

CONCEPTUAL AND METHODOLOGICAL CHALLENGES IN THE QUANTIFICATION OF INTELLECTUAL CAPITAL: A FUNDAMENTAL APPROACH

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Abstract

The contribution of intangible resources, particularly intellectual capital (IC), to business performance remains an extremely important and timely topic in the specialized literature, despite the existence of a significant body of work on this subject. In this context, the main challenge for companies lies in identifying the most accurate methods for evaluating it. Thus, the present research is fundamental, taking the form of a comprehensive review of the specialized literature, with the aim of identifying the contribution and utility of IC in creating organizational performance, as well as the gaps and difficulties in identifying standardized methods for evaluating IC that can be applied. The results of our research reveal, on the one hand, that no standard method for evaluating IC has yet been identified in the specialized literature that would incorporate all the determining factors of a concrete assessment, and, on the other hand, that the proposed calculation methods still have limitations in terms of applicability and interpretation. We believe that this research is useful both to the academic community, by expanding the body of scientific literature on this topic, and to the management of business organizations, which can identify the contribution of IC components to organizational success and, consequently, base their managerial decisions on this knowledge.

Key words: *organizational performance; methods for evaluating intellectual capital; limitations of intellectual capital evaluation*

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INTRODUCTION

In a knowledge-based economy that is increasingly digitized, complex, and interconnected, business organizations are increasingly focused on identifying innovative strategies to differentiate themselves from the competition and gain a competitive advantage. In this context, the research conducted by Asutay (Asutay & Ubaidillah, 2023) and focused on examining the impact of intellectual capital (IC) on financial performance within Islamic banks has demonstrated the need to develop their innovation capacity in order to remain competitive in a fiercely competitive financial market. Furthermore, the study reveals a significant positive impact of IC on financial performance indicators, particularly on profitability indicators, as well as an inconclusive impact in terms of productivity.

In this context, we conclude that the assessment of IC and its components is of major importance as key determinants of financial performance. For these reasons, the current literature focuses on identifying models for assessing IC (Buenaño et al., 2025; Yin & Xu, 2025), with the aim of identifying standardized calculation methods and formulas that can be applied by companies, since a consensus has not yet been reached regarding their effectiveness and applicability in different contexts, particularly in the context of accelerating digital transformations within companies, where IC plays a fundamental role in creating value and achieving competitive advantage. In this research, we aim to analyze the literature focused on this topic in order to identify the main gaps encountered in the evaluation of the IC, which lead to difficulties in identifying calculation methods capable of

quantifying the true value of IC in business organizations, with a focus on both the analysis of the evaluation methods proposed in the literature and the individual evaluation of IC components.

Over time, the concept of IC has taken on various connotations. According to the DEX Explanatory Dictionary of the Romanian Language, the term “capital” is defined as a set of economic assets owned by an individual, which can be used to create goods or services with the aim of generating profit. The concept of “intellectual” implies an activity performed by the human mind, that is, an activity initiated by the human intellect. Thus, by combining these two definitions, we can identify an economic explanation of IC. Consequently, IC represents the totality of all attributes possessed by an employee—attributes that the employee can utilize through the direct engagement of the intellect to produce goods or services in a professional and intellectual manner, so that the client/consumer is satisfied with the product/service provided, and the business organization remains profitable. In other words, IC can be defined as the set of elements related to employees’ knowledge and skills, which they use in their professional work and which contribute to creating value for the employing organization.

With regard to the definition of IC, we consider the research conducted by Hatamizadeh to be relevant, as it focuses on clarifying ambiguities in the definition of IC and its components (Hatamizadeh et al., 2020). Thus, IC has been defined as the capital derived from the interaction between the ability to think and generate ideas and the existence of an internal and external organizational environment conducive to this process, which contributes to creating added value for organizations and, implicitly, to their performance.

Thus, in the context of our research, two research questions arise:

Q1 - Is IC a resource capable of determining and sustaining an organization’s performance?

Q2 - To what extent can the contribution of IC in a business organization be evaluated?

This study is organized into sections designed to answer the research questions stated above. Thus, the following section aims to demonstrate the extent to which IC is a resource capable of determining and sustaining an organization’s performance (Q1).

The analysis will be based on the specialized literature that has addressed this concept, as well as relevant findings. Continuing the research, the next section will present a meta-analysis of the most relevant studies that have attempted to evaluate IC using various formulas. The third section presents the methodology used, and the fourth section reports the results and discussions based on the analyzed literature, using the bibliometric map generated by the VOSviewer program as a starting point. The paper concludes with a final section that summarizes the main findings, presents the theoretical and methodological implications of the study, and outlines future research directions.

I. LITERATURE REVIEW

1.1. Theoretical Framework: The Contribution of Intellectual Capital to Organizational Performance

The contribution of IC to organizational performance is a widely debated research topic in the literature (Abdallah et al., 2025; Barak et al., 2023; Prasad & Mondal, 2025; Ryu et al., 2021). However, this issue has been addressed in the literature from multiple perspectives. Thus, in this section, we aim to review studies focused on this topic, which will allow us to identify an answer to the research question formulated earlier, regarding the extent to which IC can determine and sustain organizational performance. Thus, a first study we consider relevant in this regard is by Ur Rehman and colleagues, who, in a study focused on identifying the relationship between IC and the innovative performance of organizations - a relationship mediated, on the one hand, by managerial control systems and business strategies, and on the other hand, by the organization’s innovation capabilities, reveals the significant impact of IC on the managerial control system, business strategies, and innovative performance (Ur Rehman et al., 2021).

The study also demonstrates that the managerial control system, business strategies, and innovative capabilities lead to a significant improvement in innovative performance. The research also reveals that the managerial control system and business strategies have a significant impact on the relationship between IC and innovative performance, and that innovative capabilities, as a moderating variable, significantly influence the link between IC and innovative performance. In conclusion, the study demonstrates the presence of a significant link between IC, innovation, and performance. From another perspective, the study conducted by Do and colleagues, which aimed to investigate the impact of IC on organizational performance, reveals that there is a positive correlation between organizational performance and IC, as well as between organizational performance and the components of IC (Do et al., 2022). In this regard, the research reveals that among the components of IC, human capital is the primary driver of financial performance, as it exerts both direct and indirect influences on it. The study also reveals that intellectual property rights mediate the relationship between intellectual property and organizational performance. This relationship is explained by the fact that intellectual property rights encompass all legal rights associated with trademarks, copyrights, or various inventions—elements found within IC.

In light of the above, we believe that organizations' effective management of intellectual capital and its integration into business strategies can be a key determinant of organizational success. Thus, IC becomes a key element, a valuable asset, that contributes fundamentally to the monitoring and management of business organizations. From this perspective, the research conducted by Baldini and Liberatore on a sample of listed Italian companies, which aimed to analyze the internal mechanisms of corporate governance, specifically the composition of the board of directors, dual roles, shareholder structure, type of auditor, and size of the audit committee, which all contribute to the disclosure of IC in companies' annual reports, demonstrated that the proportion of independent directors has a positive impact on IC disclosure (Baldini & Liberatore, 2016). Furthermore, the study reveals causal links between the size of the board of directors and IC, as well as between its structure and IC. Regarding dual roles, an inverse relationship is demonstrated between them and IC disclosure.

From another perspective, we consider relevant the research conducted by Tran and other authors, which focuses on identifying the effects of the independent and combined elements of IC and corporate social responsibility (CSR) on the performance of a sample of companies listed on the Vietnamese capital market, reveals the existence of a direct relationship between both structural capital efficiency and capital employed efficiency and firm performance (Tran et al., 2022). The study also reveals the effects of IC and CSR on organizational performance. The bibliometric research conducted by Grosu and colleagues highlights the causal links between CSR, sustainability, and integrated reporting, and reveals a trend in the literature focusing on the importance of human capital and sustainability reporting on business performance (Grosu et al., 2022). Thus, the studies cited above highlight the crucial importance of IC as a key determinant of business organization performance. For these reasons, there is an urgent need to identify methods for evaluating its contribution to creating added value for organizations. In this regard, the following section is dedicated precisely to this endeavor.

1.2. Analysis of Methods for Evaluating Intellectual Capital

As demonstrated in the previous section, IC holds strategic importance for business organizations, given its contribution to the creation of added value and, by extension, to superior performance for companies. For these reasons, four components of IC have been identified in the literature: capital employed, human capital, structural capital, and relational capital, which we present in the table below, in accordance with the literature.

Table 1. Components of IC

Components	Elements of the Components	References
Capital Employed	Total assets Equity Long-term liabilities	(Dancaková & Glova, 2024; Xu & Zhang, 2021)
Capital Human	Skills and abilities Experience Education, training Creativity, innovation	(Barak et al., 2023; Huynh et al., 2024; Yin & Xu, 2025)
Structural structural	Processes and procedures IT infrastructure Intellectual property	(Nazneen et al., 2025; Nour et al., 2024; Yin & Xu, 2025)
Relational Relational	Customer relationships Supplier relationships Relationships with business partners Investor relations Community relations	(Khanchel et al., 2025; Yin & Xu, 2025)

Source: own compilation based on the literature

In the specialized literature, the capital efficiencies presented in Table 1 are conceptualized as the ratio between the firm's value added and the resources associated with the analyzed capitals. This reflects the ability of capitals to generate economic value for firms, an efficiency reflected in the IC index. The validity of this calculation formula is supported by the literature through studies (Khalil et al., 2024; Nazneen et al., 2025; Rong et al., 2025) that use these indicators in empirical analyses of the IC. Furthermore, the literature presents two main categories of IC assessment, which we summarize using the calculation formulas presented in Table 2, in correlation with the relevant scientific research.

Table 2. Methods for evaluating IC

Method	Acronym	Components	References
Value-Added Intelligence Coefficient	VAIC	+ employed capital efficiency coefficient + human capital efficiency coefficient + structural capital efficiency coefficient	(Habib & Dalwai, 2024; Mandariani & Cave, 2025; Muftiasa et al., 2023; Soenarno & Kheay, 2025)
Modified Value-Added Intellectual Coefficient	MVAIC	+ employed capital efficiency coefficient + human capital efficiency coefficient + structural capital efficiency coefficient + relational capital efficiency coefficient	(Asutay & Ubaidillah, 2023; Khanchel et al., 2025; Lekić et al., 2021; Yin & Xu, 2025)

Source: own elaboration

The study published by Asutay and Ubaidillah, analyzing the individual components of IC, demonstrates both the positive link between invested capital and human capital, as well as the insignificant link between structural capital and financial performance (Asutay & Ubaidillah, 2023). This is also demonstrated by a study conducted by Yin and Xu based on Chinese companies from 2018 to 2021 (Yin & Xu, 2025). Aiming to analyze the impact of IC on financial performance in the context of digitalization, the authors used the MVAIC calculation method and demonstrated that, during the analyzed period, IC led to superior organizational performance. Thus, the results of this study reflect the existence of a positive relationship between human capital, relational capital, and employee capital and organizational performance, while structural capital does not have a significant influence.

In assessing IC, the VAIC calculation method is often used to evaluate the impact of IC on financial performance. For example, Nazneen and colleagues used this calculation method to analyze the impact of IC on financial performance for 24 public sector companies in India (Nazneen et al., 2025). Using the VAIC calculation method, the authors demonstrated that firms effectively use IC to increase sales. Furthermore, the authors showed that IC makes no contribution to increasing productivity and profitability. Moreover, it was demonstrated that sales are driven by human and structural capital. However, the authors caution against overinterpreting the results of the analysis, as there are methodological limitations regarding VAIC. It should be noted that this calculation method excludes relational capital from the analysis.

With the aim of analyzing the role of IC in Indian companies, authors Prasad and Mondal examined 65 companies in the manufacturing industry and 35 companies in the service sector to identify sectoral and disparities (Prasad & Mondal, 2025). The authors analyzed financial performance in relation to IC, using the MVAIC method as an evaluation tool. The results demonstrate the direct influence of structural capital, with sectoral disparities identified regarding whether or not there is a positive impact on performance. As a component of the MVAIC method, the correlation between human capital and the efficiency of capital employed reveals a negative impact across all sectors. Furthermore, the econometric results of the study demonstrate the positive impact of relational capital on performance in the services sector. In the conclusions, the authors note that companies should prioritize optimizing only those elements of IC that have a significant impact on enhancing performance.

This demonstrates that MVAIC offers a more comprehensive calculation method, as it incorporates elements of relational capital, which make a significant contribution to performance. Some of the analyzed studies, conducted by both Lekić and Asutay and their collaborators, chose this calculation method, considering that the implications of this calculation framework offer more analytical possibilities (Lekić et al., 2021; Asutay & Ubaidillah, 2023). Indeed, MVAIC includes external factors in its calculation components, which can serve as useful reference points for users. We note that the use of both calculation methods, VAIC and MVAIC, allowed for an in-depth analysis of IC, highlighting the utility of their constituent components, particularly the additional contribution of relational capital, which is integrated only into the MVAIC method.

Regarding the relationship between IC and the innovative performance of enterprises, the research conducted by Ur Rehman demonstrates the mediating role of IC between them (Ur Rehman et al., 2021). The utility of the research derives from the theoretical model developed, centered on the role of IC in the development of business strategies based on innovative capacity and performance. In line with the previously cited study, Mata and colleagues used the results of questionnaires administered to 308 employees and managers in the Portuguese IT sector to analyze the link between collaborative innovation and financial performance (Mata et al., 2024). Following econometric modeling, the researchers concluded that firm performance is supported by collaborative innovation, and absorptive capacity can mediate this relationship, while IC directly strengthens it.

To highlight the main contributions of the literature on IC and its utility, Table 3 presents a synthesis of relevant studies in the form of a literature review.

Table 3. Overview of the literature

Author, year	Purpose	Results/conclusions	Impact
(Qiu et al., 2025)	Assessment of SME efficiency through the adoption of eco-friendly practices regarding human capital, green IC, and green innovation.	The emphasis on creating new opportunities, incentives, and enhancing human capital has an impact on the development of green	The study demonstrates the utility of applying the skills-motivation-opportunity theory, offering a current contextual approach to

Author, year	Purpose	Results/conclusions	Impact
		products and process improvement.	improving SME performance.
(Gariba et al., 2025)	Based on human capital, this study examines the evolution of institutional quality by analyzing migration flows, digitalization, and IC.	A significant, positive link is demonstrated between migration, digitalization, institutional quality, and IC.	The volatility of IC is presented through the lens of an analysis of determining factors, such as digitalization and institutional quality.
(Suryantini et al., 2024)	The study aimed to analyze the improvement of competitiveness through the involvement of IC and sustainability performance.	The results highlight the link between competitive advantage and IC through the effective use of sustainability performance.	The study is useful to companies because it demonstrates that competitive advantage and IC are created by the role of sustainability performance.
(Asutay & Ubaidillah, 2023)	Analysis of the relationship between IC and performance.	The findings showed that profitability is impacted by IC, while the relationship between productivity and IC is inconclusive.	The study is useful for assessing the level of IC performance, based on which a more effective implementation policy can be reorganized.
(Barak et al., 2023)	Analysis of IC in relation to return on assets.	IC elements are significant in relation to return on equity.	The efficient use of IC contributes to sustaining competitiveness.
(Skhvediani et al., 2023)	Assessment of the relationship between IC and organizational performance.	There is a positive influence between company performance and IC, both at the level of human capital and structural capital.	The study provides a basis for analyzing organizations, offering insights into the relationship between revenue and IC.
(Ali et al., 2022)	Comparative analysis between financial performance and IC.	The impact of relational capital efficiency is not particularly significant on firm performance.	The analysis of relational capital efficiency is useful to investors in making financial decisions.
(Radonic et al., 2020)	Revealing the impact of IC on organizational performance.	Innovative capital has the greatest impact on financial performance.	The study provides the ability to understand and effectively manage IC.
(Ryu et al., 2021)	Analysis of relational capital as an important component in the era of open innovation.	Relational capital impacts the capacity for innovation, and innovative capital influences organizational performance.	Important managerial implications from the perspective of the relationship between innovation capital and performance.

Source: own elaboration

Thus, from the analysis of previous studies, highlights the strategic importance of IC and its constituent elements as a resource capable of driving and sustaining an organization's long-term performance. In practice, studies have demonstrated that the use of this resource leads to value creation for organizations, thereby answering our first research question (Q1). If studies have demonstrated the causal relationship and the role of IC as a determining factor in financial performance, it follows that it is important to identify methods for evaluating as accurately as possible the contribution of this intangible element to the creation of strategic added value and competitive advantage, which is the subject of the second research question (Q2). Thus, the following section is dedicated to presenting the research methodology through which we seek to answer this research question.

II. RESEARCH METHODOLOGY

To map the landscape of IC evaluation methods, we conducted a bibliometric analysis of the specialized literature. We chose this method because we consider it the most robust approach for identifying research clusters present in the relevant specialized literature pertaining to the subject under analysis. Since we wanted to ensure the quality and relevance of the sources, we used the Web of Science (WoS) platform to collect and interpret trends in the scientific literature on this topic. The structured search strategy for articles was carried out using Boolean operators and relevant search queries, employing key e terms such as "intellectual capital," "intangible assets," "performance," "components of intellectual capital," "intellectual capital valuation," "conceptual framework," "model," and "matrix." The analysis included only scientific articles published in full in specialized journals, and excluded research presented at conferences, as well as books or scientific articles that are not open access. All

analyzed articles were published in English. Thus, this approach maximizes coverage of the relevant literature by ensuring relevant results.

Following the application of search filters, 887 scientific articles published between 1998 and 2025 were identified. The resulting articles were imported into VOSviewer, and based on the co-occurrence analysis of key terms, the software selected 2,606 terms, of which only 96 met the threshold of at least five occurrences. Setting this threshold served to limit the selection to only those terms relevant to the subject of analysis, thereby eliminating terms that appear sporadically and do not have a significant influence on the analysis results. To ensure an integrated data cleaning process, we standardized terms with complementary meanings to avoid fragmentation of concepts in the analysis. No duplicates were recorded. Furthermore, the analysis was conducted using the network visualization method, thereby allowing for the highlighting of term frequencies, the relationships between the analyzed terms, and their clustering.

The following section presents the results and related discussions resulting from the processing of bibliometric information using the VOSviewer software.

III. RESULTS AND DISCUSSION

An analysis of the literature review highlights conceptual diversity regarding the relationship between IC and innovation (Ur Rehman et al., 2021), digitalization (Gariba et al., 2025), the green economy (Qiu et al., 2025), performance (Asutay & Ubaidillah, 2023). In this regard, for the structural conceptual analysis of IC, we analyzed 887 articles that featured methods or models for evaluating this element as key components (Buenaño et al., 2025; Yin & Xu, 2025). Using term co-occurrence analysis with the VOSviewer program, we can visualize the conceptual map resulting from the analysis of the specialized studies. The term network is presented in Figure 1 and highlights the methodological fragmentation regarding IC quantification methods.

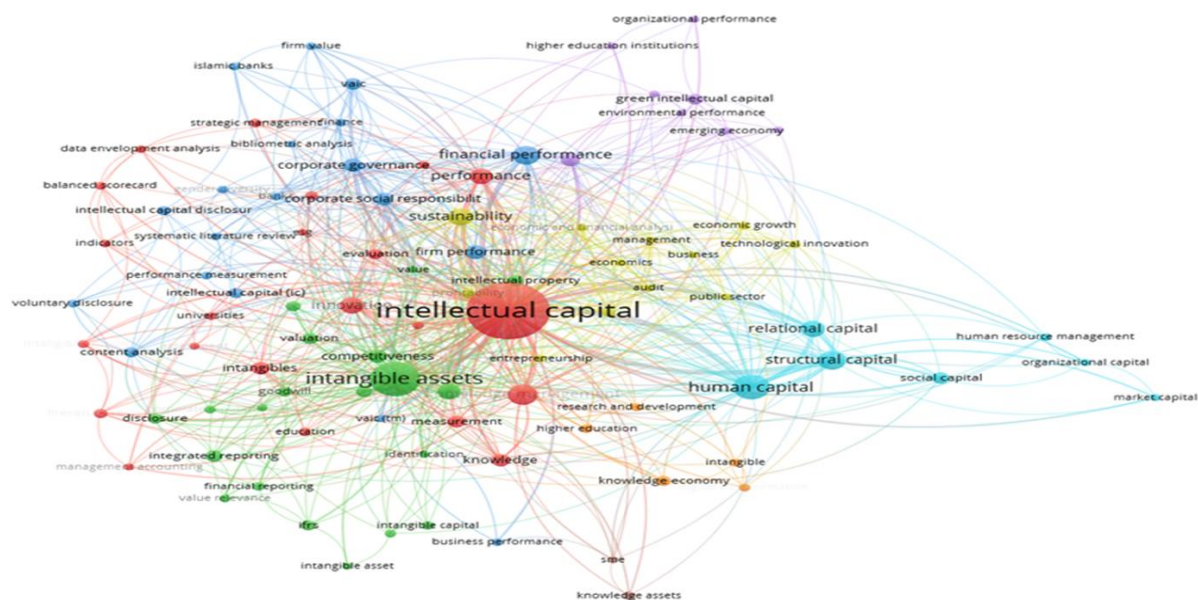


Figure 1. Conceptual map of IC calculation methods based on the literature

Source: own processing using VOSviewer

Thus, the analysis of the co-occurrence network allowed for the identification of distinct thematic clusters that reflect the main research trends present in the specialized literature. The analyzed network is structured into seven dimensions regarding IC assessment, based on the clusters resulting from running VOSviewer. Each cluster is defined by a set of correlated terms that relate to a specific dimension of IC.

Table 4 summarizes the 7 resulting clusters and the limitations present in the literature regarding IC evaluation.

Table 4. Main research concepts regarding IC calculation methods

VOSviewer Cluster	References in the literature	Limitations and gaps in scientific research
IC (red)	Innovation, evaluation, disclosure of IC.	Reporting is often narrative rather than in the form of quantifiable data.
Intangible assets (green)	IFRS reporting framework, financial reporting, measurement.	Inability to measure; the prudence principle undervalues IC.

VOSviewer Cluster	References in the literature	Limitations and gaps in scientific research
VAIC calculation method (blue)	Profitability, firm value, DEA index, VAIC.	Correlation with performance indicators undervalues IC, as the innovation perspective is not taken into account.
Components of IC (turquoise)	Structural capital, relational capital, social capital, human capital.	The focus is on human capital, but without taking into account factors related to staff turnover.
Sustainability of IC (yellow)	Green IC, innovation technology, economic expansion.	The method of evaluating IC within universities cannot be universally applied to SMEs. External reporting on IC may be overestimated and may not reflect the internal reality.
External connections (purple)	Universities, organizational performance, emerging economy.	
Capacity for knowledge management (orange)	Level of knowledge, SMEs, knowledge assets, research, development.	

Source: own processing

Thus, our analysis divides the literature into seven distinct thematic clusters, each reflecting a specific research direction, which we present below. The IC-associated cluster reflects the focus of research on its disclosure and its link to innovation. This cluster acts as a conceptual core in the approach to IC and integrates all other directions present in the literature. Thus, the red cluster is connected to all other clusters, as can be seen in Figure 1. Among the keywords are “performance” and “evaluation,” concepts directly linked to IC. The second cluster (green) highlights the accounting dimension of IC, including terms such as intangible assets, IFRS, and financial reporting. This cluster demonstrates the focus in the literature on how this intangible asset is recognized and reported in accounting. The third cluster (blue) reflects the use of the MVAIC calculation method in disclosing IC. Research is more focused on quantifying the efficiency of IC without utilizing information regarding relational capital, a component found in the MVAIC calculation formula.

The turquoise cluster outlines the components of IC. We observe a detailed analysis by component, indicating the presence of robust research that captures the individual contributions of IC components. The yellow cluster reflects the integration of IC within the context of a sustainable economy. It highlights links to the green economy, the digital transition, or even economic expansion. This demonstrates the catalytic effect of IC in the era of open innovation. The analysis of the purple cluster suggests the representativeness of external connections with IC efficiency. The analysis includes universities, organizational performance, and the external business environment. The last cluster is associated with knowledge management capacity. Thus, the role of knowledge is fundamental to the emergence of IC, and the processes of generating it have an impact within organizations.

Overall, the distribution of clusters highlights the interdisciplinary nature of IC, as well as the tendency of this intangible element to expand in the context of research focused on the dual transition, driven by rapid digitalization and the concept of sustainability. Nevertheless, we observe a systematic fragmentation between conceptual and methodological approaches regarding the quantification of IC.

Upon analyzing the resulting bibliometric map, we can see that MVAIC is not significant at all, meaning it did not exceed the significance threshold established in the methodology. This confirms that relational capital, presented as a relevant resource to be developed—is excluded from the analysis. For example, Ryu and colleagues collected data from 175 SMEs to demonstrate, through a regression analysis, the effects of relational capital on performance (Ryu et al., 2021). It was shown that relational capital is a key factor in performance development, alongside proactivity in external relations. However, this resource is under-researched in the literature.

Even though VAIC is correlated with various research topics, there is limited connectivity between them and its constituent components. In the turquoise cluster, the three types of capital analyzed can be observed distinctly as three individual components. We consider this aspect to be a substantial limitation of the literature, due to the incompleteness of the reference concepts. These aspects limit existing research due to their limited relevance, as the focus is on connecting with various specific factors, rather than on the trend toward standardizing calculation methods.

To further explore the results reported following the cluster analysis, it is necessary to refer to studies in the scientific literature, which can offer detailed insights into IC and the research niches that have been revealed. For example, Abdallah and the other authors, aiming to analyze IC in promoting competitive advantage, conducted a literature review using 84 papers published over a 19-year period (Abdallah et al., 2025). This study confirms the direct influence that IC has on revealing sustainable competitiveness. Regarding IC as a theoretical and organizational construct, Taha and colleagues analyzed evaluation models such as VAIC and MVAIC to demonstrate the strategic role this resource plays (Taha et al., 2025). Based on the literature, the study advocates for the use of IC as a distinct field, due to its ability to create value, foster innovation, and drive sustainable performance.

Onoja and the other authors, in their exploration of banks' willingness to comply with IAS 38 when valuing an intangible asset (Onoja et al., 2025), demonstrated that the application of this standard is directly proportional to the size of the enterprise. The study was conducted on 38 banks across 6 African countries between 2012 and 2023 and demonstrates the usefulness of company attributes in disclosing information regarding ICT software. In the same line of research, Suwansin and colleagues addressed the question regarding the utility of compliance with IAS-compliant reporting (Suwansin et al., 2026). The study highlights the need to evaluate intangible assets within contextual frameworks, as individual reporting has a low level of relevance.

The conclusions of the previously cited study are reinforced by the research conducted by Maysari and Endri, a study that took the form of a regression analysis using data from 31 companies listed on the Indonesia Stock Exchange and reported between 2021 and 2023 (Maysari & Endri, 2025). The research offers critical insights into the link between firm value and IC. Thus, the study's conclusions reveal that the Indonesian market has not fully valued IC's contribution to the overall value of companies, with the results showing a negative effect between the analyzed variables. In parallel, Zheng argues that traditional valuation methods undervalue the image of firms, which is why new methods must be researched that are adapted to continuous changes (Zheng, 2025). These results derive from a review of the specialized literature aimed at revealing a conceptual framework regarding IC based on knowledge or firm resources.

However, Peric and colleagues conducted a study comparing the evaluation methods used to date in IC assessment (Perić et al., 2025). The authors demonstrated that these methods are incomplete, as none of them account for all the elements that create links between capital components, especially given the reporting framework or sudden changes. The authors believe that IC valuation models lack a holistic approach, and their recommendation is to include factors such as national culture, the political environment, or the legal environment in the analytical formulas. Other authors, such as Gotti et al., conclude that current valuation methods are suitable only for comparisons or internal management, but in the long term, the valuation methodology must be improved (Gotti et al., 2025). The authors demonstrated, through econometric analyses based on data reported by 2,166 SMEs in Italy, that firm performance is enhanced by IC and moderated by the size of the Board of Directors.

Focusing on the analysis of IC regarding profitability generated by profitability indicators, Ankinbode and Adeniyi sought to demonstrate that this approach is relevant in terms of asset measurement (Akinbode & Adeniyi, 2025). Data collected from 22 companies in Nigeria between 2013 and 2022 allowed for an individual analysis of the impact of IC components on the companies. The study's results demonstrated a positive relationship between human capital efficiency and return on assets and return on equity. Company performance was significantly negatively influenced by the other components: structural capital, committed capital, and relational capital. The researchers conclude by offering clear strategies for companies, recommending improvements in human capital, proactive investments in structural capital, and continued investments in relational capital.

Authors Bukian and Herawati conducted a cross-sectoral literature review to identify perspectives and conceptual gaps regarding the influence of IC on competitive advantage (Bukian & Herawati, 2025). The authors demonstrate that although IC plays a strategic role in value creation across all sectors, human capital is its most influential component. However, Buenano and colleagues demonstrate the instability of IC reporting through a study conducted in the banking sector (Buenano et al., 2025). The authors used several methods to calculate VAIC and MVAIC to analyze performance in the banking sector. The authors demonstrated that financial performance is consistently influenced by human capital and employed capital, while relational capital and structural capital yield mixed results.

The introduction of the concept of digital IC alters the defined conceptual framework, as, by incorporating the new digital paradigm, these assets must be evaluated in the context of adapting to the digital transition. The effects of digital transformation on IC are extensively studied by Vo and Tran (Vo & Tran, 2025). Based on data reported by 118 firms in Vietnam from 2011 to 2021, the researchers constructed the MVAIC model, which they analyzed from a performance perspective. The result was positive. However, when they analyzed digital transformation in relation to firm performance, a significant negative influence was observed. Furthermore, the authors analyzed the correlation between IC and digital transformation on performance, and the results were statistically significant. Thus, the study's findings provide valuable insights into the mediating role of the link between digital transition and IC.

From the perspective of the green transition, green IC was assessed by authors Alnaim and Metwally through questionnaires administered to 298 employees in the Egyptian industrial sector (Alnaim & Metwally, 2024). They demonstrated that there is a statistically significant positive impact of all components of green IC on corporate performance. The link between them is supported by environmental management accounting, which acts as a mediator in practice. This study adds value to the existing literature at the time of publication, as it is among the first studies to examine the impact of environmental accounting practices on green CI.

In the context of the dual transition, IC should be viewed as a resource that contributes to achieving sustainable development goals, not merely to generating profit. The following section briefly presents the conclusions and recommendations resulting from the review of the relevant literature.

IV. CONCLUSIONS AND RECOMMENDATIONS

Our analysis has demonstrated that business performance and innovation are directly linked to IC. It brings together all the assets, both tangible and intangible, that a company possesses and for which development policies are in place, so that business performance and profitability are directly supported. The studies analyzed compared IC with profitability, performance, or the level of innovation. Various studies used methods to analyze and report on an organization's IC through its ability to reveal the efficiency of this resource. The results provide a clear answer to the first research question, highlighting that an organization's performance is determined and supported by IC.

The second research question aimed to reveal how IC can be assessed in a business organization. In the scientific research, both calculation methods that sum the efficiency of human capital, engaged capital, and structural capital were used, as well as a method that includes all three efficiencies in the formula, to which the efficiency of relational capital is also added. An attempt was made to create an overview of all IC components, demonstrating their efficiency without establishing a clear distinction, thereby enabling a comparison between the costs each component entails and its implications for the organization through value creation.

Organizing the findings into thematic clusters allowed us to highlight the main research directions regarding IC. Thus, we can conclude by stating that these directions focus on the conceptual dimension, the accounting dimension, the methodological dimension, the components of IC, and their correlation with organizational performance, sustainability, and knowledge management. These results support the studies analyzed in the literature review section, thus confirming the diversity of research approaches, as well as the lack of standardization in IC quantification.

Like any scientific endeavor, this research also has its limitations. For example, only a single database was used, which may result in the omission of relevant studies that are indexed in other scientific databases. The results are influenced by the selected keywords, which may lead to the omission of relevant papers due to the non-use of the search terms, even if the research addressed the topic under analysis. Furthermore, the established frequency threshold reduces the sample of analyzed studies, having a direct impact on the structure of the resulting clusters.

Future research may expand the analysis by including more databases, using mixed methods of analysis. Noting the methodological fragmentation present in the literature, we propose the development of standardized methods for evaluating IC that can be applied in any field of activity. We recommend including in the calculation models the determinants regarding the dynamics of heterogeneous factors that have a direct impact on IC. In the era of open innovation, an emerging direction may also be the standardization of IC quantification by integrating the concept of green and sustainable IC, as the reviewed literature only highlights the existence of correlations between these concepts but does not standardize a calculation method relevant to the current economic context.

In conclusion, our research highlights the utility of IC in business organizations and emphasizes both its fundamental role in value creation and the need for an integrated approach to its assessment, adapted to the current economic context marked by the dual transition—namely, the digital and sustainable transitions.

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