



UDC 332

## INTELLECTUAL CAPITAL AND FIRM PERFORMANCE: A SYSTEMATIC LITERATURE REVIEW

Wardani Made Kusuma\*, Wiagustini Ni Luh Putu, Candraningrat Ica Rika,  
Artini Luh Gede Sri

Faculty of Economics and Business, University of Udayana, Bali, Indonesia

\*E-mail: [kusumaw2525@gmail.com](mailto:kusumaw2525@gmail.com)

### ABSTRACT

This study aims to analyze the components of IC and the methods employed to measure it. Additionally, it investigates the impact of IC on company performance through a Systematic Literature Review. The systematic literature review method is sufficient for formulating research questions, database selection, keyword selection, literature search, research criteria selection, article selection, article quality evaluation, data extraction, analysis and synthesis, and writing a literature review. A systematic review of the literature was conducted to gather data on IC components and measurement techniques. Relevant studies were identified and analyzed. Analysis reveals that Intellectual Capital comprises human capital, structural capital, and relational capital. However, some studies introduce additional components. Measurement tools and methods for IC vary widely, including both qualitative and quantitative approaches. The review highlights the importance of customizing measurement techniques to suit specific organizational contexts. Intellectual Capital significantly influences company performance. Understanding the diverse components and measurement approaches is essential for enhancing organizational success. Future researchers can benefit from this systematic review to access valuable insights into IC measurements and their impact on company performance, aiding in more informed decision-making.

### KEY WORDS

Firm, intellectual capital, performance, systematic, literature review.

Performance is a critical concern for both for-profit and non-profit organizations. It serves as a fundamental benchmark for the achievement of organizational goals, objectives, and missions. Measuring and evaluating performance allows organizations to gauge their success against specific criteria, encompassing both quantitative and qualitative aspects. In today's knowledge-based economy, the concept of Intellectual Capital (IC) has gained prominence as a key driver of company performance. IC represents a set of intangible resources, including knowledge, experience, management philosophies, brand, systems, and human resources, which collectively support the creation of corporate value.

Although IC does not appear on a company's balance sheet, it significantly influences its performance. Traditional accounting systems often struggle to capture the intangible assets that contribute to a company's value. Consequently, various methods have emerged to measure IC's impact on financial performance, classifying measurements into qualitative and quantitative approaches. The relationship between IC and firm performance has been a subject of extensive research. This paper aims to systematically explore the influence of IC on firm performance and examine the evolution of empirical IC research over the past decade. By reviewing literature published from 2012 to 2022, we assess how the utilization of IC components and firm performance indicators align with previous research findings.

In light of the diverse definitions and components associated with IC, this paper seeks to identify the analytical dimensions and components of IC and performance, contributing to a better understanding of management processes. As we delve into the complexities of IC, its components, and its profound implications for organizational performance, we aim to shed light on the evolving landscape of intellectual capital in contemporary business.



We suspect that intellectual capital has a significant impact on a company's business development. This hypothesis stems from the growing recognition of the role of intellectual capital in driving innovation, increasing organizational efficiency, and ultimately contributing to the company's overall competitiveness.

## LITERATURE REVIEW

Along with various changes in the increasingly dynamic business environment, managing and utilizing intellectual capital has become a strategic key to the success of a company. In this context, a comprehensive review of the literature on the impact of intellectual capital on corporate performance becomes essential to provide a deeper and more informed view of the factors that influence the success of a business entity.

Performance is a pivotal factor in both for-profit and non-profit organizations, as it represents the realization of company goals and objectives (Tjahjadi et al., 2019). Moreover, performance extends to the attainment of a company's overarching vision and mission, underlining its significance as a multifaceted concept (Duygulu et al., 2016). The measurement and evaluation of a company's performance offer a valuable opportunity to dissect and articulate the degree of success, employing specific criteria as yardsticks (Karabulut, 2015).

Business performance, while indispensable, often grapples with the intricacies of economic facets that are not easily discernible through research. The evaluation of business performance hinges on the availability of objective and subjective metrics, incorporating both financial and non-financial data. Objective assessments entail the use of quantitative data, whereas subjective appraisals delve into perception-based research methods, encompassing factors like augmented sales, market share expansion, and profitability (Dawes, 1999).

Resource-Based Theory posits that a company's performance is intrinsically linked to the unique resources it possesses, encompassing tangible and intangible assets (Soewarno & Tjahjadi, 2020). In today's information-driven and knowledge-centered economy, physical capital is gradually giving way to intangible capital (IC) as a pivotal factor in ensuring sustainable, long-term profitability (T. et al., 2017). Companies, regardless of their size, have come to acknowledge the indispensability of IC for fostering corporate sustainability (Ousama et al., 2020). IC encompasses intangible elements such as knowledge, experience, management philosophy, brand, systems, and human resources, all of which converge to bolster corporate value (Martín-de Castro et al., 2019).

The concept of IC traces its origins back to Kenneth Galbraith in 1969 (Örnek & Ayas, 2015). Over time, IC, once relegated to the periphery, has risen to prominence within the corporate landscape. Nevertheless, the definition of IC remains fluid across various studies, with interchangeable usage of terms like 'intangible assets,' 'intellectual assets,' and 'knowledge assets.' Despite this semantic variability, IC generally alludes to the intangible resources within an organization that contribute to its value creation, albeit with differing interpretations. Multiple models have emerged to elucidate the constituents of IC, driven by diverse perspectives (Zhicheng et al., 2016).

Notably, IC remains conspicuously absent from a company's balance sheet, even though it exerts a positive influence on its performance, revealing the intricate nexus between employees, ideas, and information that eludes traditional metrics (Edvinsson, 1997). Conventional accounting systems have struggled to incorporate the intangible assets that underpin a company's value creation (Ozkan et al., 2017). Recognizing the impact of IC on enhancing financial performance, various methodologies have been devised to gauge its dimensions (Sveiby, 1997).

Assessing the value of IC and its correlation with company performance has posed persistent challenges to scholars and practitioners alike. Clarke et al. (2011) identified three recurrent issues in IC measurement: the unavailability of requisite information to external parties, the predominantly qualitative nature of the data, and the difficulty in translating information into quantifiable monetary terms. IC measurements are typically categorized into two broad classes: Qualitative and Quantitative (Zhicheng et al., 2016). Qualitative



measurements encompass frameworks like the Balanced Scorecard (BSC), Kannan and Aulbur's Three-Step Model, Skandia IC Report (Navigator Model), and more. Quantitative measurements, on the other hand, involve metrics such as Economic Value Added (EVA), Market Value, Tobin's Q, Value Added Intellectual Coefficient (VAIC), and Lev and Feng's indicators.

Inkinen (2015) conducted research on IC and firm performance by reviewing existing IC literature and systematically evaluating the influence of IC on firm performance outcomes. The findings underscored that IC predominantly impacts company performance through interaction, combination, and mediation, with substantial evidence indicating a significant relationship between IC and company innovation performance. Another study by Pedro et al. (2018) sought to categorize IC components based on literature references, considering multidimensional analysis axes (MAAs) such as organizational, regional, and national perspectives, spanning the empirical period from 1960 to 2016. The study revealed that empirical research in this area gained momentum around 2004, with organizational MAAs being the most explored. Commonly studied component groups associated with the impact of IC on performance encompass human capital, structural capital (organizational or process), and relational capital (social or customer). Nevertheless, the effect is non-linear and contingent on contextual and environmental factors.

This paper's primary focus is twofold: to ascertain whether IC systematically influences firm performance and to examine the evolution of empirical IC research between 2012 and 2022. This review concentrates primarily on empirical IC research papers, despite the extensive attention received by the intersection of IC and company performance. In addition to elucidating the findings on firm performance, Inkinen's (2015) research highlights a potential waning of interest in the field of empirical IC research, prompting an exploration of IC research trends over the past decade.

Given the lack of precision in the definition of IC within the literature, as well as the absence of consensus on its components, it becomes paramount to systematize existing knowledge. Generally acknowledged as comprising human capital, structural capital, and relationship/customer capital, IC necessitates a systematic analysis to map its path and its interplay with company performance. This paper aims to delineate the analytical dimensions and components of IC and performance, with the overarching goal of enhancing comprehension and optimizing management processes (Dzenopoljac et al., 2017). The definitional aspects and components of IC must be duly considered, given the multitude of approaches aimed at defining, measuring, and delineating IC and its effect on performance.

## METHODS OF RESEARCH

Systematic Literature Review (SLR) is a primary tool to develop the evidence base by identifying, evaluating, and interpreting all available research relevant to a specific research question, topic area, or phenomenon of interest (Mengist et al., 2020). To ensure transparency and reproducibility, reviews should follow clear guidelines and steps (Mengist et al., 2020). This article uses methodological procedures and techniques from (Jungell-Michelsson & Heikkurinen, 2022a) and (Paul & Criado, 2020). Essential information regarding these methods is summarized in Table 1.

Table 1 – Basic information about the systematic literature review (SLR)

Question Item	Answer
Who conducted the review?	The authors of this paper
When was the data collected?	During 2010 to 2022
Where was the data collected?	Articles in peer-reviewed, scientific journal database searches (ScienDirect and Emerald)
How was the data found?	snowball sampling
What was found?	Final dataset of 94 articles
Why were certain works included (selection criteria)?	Search words found in title, abstract, or keywords;

Source: Jungell-Michelsson & Heikkurinen (2022).



The enhanced objectives of this SLR on IC and financial performance, as a case study, are presented as research questions below.

- Which type of Intellectual Capital component has the highest and least number of studies in corporate financial performance research?
- Commonly used measurements to assess Intellectual Capital and Performance?
- Does Intellectual capital play a role in improving the company's financial performance?
- What can be learned for future studies of Intellectual Capital and performance?

The data consisted of literature published from 2012 to 2022 that met the following selection criteria: peer-reviewed articles published in academic journals; written in English; intellectual capital and performance mentioned in the title, abstract or keywords; explicitly discussing intellectual capital in relation to performance. In addition, articles were only included if they explicitly explained intellectual capital and performance or how they can be conceptualized or understood. In other words, articles that mentioned intellectual capital and performance without substantially explaining the concepts and components were excluded. We followed a systematic search procedure with these criteria, and consequently books, book chapters, conference papers and public reports should have been included in the data.

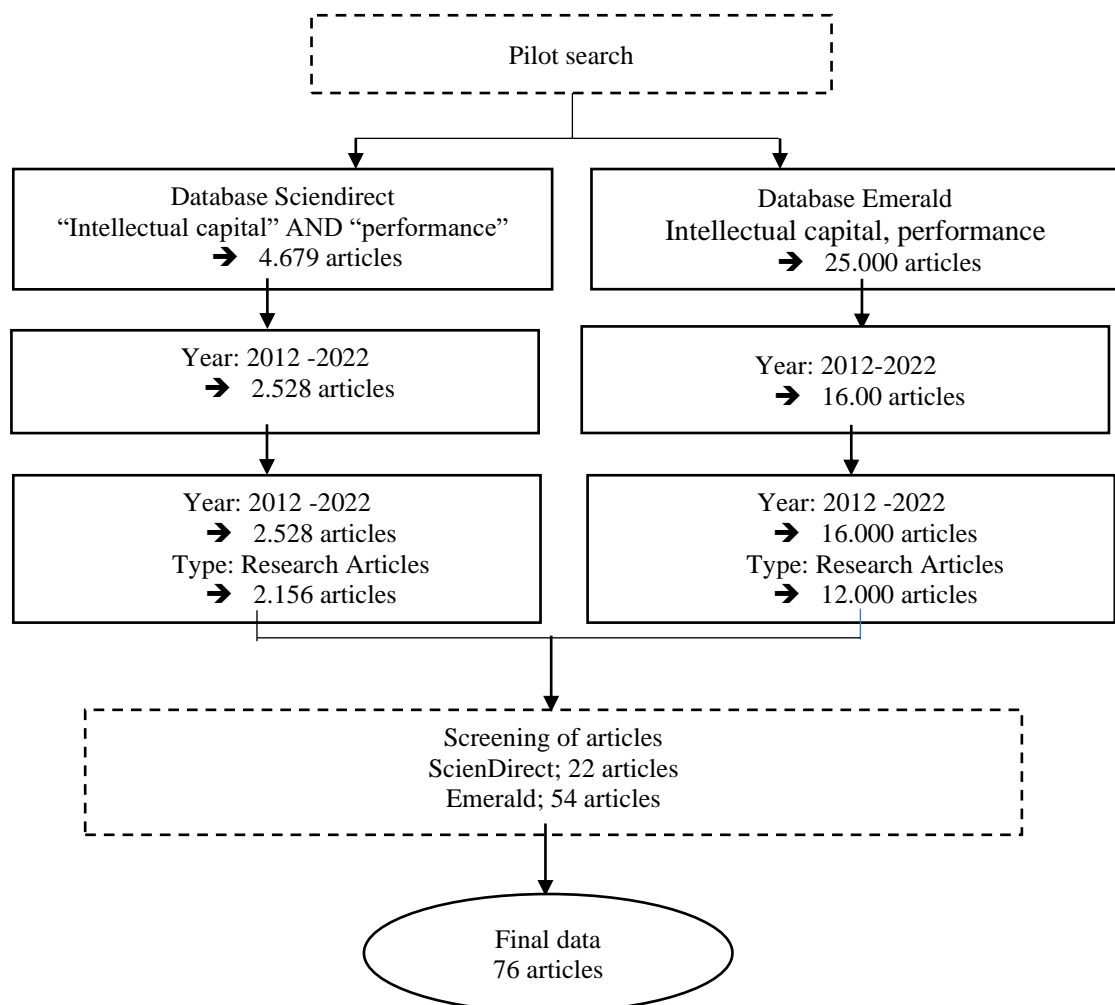


Figure 1 – Data Collection Process

A search on ScienDirect showed that searching using only the words "intellectual capital" AND "performance" would yield 4,679 articles, after filtering out articles that spanned the years 2012-2022 yielded 2,528 articles. The number of articles is then filtered again by



selecting the "Research Articles" type resulting in 2,156 articles. After checking the articles related to the material under study, only 22 articles were produced.

A search on Emerald shows that a search using only the words intellectual capital, and performance will produce more than 25,000 articles, after filtering articles that have time from 2012-2022 produces more than 16,000 articles. The number of articles is then filtered again by selecting Content-Type "Article", resulting in more than 12,000 articles. After checking the articles related to the material under study, only 54 articles were produced.

This test search led to collecting data in three phases with a screening process (Figure 1).

The systematic literature review aimed to provide a complete summary of results relevant to this study. The literature review indicated key topics, findings and best managerial practices that emerged from the analysis of each research group. These selection criteria are in line with best literature review practices used to analyze the structure of specific journals. As a result and in line with the approach adopted by similar papers on similar fields of study (Caputo et al., 2018), selected relevant papers were selected and analyzed.

## RESULTS OF STUDY

To answer RQ1, the data that has been collected and analyzed is presented in the form of Figure 2:

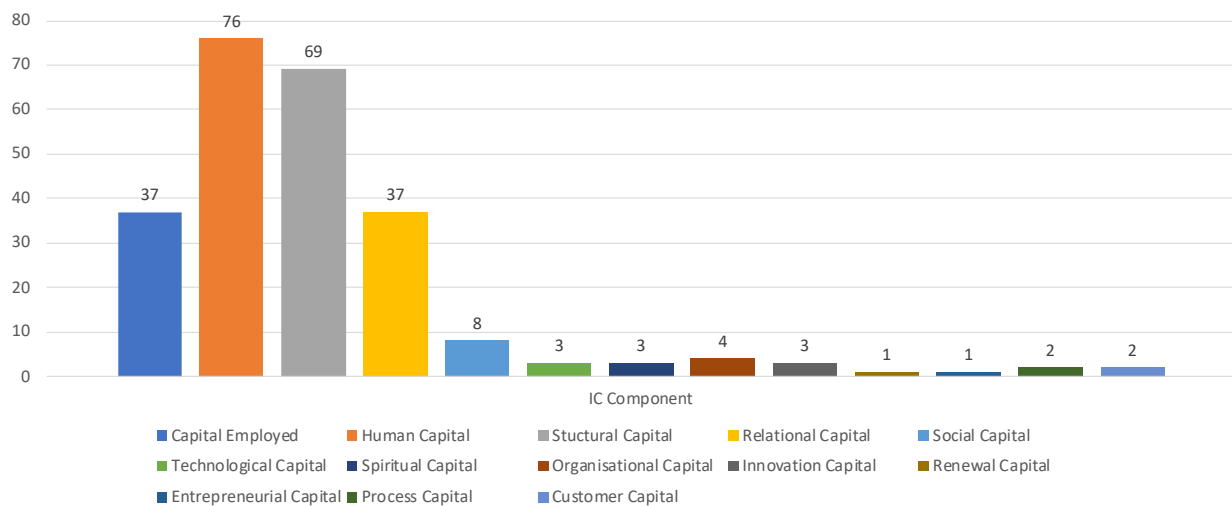


Figure 2 – Components of IC

Figure 2 shows that the study's most widely used intellectual capital component is human capital, and the top 3 IC components are human capital, structural capital and relational capital. Based on these data, it can be seen that human capital dominates in its contribution to overall intellectual capital. This means that individual expertise, knowledge and skills in the organization have a very important role in supporting overall intellectual capital. These results are in accordance with the proposals of some previous researchers such as (Bontis, 1998) proposing three types of intellectual capital: human, structural, and relational. Some other studies used other types of intellectual capital such as Social Capital, Technological Capital, Spiritual Capital, Organizational Capital, Innovation Capital, Renewal Capital, Entrepreneurial Capital, Process Capital and Customer Capital.

Human capital (HC) is an intangible asset owned by the company in the form of its employees' intellectual abilities, creativity and innovation. Human capital is a major factor in knowledge-based industries because this resource is the dominant cost in the production process (Nuryaman, 2015). Human capital is a combination of people's genetic heritage, attitudes, education and experience in life and business. The most valuable asset in any business is human capital compared to other capital or equipment (Hashim et al., 2015).



Understanding and good management of human capital is a strategic key for companies, especially in facing the challenges and dynamics of change in the era of knowledge-based industries

Structural Capital (SC) is the company's ability to meet the company's standard processes and systems in an effort to produce intellectual output and organizational performance such as organizational culture, production processes, management philosophy and other intellectual property owned by the company (Olarewaju & Msomi, 2021). Structural capital includes a company's ability to reach the market, or hardware, software, and others that support the company (Sveiby, 1997). A person can have a high level of intellect, but if the organization has weak systems and processes, it is difficult to achieve optimal efficiency with IC and its capacity cannot be maximized (Urban & Joubert, 2017). The results showed that a good organizational structure in providing efficient and quality services will result in better company performance (Hashim et al., 2015). Investment and focus on structural capital can have a positive impact on achieving organizational goals and optimal use of owned intellectual capital.

Relationship Capital (RC) is an intellectual asset that manages and regulates the company's external relationships, including the organization's relationships with suppliers, customers, stakeholders, marketing channels, and the knowledge that governs these associations (Meles et al., 2016). RC is the basis of external relationships with company stakeholders in the value chain process (Mehralian et al., 2012). RC can be seen from stakeholder commitment and trust that can improve corporate reputation and customer brand loyalty, thereby affecting the company's financial and operational performance (Mention & Bontis, 2013). RC not only involves managing relationships effectively, but also has a significant strategic impact on a company's image and customer perceptions. In a competitive business environment, maintaining and strengthening relationships through investment in Relationship Capital can be a key factor in achieving competitive advantage and maintaining company sustainability in the long term.

Social capital (SoC) is defined as resources embedded in social networks that can help achieve important goals in life instrumentally (Dederichs, 2024). SoC consists of values such as social interaction, mutual trust and understanding, vision and norms, which enable organizational members to work together so as to produce maximum performance (Ozgun et al., 2022). SoC is important for performance because it can generate mutual trust in the organization, increase innovation capabilities, and expand organizational networks, leading to improved performance (Liu, 2017). The existence of an SoC is key to organizational performance because it brings several important benefits. SoC can form and maintain mutual trust within the organization. SoC can improve an organization's innovation capabilities. SoC can expand an organization's network. Through positive social interactions, organizations can build strong relationships with external parties, such as business partners, customers and other stakeholders.

Technological Capital (TC) is a total of two components, namely tangible and intangible components. The firm's tangible fixed assets and intangible assets related to production processes, production management, information technology (IT), research and development (R&D) and innovation can be considered as technological capital (Grigoriev et al., 2014). Technological capital has an important role so that knowledge can be shared quickly and can be accessed by others. Technological capital helps information collection, storage and distribution become easier (Ngah & Ibrahim, 2009). A study conducted on great companies in Taiwan found that innovation and IT used as a proxy for technological capital positively impact firm performance (Lu et al., 2010). In order to optimize resource use and improve performance, companies need to pay attention to both tangible and intangible aspects in managing their technology capital.

Spiritual Capital (Sp C) is wealth that helps sustain humanity in the future and wealth that nurtures and sustains the human spirit. Spiritual capital includes values such as morals, faith, honesty, ethics, desire and motivation, commitment, self-esteem, and passion (Abdullah & Sofian, 2012). Spiritual capital is very important in individuals and organizations that can influence how to manage companies, ensure business operations run by



established laws and standards, be honest with finances, etc. which will ultimately improve company performance (Abdullah & Sofian, 2012). Spiritual behavior in an organization can improve company performance and stakeholder benefits (Hashim et al., 2015). Spiritual capital is considered an important aspect in the context of organizational management and is recognized as having a positive impact on business ethics, company performance and relationships with stakeholders.

Organizational capital (CO) is a factor that fully supports employee productivity (Liu, 2017). Organizational capital supports forming firm-specific resources, and is important in market returns and firm performance (W. Chen & Inklaar, 2016). CO is a set of intangibles that structure and develop organizational activities more effectively and efficiently, including production or other processes, specialization and information flow (Nkundabanyanga et al., 2014). A company's ability to manage and optimize organizational capital can be one of the determining factors for its success. Therefore, increasing and effectively managing organizational capital can make a significant contribution to a company's overall competitiveness and performance.

Innovation capital (In C) is something that creates future success (Bayraktaroglu et al., 2019). CI is an organization's ability to innovate and develop new products, services, and solutions. Its main component is the activities in R&D. Innovation capital is important in a knowledge-intensive organization. Agribusiness companies applying the biotechnology business model to agriculture invest heavily in research and development and seek to recoup these investments by using and enforcing biological patents (Vincenzo et al., 2016). Innovation capital is not just about creating new things, but also about building an organization's ability to continue to grow and compete in an ever-changing environment. Companies that manage innovation capital well can be better prepared to face future challenges and create opportunities for long-term growth

Renewal Capital (Rn C) is the ability of an organization to learn and update its knowledge base (Kianto et al., 2010). Rn C consists of the company's ability to obtain information, develop skills, and learn. Organizations with high renewal capital can build knowledge to develop new products, services, and innovative ideas continuously. Organizations must survive in a volatile and changing environment, Rn C being the most crucial aspect of IC (Cabrilo & Dahms, 2018). Therefore, RnC can be considered as the foundation that enables organizations to remain relevant, competitive, and innovative amidst continuous changes in the market and its business environment.

Entrepreneurial capital (EC) is the product of entrepreneurial competence and commitment. The relationship between entrepreneurial competence and commitment is said to be multiplicative rather than additive as both components must be strongly present for development to take place (Erikson, 2002). Organizations with high entrepreneurial capital will be more innovative, enable and support the development of science, collection and socialization to increase business innovation (Cabrilo et al., 2018) and identify new business opportunities, take risks, and make decisions (Erikson, 2002). In a dynamic business environment, entrepreneurial capital is a key factor in creating competitive advantage. Organizations that are able to combine entrepreneurial competence and commitment well can be more successful in facing market changes, identifying new opportunities, and creating significant added value.

Process Capital (PC) is the procedures, systems, and techniques applied by companies to achieve operational efficiency (Shang & Wu, 2013). Process capital is critical in developing and implementing a company's strategy (Brenner and Coners, 2010). The development process is utilized so as to produce higher value assets that can affect the improvement of organizational performance. (Wang & Chang, 2005) have shown that process capital positively and significantly affects firm performance. Companies that are able to manage and update their processing capital well can create competitive advantages and increase their competitiveness in the market.

Customer capital (CC) is the value of a company's relationships with customers, suppliers, and other people who consider and have loyalty to the company (Chwalowski, 1997). Customer capital consists of processes, tools, and techniques that contribute to the



growth of the number of customers. The value created is the organization's customer base, customer relationships, customer potential, and brand recognition (Duffy, 2000). Customer capital management can create economic value and mutual relationship value. Companies that have high profitability require a slightly different approach. The value of the relationship with the customer is determined by the quality of communication and the individual service approach that requires important information for the customer regarding the required product. Customer value is seen as monthly revenue, the cost of attracting and retaining customers (Ciemleja & Lace, 2008). Companies that understand the value of customer capital and are able to manage it well can build strong relationships with customers, increase loyalty, and achieve sustainable business growth.

To answer RQ2, the data that has been collected and analyzed is presented in the form of Figures described below.

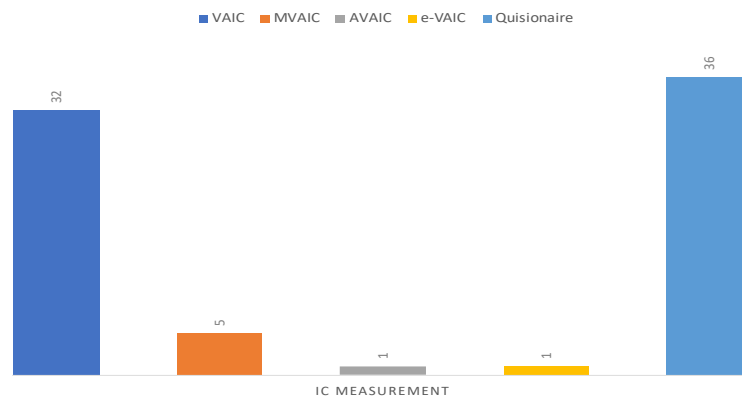


Figure 3 – Intellectual Capital Measurement

- Questionnaire.

The most widely used measurement of intellectual capital is the questionnaire. A questionnaire is a series of pre-formulated written questions to which respondents record answers, usually in rather closely defined alternatives. Questionnaires are generally designed to collect large amounts of quantitative data, and can be administered personally, distributed electronically or mailed to respondents. Questionnaires are generally less expensive and time-consuming than interviews and observations, but they introduce opportunities for non-response errors (Bougie & Sekaran, 2019: 143). Therefore, careful questionnaire design and strategies to increase responses are important factors in the success of measuring intellectual capital.

- *Value Added Intellectual Coefficient (VAIC™).*

The Value Added Intellectual Coefficient (VAIC™), pioneered by Pulic in 2000, serves as a prominent method for assessing intellectual capital, offering invaluable insights into the efficiency of both tangible and intangible assets within a company. Over time, VAIC™ has gained widespread adoption in both business and academic spheres. This approach dissects a company's resource foundation into three core components: physical capital, human capital, and structural capital, utilizing the framework of the Scandia Navigator, one of the earliest systems for quantifying and visualizing intangible capital's value.

VAIC™ methodology comprises five fundamental steps. Firstly, it gauges the company's capacity to generate Value Added (VA), calculated as the disparity between outputs (OUT) and inputs (IN):  $OUT - IN = VA$ . Outputs encompass revenue, reflecting overall profits from goods and services sales, while inputs encompass various expenses excluding employee costs, as employees are recognized as actively contributing to value creation. Value added epitomizes the fresh wealth generated during a specific timeframe.

The second step investigates the nexus between value added and capital employed, spanning both physical and financial capital:  $VA/CE = VACA$ . VACA elucidates how much new value has been engendered per unit of invested capital. The third step elucidates the relationship between value added and human capital, quantified by expenditures on





employees, encompassing benefits like social security, as these represent remuneration for employee expertise, creativity, and motivation:  $VA/HC = VAHU$ . The Value Added Human Capital Coefficient (VAHU) delineates the additional value generated per unit of investment in employees.

The fourth step probes the connection between VA and structural capital employed (SC), calculated differently due to the inverse relationship between HC and SC. SC is ascertained by discerning the variance between VA and HC, thereby facilitating the computation of structural capital's value added:  $SC/VA = STVA$ . The fifth and final step evaluates the individual contributions of each resource to VA attainment, epitomized by the derived indicators VACA, VAHU, and STVA. The amalgamation of these indicators culminates in the holistic assessment of intellectual capital efficiency:  $VACA + VAHU + STVA = VAIC^{TM}$ .  $VAIC^{TM}$ , through these intricate steps, furnishes a comprehensive understanding of the intricate interplay between intellectual and tangible assets within an organization, shedding light on its value creation prowess. With a five-step methodology,  $VAIC^{TM}$  provides an in-depth understanding of the efficiency of tangible and intangible assets in an organization, highlighting the contribution of each resource to achieving added value in a holistic manner.

- *Modified VAIC (MVAIC).*

Modified VAIC (MVAIC) represents an evolution from the original  $VAIC^{TM}$  framework, as conceptualized by Ulum et al. in 2014. Unlike its predecessor, MVAIC deviates from the Skandia Navigator's full taxonomy and introduces a novel component called relational capital. Drawing from Pulic's foundational model, MVAIC continues to compute value added (VA) using the familiar formula:  $VA = OP + EC + D + A$ , where OP stands for operating profit, EC for employee costs, D for depreciation, and A for amortization.  $VAIC^{TM}$ , however, is the culmination of Capital Employed Efficiency (CEE) and Intellectual Capital Efficiency (ICE), with ICE further decomposed into Human Capital Efficiency (HCE) and Structural Capital Efficiency (SCE). HCE is derived from VA divided by Human Capital (HC), defined as total salaries and benefits. SCE, on the other hand, results from Structural Capital (SC), calculated as value-added minus human capital. This model comprehensively assesses resource efficiency, encompassing financial and physical capital. CEE is gauged as VA over the book value of company assets (CE). The  $VAIC^{TM}$  value is derived from the sum of CEE, HCE, and SCE:  $VAIC = VA/HC + SC/VA + VA/CE$ .

MVAIC enhances the  $VAIC^{TM}$  formula by introducing Relational Capital (RC), as outlined by Ulum, Ghazali, and Purwanto in 2014. RC is approximated using the Extended VAIC model by Nazzari and Herremans in 2007, utilizing marketing costs as a proxy. Relational Capital Efficiency (RCE) is quantified as RC divided by VA. Thus, the MVAIC model is expressed as follows:  $MVAIC = CEE + HCE + SCE + RCE$ , where it encompasses the vital dimensions of capital efficiency.

A-VAIC, a modification of Nadeem et al.'s 2017 model, diverges by considering distinct independent variables for intellectual capital components: HCE, innovation capital efficiency (INVCE), and CEE. The initial step calculates VA through the equation:  $VA = NI + LC + I + T + DP + R\&D$ , wherein VA is the amalgamation of net income (NI), labor costs (LC), interest (I), taxes (T), depreciation and amortization (DP), and research and development (R&D). Intellectual capital components are assessed using the subsequent formulas:  $HCE = VA/HC$ ,  $INVCE = VA/INVC$ , and  $CEE = VA/CE$ . HCE pertains to VA divided by Human Capital (HC), which comprises total salaries and wages. INVCE gauges the ratio of VA to Innovation Capital (INVC), where INVC is represented by R&D investment and copyright. Lastly, CEE is computed as VA over the book value of total assets (CE). A-VAIC is then derived from the summation of HCE, INVCE, and CEE, thus encapsulating a distinct approach to intellectual capital efficiency assessment. A-VAIC assesses the efficiency of intellectual capital through a different approach, which provides a comprehensive view of the value of intellectual capital.

- Return on Assets (ROA).

ROA is the most widely used measurement in IC studies as a proxy for financial performance. ROA is the company's ability to utilize assets regardless of the company's



financing policy. ROA can be calculated as follows (Weygandt, et al., 2015:724):  $ROA = \text{Net Income} / \text{Average Total Assets}$ .

ROA is measured as the ratio of net income (minus preferred dividends) divided by the book value of total assets, indicating the extent to which a company's earnings exceed its costs (M. C. Chen et al., 2005).

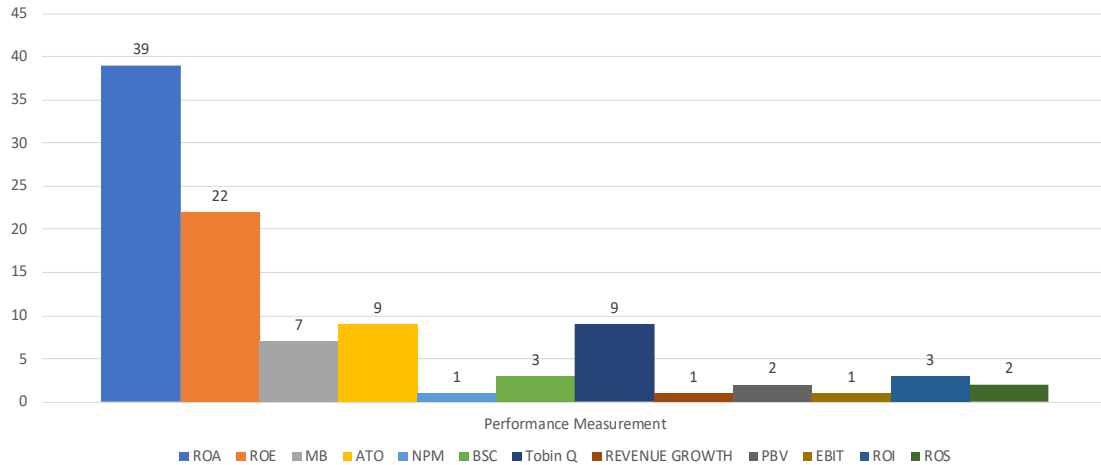


Figure 4 – Performance Measurement

- Return on Equity (ROE).

ROE, measured as the ratio of net income (less preferred dividends) divided by the book value of total equity, indicates the profit available to equity shareholders and is generally considered an important financial indicator for investors. (Chowdhury et al., 2018). Return on Equity (ROE) is the ratio of net income to shareholders' equity (Quiry et al., 2005, p. 234):  $\text{Return on equity} = \text{Net income} / \text{Shareholders' equity}$ .

- Market-to-book (MB).

MB value is measured as the ratio of market capitalization for 365 days divided by the firm's book value. Market-to-book ratio represents the degree to which a company's market value surmounts its book value (Chowdhury et al., 2018):  $\text{MB ratio} = \text{total market capitalization of 365 days} / \text{book value of the common stock}$ .

- Asset turnover (ATO).

ATO measures how efficiently a company uses its assets to generate sales. It is determined by dividing net sales by average total assets. The resulting figure shows the euro sales generated by every euro invested in assets. Unless seasonal factors are significant, we can use total assets' beginning and ending balances to determine the average total assets. (Weygandt et al., 2015:723-724):  $\text{ATO} = \text{Net Sales} / \text{Average Total Assets}$ .

- Net Profit Margin (NPM).

NPM is a measure of the percentage of sales that generate net profit. Calculated by dividing net profit by net sales (Weygandt et al., 2015):  $\text{NPM} = \text{Net Income} / \text{Net Sales}$ .

- Balanced Scorecard (BSC).

The BSC concept was created by Kaplan and Norton (1992). It enables organizations to implement strategies quickly and effectively by integrating measurement systems with management systems. BSC provides a structured approach to deciding where the organization is going (its strategy), what is needed to get there and what should be measured and controlled now to ensure that the organization stays on track to deliver the desired results in the future. BSC recognizes 4 perspectives that should be measured: customer, financial, business process and learning/growth perspectives.

- Tobin Q.

The Q ratio, also known as Tobin Q, is equal to the company's market value divided by the replacement cost of its assets. The Q ratio reveals the relationship between market valuation and intrinsic value. It is a way to estimate whether a particular business or market



is overvalued or undervalued (Buallay, 2019): Tobin Q =  $\frac{\text{The (market value of equity + book value of short-term liabilities)}}{\text{book value of total assets}}$ .

- Revenue Growth (RG).

RG refers to the increase in revenue over some time. In accounting, revenue growth is the rate of increase in total revenue divided by total revenue from the same period in the previous year:  $RG = \frac{TBR_t - TBR_{t-1}}{TBR_{t-1}}$ , where TBR is the total bank income calculated as the sum of total interest income (profit from investment for noninterest based), income from commission, brokerage and foreign exchange and other income for each company (Mollah & Rouf, 2022).

- Price to book value (PBV).

Market value indicates the value of all shares issued by the company. Market value determines the amount someone would have to pay to acquire the entire company at a given period. The equity MB value ratio, an index of market expectations of the company's future performance compared to book value, is used as a proxy for IC market value in this study.:

$MB \text{ of common stock} = \frac{\text{market value}}{\text{book value}}$

where market value is the number of shares outstanding x share price at year-end; book value the book value of shareholders' equity – paid-in capital of preferred stocks (Nimtrakoon, 2015).

- Earnings Before Interest and Taxes (EBIT).

This measure reflects income generated by operating activities (generally equal to or close to operating income) before deducting financing costs (interest) and income tax expense. (Alexander, 2018:40).

- Return on investment (ROI).

ROI is a performance measure used to evaluate the efficiency or profitability of an investment or compare the efficiency of a number of different investments. ROI directly measures the amount of return on a particular investment, relative to the cost of the investment.  $ROI = \frac{\text{Operative income}}{\text{total assets}}$  (Celenza & Rossi, 2014).

- Return on Sales (ROS).

ROS measures a company's efficiency in converting sales into profits. ROS is calculated by dividing operating profit by net sales. (Asiaei et al., 2020):  $ROS = \frac{\text{Operative income}}{\text{net sales}}$ .

To answer RQ 3, an in-depth review of the results of all articles used in this study was conducted. Intellectual capital affects company performance. Companies that have human capital with high capability, competence, commitment will increase productivity and efficiency both individually and collectively, increasing the company's ability to generate profits for the company. Structural capital reflects the ability of the system, structure, strategy, and corporate culture to meet market demand and achieve organizational goals. If the company has a good capital structure, it will facilitate the achievement of organizational targets including company profitability. In addition, other IC components used in the study show that they can increase the competitive advantage that comes from within the company.

Customer, social, technological, and spiritual capital need to be well addressed and special training programs, workshops, seminars and conferences arranged to strengthen intellect and attract potential customers. To achieve excellence and better performance in a competitive business environment, care should be taken to integrate and harmonize the various components of intellectual capital into practice. Thus, an enterprise's survival and competitive success depends more on the strategic management of IC than on financial resources.

## DISCUSSION OF RESULTS

Dumay (2016:169) states, "Intellectual Capital is intellectual material, knowledge, experience, intellectual property, information that can be used to create value". Intellectual capital is also said to be 'knowledge that can be converted into value' (Kamath, 2015). IC is a resource in the form of knowledge available to the company that ultimately brings future economic benefits to the company. IC is said to increase knowledge, skills, employee



perceptions, and other non-sensory and intangible characteristics, which can be utilized to gain wealth by expanding business assets (Rindermann et al., 2015).

IC is the company's intangible assets, which can be in the form of knowledge, information, and experience owned by human resources and corporate organizations (Stewart, 1997). The company's IC is a collection and synergy of knowledge, experience, inventions, innovations, market share, and communities that can affect the company (Akpınar & Akdemir, 2014). IC can also be defined as the difference between the market value of the company and the company's replacement assets. The company's market value is equal to the book value plus the company's intellectual capital (Nuryaman, 2015). IC is important in business today, especially in today's knowledge economy, which relies heavily on technology. IC is often recognized as an invaluable intangible asset that is managed and utilized to stimulate innovation, creativity, competitiveness, value creation and improve company performance (Abdullah & Sofian, 2012). Achieving and maintaining superior performance is the goal of every organization (Ozgun et al., 2022).

Figure 2 reveals significant insights into the composition of intellectual capital (IC). Human capital emerges as the most prominently used component in our study, closely followed by structural capital and relational capital. Interestingly, these findings align with the intellectual capital framework proposed by Bontis (1998), who categorized IC into these very components. This consistency lends credence to our research. However, it's crucial to acknowledge that other studies have introduced additional IC types, such as social capital, technological capital, and spiritual capital, underscoring the evolving nature of this field. Human capital, as a core IC component, deserves special attention. It represents the intellectual abilities, creativity, and innovation embodied in employees, making it the primary cost factor in knowledge-based industries. The paramount importance of human capital in our findings reaffirms its critical role in contemporary business environments. Structural capital, the second-most utilized IC component in our study, encompasses organizational processes, systems, and intellectual property. A well-structured organization significantly influences efficiency and quality, which, in turn, affects overall company performance. Relationship capital, the third prominent component, manages external connections with stakeholders, including suppliers, customers, and marketing channels. The trust and commitment fostered through relationship capital can bolster corporate reputation, customer brand loyalty, and ultimately, financial and operational performance.

Turning our attention to the measurement of IC (Figure 3), we find various methods, including questionnaires, Value Added Intellectual Coefficient (VAIC™), Modified VAIC (MVAIC), and A-VAIC. Each method has distinct advantages and limitations, offering versatility in assessing IC. These measurement approaches enable organizations to gauge their intellectual assets effectively. Figure 4 introduces multiple performance measurement metrics, such as ROA, ROE, Market-to-book, Asset Turnover, and others. These metrics help evaluate financial and operational performance within the IC context. It's crucial for organizations to understand the relevance of these measures in assessing their IC-driven performance. In conclusion, our study underscores the vital relationship between intellectual capital and company performance. Human capital, structural capital, and other IC components have a significant positive impact. These findings carry important practical implications, highlighting the need for organizations to invest in employee development, optimize their structures, and nurture stakeholder relationships. Moreover, this research invites future exploration of dynamic IC in an ever-evolving business landscape. Strategic management of intellectual capital has become instrumental in gaining a competitive edge, often surpassing the significance of financial resources in an organization's survival and success.

This paper provides important implications for policy makers, managers and scholars, presenting empirical evidence on the relationship between IC components and performance. Companies that develop IC, especially the human resource, structural and relationship components, will contribute to the company's development and increase its profitability.

This SLR shows the growth in the number of empirical studies related to intellectual and performance, this being the least explored area. However, due to the difficulty of data



collection, this development is not as fast as expected. Beside that, this SLR cannot address the inclusion of all publications so what can be considered a limitation is the fact of not making a systematic analysis of the measurement indicators used in the collected sample. Due to its diversity requires deeper studies in this area that can be used in future investigations.

In addition to the publications found, IC-related research provides many opportunities for future exploration so that researchers can continue making significant contributions to advancing the theory on IC. Given the limited number of empirical studies identified in the SLR, this paper emphasizes the need to deepen empirical research on IC with business sustainability.

This SLR suggests the need to continue and expand research efforts on IC, focusing also on IC and performance, given the fundamental influence on performance. Knowing the extent of IC development on performance in what sectors is the most. In addition, future research can present the differences in IC components in each different sector. A future SLR is also suggested that includes both theoretical and applied approaches.

## CONCLUSION

The aim of this review is to facilitate future researchers in accessing comprehensive information regarding IC components and performance measurement techniques, ultimately contributing to a deeper understanding of how intellectual capital influences firm performance. The abstract highlights that IC encompasses both tangible and intangible resources, particularly focusing on human capital, structural capital, and relational capital, although variations exist in its components across studies. Additionally, various measurement tools have been developed to assess IC. The study also emphasizes the strong link between IC and company performance, recognizing IC as a key driver of improved performance. By conducting a systematic literature review, this article provides valuable insights into the components of IC and the various measurement methods employed. In conclusion, the systematic literature review on "Intellectual Capital and Firm Performance" underscores the critical role of intellectual capital (IC) in shaping a company's success.

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