human capital") AND TITLE-ABS-KEY ("organizational performance" OR "financial performance" OR "firm performance" OR "corporate performance" OR "business performance") AND PUBYEAR > 2009 AND PUBYEAR < 2026 AND (LIMIT-TO (DOCTYPE, "ar") OR LIMIT-TO (DOCTYPE, "re")) AND LIMIT-TO (LANGUAGE, "English")

The search covered English articles and reviews published from 2010 to 2025 and yielding an initial sample of 1,136 records. One duplicate with the same title, authors, publication year, and source was removed during data import. The final dataset therefore contained 1,135 publications. The performance terms in the search string served as broad entry points for identifying research on organizational performance. The conceptual synthesis then identified more specific performance domains from the measures reported in the included publications. These domains included market, operational, innovation, social and sustainability, and competitive performance.

The bibliometric analysis was conducted using bibliometrix 5.2.1 in R 4.5.3 and VOSviewer 1.6.20. Bibliometrix was accessed through the Biblioshiny 5.0 interface and was used to generate the dataset overview and annual scientific production (Aria & Cuccurullo, 2017). VOSviewer was used to construct the author keyword co-occurrence network, the cited reference co-citation network, and the temporal overlay of author keywords (van Eck & Waltman, 2010). The analysis applied full counting and association strength normalization. Author keywords were required to occur at least five times. Cited references were required to receive at least 15 citations within the dataset. A total of 128 cited references met this threshold and formed three clusters. The temporal overlay was based on the average publication year

associated with each keyword. All other clustering parameters remained at their default settings, and no thesaurus file was used.

The conceptual synthesis not only refers to the original dataset, but also draws on the basic research identified in the co-citation analysis. The synthesis focuses on studies that clearly define HC, distinguish its levels, or conceptualize and measure OP.. Research that only mentions these terms as background concepts fails to provide a basis for framework construction. The selected evidence is manually coded according to the definition of human capital, the level of analysis, the theoretical basis, the measurement indicators of organizational performance and the purpose of measurement. The relevant human capital concepts are classified and integrated, while retaining the essential differences between the levels of analysis and the boundaries of ideas. In addition, organizational performance indicators are divided into financial and nonfinancial categories, and each indicator is classified and organized according to its core conceptual meaning. When an indicator covers multiple fields, its main theoretical role in the original study determines its position in the framework.

The final human capital classification framework and organizational performance hierarchy framework are obtained through systematic conceptual comparison and qualitative interpretation. These frameworks are not automatically generated by the literature measurement cluster. The literature measurement network shows the structural correlation, but it cannot prove the causal relationship between specific human capital dimensions and organizational performance results. Table 1 outlines the complete analysis procedure and its corresponding research results.

Table 1: Analytical Procedure and Research Outputs

Analytical Stage	Main Procedure	Research Output
Data Retrieval	Searching Scopus for English articles and reviews (2010–2025)	Initial dataset of 1,136 records
Data Preparation	Removing one duplicated record	Final dataset of 1,135 publications
Descriptive Analysis	Dataset overview and annual scientific production	Table 2 and Figure 1
Science Mapping	Keyword co-occurrence, temporal overlay, and reference co-citation analysis	Conceptual and intellectual structure of the field
Conceptual Synthesis	Comparing and categorizing HC constructs and OP measures	HC classification framework and OP hierarchical framework

Bibliometric Mapping

Based on the final dataset containing 1,135 publications, this section shows the results of literature measurement research. The study explores four aspects in the fields of HC and OP: the scale and annual growth rate of literature, the main knowledge base, the conceptual relationship between keywords, and the spatial and temporal evolution of the research topic. The overview of the dataset and the annual publication trend reflect the development and change pattern in this field. Co-citation analysis reveals the main knowledge basis, while keyword co-occurrence analysis highlights the relationship between core concepts. The time

overlay diagram further shows the evolution of the research topic and highlights the recent research hotspots. Together, these results provide organized evidence for the subsequent conceptual synthesis. However, bibliometric results alone cannot define the conceptual boundaries of HC and OP or establish causal relationships between specific forms of HC and specific performance outcomes.

Dataset Overview and Publication Growth

The final dataset contains 1,135 publications published between 2010 and 2025 across 587 sources. Table 2 summarizes the main characteristics of the dataset. A total of 2,883 authors contributed to the literature, averaging 2.85 coauthors per paper. International co-authorship accounted for 28.28% of the publications. At the time of data retrieval, each document averaged 29.08 citations. Together, these indicators provide an overview of the scale, citation profile, and collaboration patterns of research on HC and OP.

Table 2: Overview of Data

Main Information	Value
Timespan	2010–2025
Documents	1,135
Sources	587
Annual Growth Rate	13.99%
Average Citations per Document	29.08
Authors	2,883
Coauthors per Document	2.85
International Co-authorship	28.28%

Figure 1 presents the annual scientific production from 2010 to 2025. The number of publications increased from 23 in 2010 to 164 in 2025, with an annual growth rate of 13.99%. Although publication output fluctuated in some years, the field showed a clear pattern of growth over the study period. This growth became more evident after 2019. The trend indicates continued scholarly attention to the relationship between HC and OP. However, growth in publication volume does not mean that the concepts and measures used in the field have become consistent. It is therefore necessary to examine its intellectual foundations and conceptual structure.

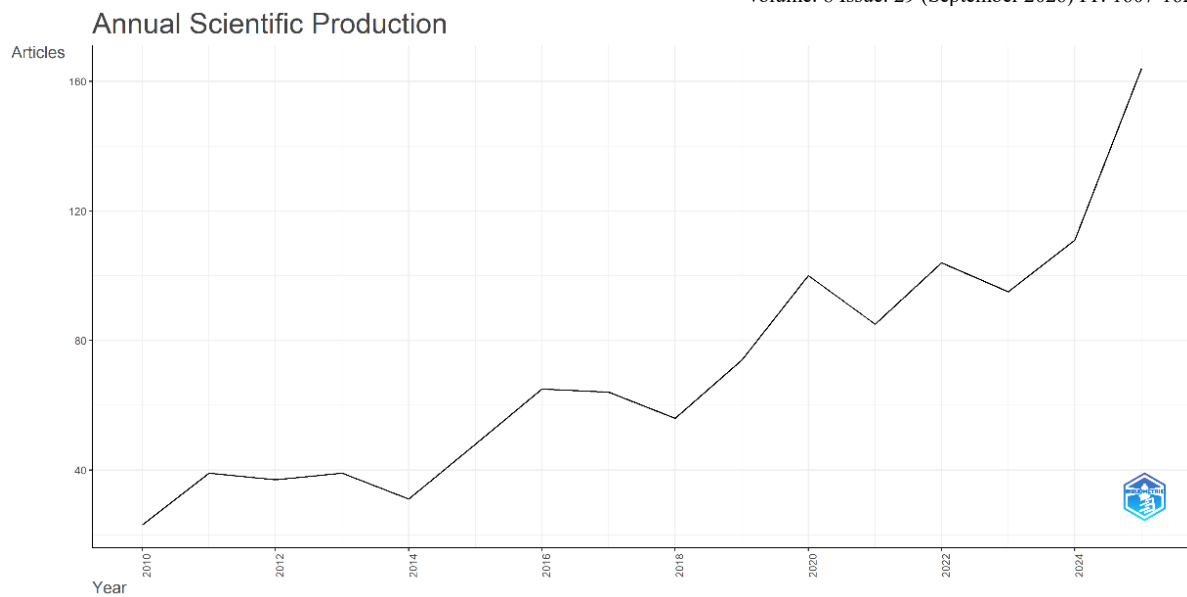


Figure 1: Annual Production in HC and OP Research

Intellectual Foundations of HC and OP Research

Co-citation analysis was used to identify the theoretical, conceptual, and methodological works that are frequently cited together in the field. Table 3 presents representative references in the co-citation network and summarizes their main contributions.

Table 3: Key Intellectual Foundations of HC and OP Research

Rank	Key Reference	Main Contribution to HC and OP Research	Citations
1	Barney (1991)	Resource based view, strategic resources, and sustained competitive advantage	136
2	Bontis (1998)	Intellectual capital measurement and model development	99
3	Bontis et al. (2000)	Intellectual capital and business performance	88
4	Wernerfelt (1984)	Early development of the resource-based view of the firm	61
5	Subramaniam and Youndt (2005)	Intellectual capital and innovation capability	60
6	Fornell and Larcker (1981)	Measurement validity and structural equation modelling	54
7	Teece et al. (1997)	Dynamic capabilities and strategic renewal	53
8	Stewart (1997)	Intellectual capital and organizational intangible value	49
9	Sharabati et al. (2010)	Intellectual capital and business performance	48
10	Smriti and Das (2018)	Intellectual capital and firm performance	47
11	Hitt et al. (2001)	Human capital, strategy, and firm performance	47

Note: Citation values represent the number of citations received by each cited reference within the analysed dataset, as reported by VOSviewer. They do not represent global Scopus citation counts.

Representative literature shows that human capital (HC) research draws on a variety of related knowledge traditions. Barney (1991), Wernerfelt (1984), Teece et al. (1997) and Hitt et al. (2001) represent the resource based view, strategic management and dynamic capabilities. These studies explain how valuable, unique and difficult-to-imitate human resources within an enterprise can support organizational capabilities and competitive advantages. Bontis (1998), Bontis et al. (2000), Subramaniam and Youndt (2005), Sharabati et al. (2010) and Smriti and Das (2018) represent the tradition of intellectual capital. This tradition emphasizes the relationship between human capital, structural capital, relational capital, knowledge creation and innovation ability. The research of Fornell and Larcker (1981) also reflects the impact of the methodological path used in measuring effectiveness and structural models. These intellectual foundations reveal several theoretical perspectives on human capital in previous studies. Researchers define human capital as a productive capacity, strategic resource, and an important part of the organization's intangible assets. However, the co-citation relationship only shows the use of references in the field, and does not directly define the category or conceptual boundaries of HC. Therefore, these boundaries need to be further clarified through conceptual synthesis.

Keyword Structure and Temporal Development

Keyword co-occurrence analysis was used to examine the relationships among the main concepts in HC and OP research. Figure 2 shows that human capital, organizational performance, firm performance, and intellectual capital occupy central positions in the network. These concepts represent the main focus of the field.

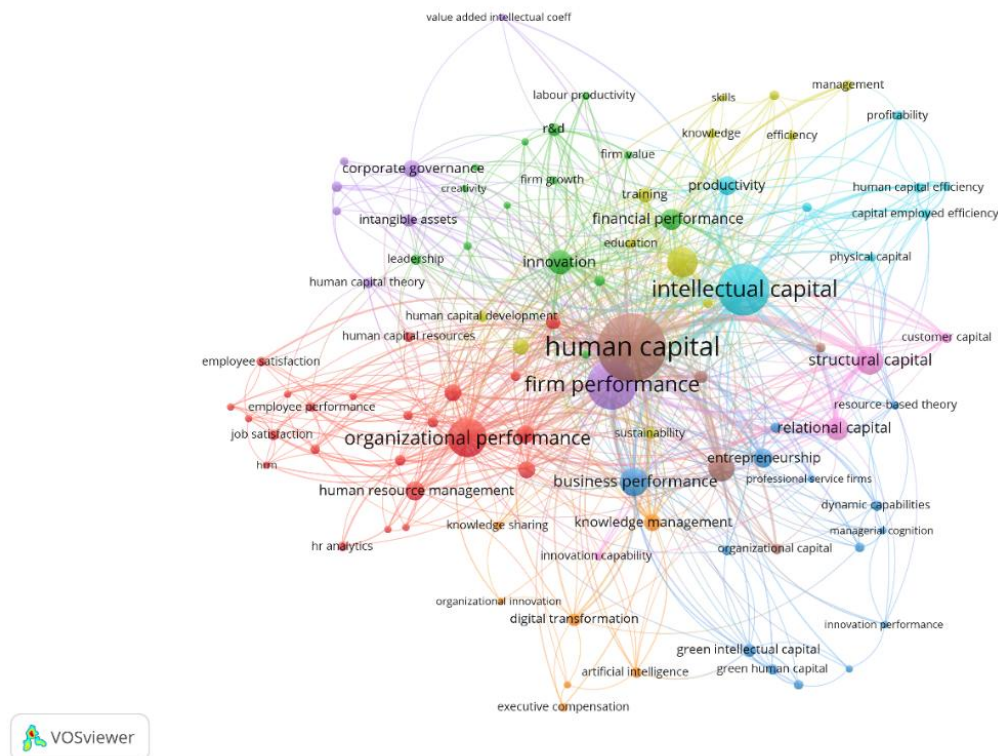


Figure 2: Keyword Co-occurrence Network of HC and OP Research

The network also connects human capital (HC) with human resource management, training, knowledge sharing, innovation, structural capital, relationship capital, financial performance and productivity. These associations show that previous studies have not only explored the relationship between human capital and performance indicators but also analyzed the organizational processes that may link the two, such as human resource management, knowledge sharing and innovation. However, the keyword co-occurrence only shows that relevant concepts appear frequently in the literature at the same time, which does not prove that there is an mediating effect, or that a specific form of human capital will lead to specific performance results.

Figure 3 shows the temporal overlay based on the average year of publication of each author's keyword. Compared with more mature research topics such as intellectual capital, structural capital, relational capital and financial performance, artificial intelligence, digital transformation, green innovation, corporate social responsibility and sustainability represent a relatively new research direction. Temporal overlay shows that the research on human capital (HC) and organizational performance (OP) has gone beyond the traditional discussion of human capital, intellectual capital and financial performance. Recent research has increasingly focused on topics such as digitalization, artificial intelligence, green innovation and sustainability. However, the average year of publication only reflects the relative time position of each keyword in the dataset and does not indicate whether the emerging theme replaces the original research tradition.

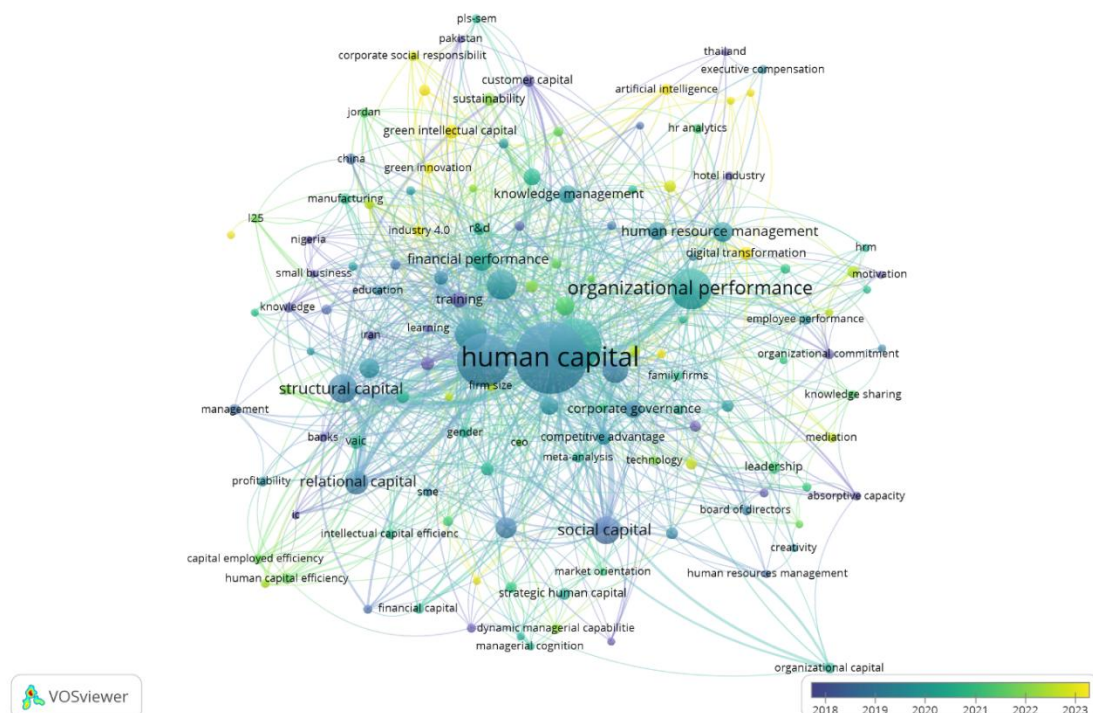


Figure 3: Temporal Overlay of Author Keywords in HC and OP Research

Taken together, the publication trend, co-citation structure, keyword associations, and temporal overlay show that HC and OP research has developed a broad knowledge base. However, differences remain in how HC is conceptualized, how OP is measured, and how the theoretical relationships between them are explained. The next section therefore compares definitions, levels of analysis, and performance measures to develop the HC classification framework and the OP hierarchical framework.

Conceptual Synthesis and Framework Development

The conceptual synthesis examines the conceptual differences identified through bibliometric mapping. It focuses on variations in HC definitions and levels of analysis, as well as the diverse financial and nonfinancial measures of OP. Bibliometric relationships alone cannot establish construct boundaries or classification rules. The analysis therefore compares the definitions, theoretical foundations, analytical levels, and performance measures reported in representative studies.

The synthesis first traces the development of HC from individual productive capacity to collective capability, strategic resource, a component of intellectual capital, and capability within a specific context. This analysis supports the Conceptual Evolution and Classification Framework of Human Capital. It then organizes OP measures into financial and nonfinancial performance and classifies specific domains according to their primary meaning and measurement purpose. Indicators relevant to more than one domain are classified by their main theoretical function, while their possible overlap is acknowledged. This analysis supports the Hierarchical Framework of OP in HC Research. An integrative figure then presents possible links among HC forms, organizational mechanisms, and OP domains. These links are drawn from previous literature and do not constitute a third framework or establish causal relationships.

Classification Framework of Human Capital

The conceptual synthesis shows that the development of HC does not involve one definition simply replacing another. Different research traditions focus on who possesses HC, its level of analysis, its strategic value, its position within organizational intangible assets, and its content in specific contexts. Based on definitions, levels of analysis, theoretical foundations, and primary conceptual functions, this study identifies five analytical forms of HC: individual human capital, collective human capital, strategic human capital, human capital as a component of intellectual capital, and human capital in specific contexts. Table 4 presents their definitions and distinguishing criteria. These forms are not mutually exclusive stages of development. The same HC construct may have several attributes and should be classified according to its primary conceptual focus.

Table 4: Conceptual Evolution and Classification Framework of Human Capital

HC Form	Core Definition	Main Level of Analysis	Distinguishing Criterion	Representative Literature
Individual human capital	Knowledge, skills, abilities, experience, and other productive attributes developed through education, training, and experience	Individual	The attributes are possessed by individuals and are not assumed to have become team or organizational capabilities	Schultz (1961); Becker (1964); Mincer (1974); Crook et al. (2011)
Collective human capital	Shared capability formed when individual	Team, business	The focus is on how individual capabilities form a collective	Ployhart and Moliterno (2011); Nyberg

HC Form	Core Definition	Main Level of Analysis	Distinguishing Criterion	Representative Literature
Strategic human capital	knowledge and skills are combined through interaction, coordination, and knowledge sharing Human capital that is relevant to organizational strategy and is valuable, scarce, specific to the firm, or difficult to imitate	unit, or organization Mainly organization	resource that is more than their simple sum The main criterion is the relationship between HC, organizational strategy, resource configuration, and competitive advantage	et al. (2014); Ray et al. (2023) Barney (1991); Wright et al. (1994); Coff and Kryscynski (2011)
Human capital as a component of intellectual capital	Employee knowledge and capabilities positioned within a system that also includes structural and relational capital	Mainly organization	The focus is the position of HC within the organizational intangible asset system rather than a different level of analysis	Bontis (1998); Bontis et al. (2000); Subramaniam and Youndt (2005)
Human capital in specific contexts	Specialized knowledge and capabilities related to digitalization, artificial intelligence, environmental management, or sustainability	Individual or organization	A separate form is recognized only when the content and measurement of the capability have clear contextual features	Cabral and Dhar (2019); Munawar et al. (2022); An et al. (2024); Pratiwi et al. (2025)

The main difference between individual and collective human capital concerns the location and formation of capability. Individual human capital refers to the education, knowledge, skills, and experience possessed by employees. Collective human capital emerges when these attributes are combined through interaction, coordination, and knowledge sharing (Ployhart & Moliterno, 2011; Nyberg et al., 2014). It is therefore more than the simple sum of individual capabilities. The presence of highly capable employees does not necessarily mean that an organization has developed collective capability.

Strategic human capital and human capital as a component of intellectual capital represent different theoretical perspectives. Strategic human capital focuses on whether HC is aligned with organizational strategy and possesses the value, specificity, and difficulty of imitation needed to support competitive advantage (Barney, 1991; Wright et al., 1994; Coff & Kryscynski, 2011). In contrast, the intellectual capital perspective examines the position of HC within the broader system of organizational intangible assets and its relationship with structural and relational capital (Bontis, 1998; Bontis et al., 2000). The strategic perspective therefore emphasizes the value of HC for competitive advantage, whereas the intellectual capital

perspective explains its conceptual position within a broader intangible asset system. These perspectives may overlap, but they should not be treated as equivalent.

Human capital in specific contexts reflects the extension of HC research into areas such as digitalization, artificial intelligence, and sustainability. Digital skills, data capabilities, artificial intelligence competencies, environmental knowledge, and green skills may represent distinct forms of HC (Cabral & Dhar, 2019; Munawar et al., 2022; An et al., 2024; Pratiwi et al., 2025). However, the research context alone does not justify the creation of a separate HC category. When a study examines general knowledge and skills in a digital or environmental setting without defining distinct capabilities or measures, the construct is more appropriately classified as individual, collective, or strategic human capital.

The framework provides principles for identifying and classifying HC concepts rather than a set of fixed and mutually exclusive categories. Future studies can classify an HC construct according to its primary definition, level of analysis, and theoretical function while still recognizing possible overlap across categories. This approach can reduce the risk of treating constructs with different meanings and analytical levels as equivalent. It can also improve comparability across studies. However, the framework does not imply that any particular form of HC necessarily leads to a specific organizational performance outcome.

Hierarchical Framework of Organizational Performance

The conceptual synthesis shows that OP is not a single and uniform outcome. Previous studies measure it through profitability, market value, productivity, innovation output, customer response, social responsibility, and competitive advantage. These indicators represent different aspects of organizational value creation and have different measurement purposes. This study therefore develops a two-level structure. The first level distinguishes financial from nonfinancial performance. The second level divides nonfinancial performance into market, operational, innovation, social and sustainability, and competitive performance. The term hierarchical refers to the nested organization of performance categories. It does not imply an order of importance, a sequence of development, or a causal relationship. These domains were derived from the measures used in the included publications rather than predetermined by the search terms.

Table 5: A Hierarchical Framework of OP in HC Research

Broad Performance Category	Performance Domain	Core Meaning	Typical Indicators
Financial performance	Financial outcomes	Reflects realized economic returns and financial value	ROA, ROE, ROI, profitability, revenue or sales growth, Tobin's Q, shareholder return
Nonfinancial performance	Market performance	Reflects customer response, brand performance, and market position	Market share, customer satisfaction, customer retention, brand value, sales volume

Broad Performance Category	Performance Domain	Core Meaning	Typical Indicators
	Organizational performance	Reflects internal efficiency, quality, and process outcomes	Productivity, operational efficiency, service quality, product quality, process improvement
	Innovation performance	Reflects knowledge application, organizational renewal, and the creation of new products or processes	New products, patents, innovation output, process innovation, organizational innovation, technology application
	Social and sustainability performance	Reflects outcomes for stakeholders, society, and the environment	Corporate social responsibility performance, ESG performance, environmental performance, green performance, stakeholder value
	Competitive performance	Reflects the organization's relative strategic position and capacity to adapt	Competitive advantage, relative competitive position, organizational resilience, adaptability

Note: The hierarchy represents the nested classification of broad performance categories and specific performance domains. It does not indicate their relative importance or a necessary causal order.

Financial performance reflects relatively final economic outcomes and is commonly measured through accounting indicators or measures based on market valuation (Crook et al., 2011; Youndt & Snell, 2004; Paeleman & Vanacker, 2015). Profitability, ROA, and ROE capture realized accounting returns. Tobin Q value and shareholder return reflect the capital market's valuation of the organization. Although the latter indicators involve the market, they are mainly measured by financial value and are therefore classified as financial performance.

Nonfinancial performance covers other results created by organizational value. Market performance focuses on customer response and market position; organizational performance focuses on internal efficiency, quality and productivity; innovation performance focuses on knowledge application and organizational renewal; social and sustainability performance focuses on stakeholders, social and environmental results; competitive performance focuses on relative strategic position and long-term adaptability. (Subramaniam & Youndt, 2005; Surroca et al., 2010; Georgakakis et al., 2017). These results may have appeared before the financial results, but the framework does not arrange them in a fixed order.

Some indicators may be applicable to multiple fields at the same time, so the classification is based on the definition, measurement purpose and main theoretical functions of each indicator in the original research. For example, sales growth measured in revenue is classified as financial performance, while market share or sales volume is classified as market performance. When the focus is on new products or new processes, green innovation should be classified as innovative performance; when the focus is on environmental results, it should be classified as social and sustainability performance. Reputation may represent market performance when

reflecting customer evaluation, and competitive performance when reflecting relative strategic status. When the main function is not clear, the indicator should be reported as relevant in multiple fields.

The framework clarifies the main meaning and outcome level represented by each OP measure. It allows future studies to select indicators that match their research questions and improves comparison between studies that use different performance measures. However, the framework does not assume a fixed order among performance domains or suggest that a particular form of HC necessarily produces a specific OP outcome.

Integrating HC Forms, Potential Organizational Mechanisms, and OP Domains

The HC classification framework clarifies the main forms of human capital examined in previous studies, while the OP hierarchical framework distinguishes the main performance domains. Many studies report a direct relationship between HC and OP. However, whether and how HC is associated with organizational outcomes may also depend on how it is developed, integrated, allocated, and used. HRM systems, knowledge sharing and integration, organizational learning, innovation activities, and strategic resource allocation can therefore be viewed as potential organizational mechanisms (Bos-Nehles et al., 2023; Singh et al., 2021; Peng et al., 2023). These mechanisms complement explanations of the direct relationship rather than reject it. They do not form a third framework and were not empirically tested in this study.

Different HC forms may be associated with several OP domains through different organizational processes. Individual HC may be linked to operational outcomes through capability development, job allocation, and knowledge application. Collective HC may support operational and innovation performance through knowledge integration, team coordination, and organizational learning. Strategic HC may be related to competitive and financial performance through strategic alignment and resource allocation. HC as a component of intellectual capital may connect with innovation, market, and financial outcomes through structural capital, relational capital, and organizational knowledge systems. HC in digital, artificial intelligence, green, and sustainability contexts may be associated with innovation and social and sustainability outcomes through technology application and green innovation activities (Ployhart & Moliterno, 2011; Subramaniam & Youndt, 2005; Munawar et al., 2022; An et al., 2024).

The OP domains represent different aspects of organizational value creation rather than a fixed sequence. The use of HC may be reflected in productivity, process quality, innovation output, market response, or financial performance. However, nonfinancial outcomes do not necessarily lead to financial results. The same HC form may be associated with several OP domains, while the same OP outcome may involve several forms of HC and organizational mechanisms.

Figure 4 places the two formal frameworks within one analytical structure by presenting HC forms on the left, potential organizational mechanisms in the middle, and OP domains on the right. It helps future studies select and align specific HC constructs, organizational mechanisms, and OP measures.

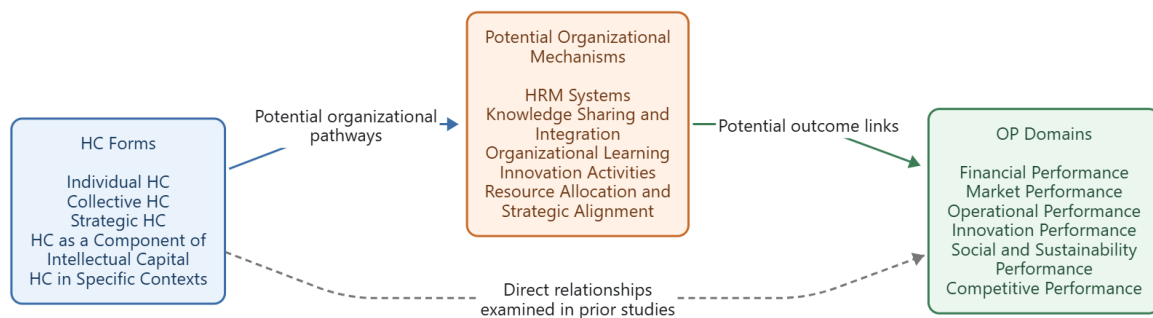


Figure 4: HC Forms, Organizational Mechanisms, and OP Domains

Note: The solid arrow indicates the potential organizational path identified from the previous literature. The dotted arrow indicates the direct relationship between HC and OP examined in previous studies. The figure does not show a verified causal path or a fixed direct relationship.

Conclusion

This study combines bibliometric mapping and conceptual synthesis to deal with the problems of conceptual fragmentation, differences in performance evaluation methods and insufficient theoretical integration in human capital (HC) and organizational performance (OP) research. The analysis covers 1,135 English-language articles and reviews included in the Scopus database from 2010 to 2025. The research results show that the publication output continues to grow, and the knowledge system is influenced by the resource-based view, strategic management, dynamic ability and intellectual capital research. Keyword analysis also reveals the relationship between human capital and human resource management, knowledge sharing, innovation, productivity and intangible assets. Temporal overlay analysis shows that artificial intelligence, digital transformation, green innovation and sustainability have become relatively new research directions. These topics do not replace the existing field of human capital and organizational productivity research but expand it.

Two formal frameworks have been constructed by the concept synthesis: the conceptual evolution and classification framework of human capital, and the hierarchical framework of organizational productivity in human capital research. Together, these frameworks clarify the conceptual boundaries between different forms of organizational performance (HC) and distinguish a wide range of performance categories from more specific organizational performance (OP). At the same time, they also recognize that the construction of HC and performance indicators may overlap between different categories. Therefore, these constructions and indicators should be interpreted according to their main definitions, analysis levels, measurement purposes and theoretical functions.

The integrative figure further aligns HC forms, potential organizational mechanisms, and OP domains, but does not treat the proposed relationships as empirically tested causal paths.

There are several limitations of this study. The analysis is based on the Scopus database, and only English literature and review articles are included. Retrieval terms cover the main content of organizational performance research but may not directly identify each specific performance area. In addition, the literature measurement network reflects more the citation relationship and conceptual association than the causal relationship. Future research can empirically investigate the proposed relationship according to the situations of different industries, countries and

organizations. They can also study the conditions under which specific forms of HC (human capital) and organizational mechanisms are associated with specific financial and nonfinancial performance areas.

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