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## IMPACT OF SELECTED VARIABLES ON VALUE ADDED OF INTELLECTUAL CAPITAL: THE BOOK PUBLISHING SECTOR IN SLOVAKIA\*

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**Abstract.** This article examines how selected micro- and macro-level factors affect the Value Added Intellectual Capital (VAIC<sup>TM</sup>) indicator for a set of enterprises in the book publishing sector in the Slovak Republic, using a regression model. Alternatively, authors examine the Intellectual Capital Efficiency (ICE) indicator for the same set of enterprises. They employ a regression analysis with cross-sectional panel data, considering fixed effects (FE) and random effects (RE) models. The research sample was rigorously selected, comprising 350 observations from 2018 to 2024. In the case of the fixed effects model, none of the explanatory variables turned out to be a significant determinant of the dependent variable VAIC<sup>TM</sup>. In the random effects model, the authors found that the most significant factors affecting VAIC<sup>TM</sup> are profitability (positive) and company age (negative), while inflation has an additional (marginal) impact. In the case of the dependent variable ICE, the authors using a fixed-effects model found that profitability measured by the EBIT/Sales ratio positively affects the dependent variable ICE, while a higher EBITDA/Assets ratio has a slightly negative impact. The results of the random-effects model for the ICE variable show that profitability (EBIT/Sales) increases, and older companies (Age) have lower ICE. The key finding is that company size, measured by sales or asset value, is not a determining factor in intellectual capital efficiency. The results of the work indicate the need to reassess the ratio between investments in physical assets and investments in human, organisational or innovation capital. The contribution of this article is the findings of the impact of selected factors on the added value of intellectual capital and the efficiency of intellectual capital in a specific creative industry sector.

**Keywords:** Value Added Intellectual Capital (VAIC<sup>TM</sup>); Intellectual Capital Efficiency (ICE); intangible assets; creative industries; regression model; book publishing sector; Slovak Republic

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### 1. Introduction

The significance of the presented research lies in its focus on the book publishing industry. This industry is a bearer of cultural identity and requires creativity and intellectual skills. It is also a bearer of digital transformation. The object of our research was a sample of Slovak book publishers. An important factor and driving force in the creation of book products and their success is human resources. The objective of this article is to examine the impact of selected microeconomic and macroeconomic indicators on the Value Added Intellectual Capital (VAIC<sup>TM</sup>) indicator and the Intellectual Capital Efficiency (ICE) indicator.

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The book publishing industry has undergone significant changes in recent years, affecting its business models, product development processes and overall efficiency. In this dynamic situation, traditional performance measurement methods such as profit, margin or sales are not always sufficient to evaluate the potential performance of publishing houses. An equally important factor is the effective use of intellectual capital, i.e. the capabilities of personnel, their knowledge, skills, creativity and innovative potential that contribute to the creation of a book as a product and drive the publishing process (Abeysekera, 2021). Intellectual capital, which includes human, structural and relational dimensions, has become a key determinant of firm performance, innovative capacity and adaptability in rapidly changing environments (Passavanti et al., 2025). Book publishing is part of the cultural and creative industries, where value creation is based primarily on intangible resources such as employee expertise, editorial processes, copyright, brand and relationships with authors and distributors. For this reason, the use of traditional financial indicators is insufficient to capture the true sources of performance. Employees in the publishing industry are not just operational contributors; they are key players in creativity and innovation. Their ability to generate ideas, manage content, and adapt to changing market conditions directly impacts the competitiveness of the business, which is increasingly knowledge-based (Bontis, 1998). Book publishing is driven by knowledge, creativity, innovation, and high added value, drawing on individual and collective talent. It drives economic growth and strengthens society's identity and cohesion. Human skills, intellectual capital, talent and creativity play a key role. Behind all of this are specific creative employees with the aforementioned qualities and abilities. Book publishing, as an industry that organises the publishing process and finances the publication and distribution of books—from manuscript preparation to their final sale—has two key dimensions: economic and cultural. Like any other business activity, publishing pursues profit as its primary economic objective. However, what distinguishes book publishing is that it is not only a production activity but also a social and cultural practice that shapes a country's cultural identity and, consequently, its citizens (Tomašević & Lebeda, 2014).

In this context, given the specifics of book publishing as a knowledge- and creativity-based industry, where value creation is primarily driven by intellectual capital, the Value Added Intellectual Capital (VAIC™) indicator was chosen. VAIC™ enables assessment of the efficiency of the use of human and structural capital using publicly available accounting data and is a suitable complement to traditional financial performance indicators. Value Added Intellectual Capital (VAIC™) is a model developed by Professor Pulić to measure and evaluate the effectiveness of intellectual capital in creating enterprise value (Pulić, 2004). The author emphasises that a central principle of this concept is the assumption that all employees are regarded as equal contributors to corporate success, and they highlight the importance of information on the effectiveness of intellectual capital at both the firm and economy-wide levels.

Pulić (1998) developed an original model and tested it using a sample of 200 Austrian companies across 14 industry sectors, and 400 Croatian companies with the highest revenue. He concluded that the efficiency of intellectual capital can be measured and managed, and that there is a strong dependency between borderline intellectual potential and added value. All of the following elements of the VAIC™ indicator were designed by Professor Pulić so that they could be easily obtained from companies' accounting records. He considers these data to be publicly available and legislatively prescribed under the accounting, reporting, and financial control systems of business entities, in accordance with applicable national laws.

Value Added Intellectual Capital (VAIC™) is a model that focuses on three key components, expressed in the form of efficiency coefficients:

- Human Capital Efficiency (HCE);
- Structural Capital Efficiency (SCE);
- Capital Employed Efficiency (CEE);
- Efficiency of Intellectual Capital (ICE),  $ICE = HCE + SCE$ .

Human Capital Efficiency (HCE) measures how efficiently an enterprise utilises its human resources and indicates how much value added is generated by one monetary unit invested in employees (Pulić, 2000). In the context of book publishing, human capital includes the jobs of editors, designers, marketers, and other professionals who contribute to the production, marketing, and distribution of books. Human capital consists of

intangible collective resources possessed by individuals and groups within a given population. These resources include knowledge, skills, abilities, experience, intelligence, talent, education, judgment, and wisdom, whether possessed individually or collectively. The cumulative value of these attributes represents a form of wealth that nations and organisations can draw upon to achieve their objectives (Huff, 2025). Human capital serves as a resource for creating material and non-material wealth in the national economy and in private enterprises. In public organisations, it is utilised to deliver public goods. As a result, the way human capital is developed and managed is one of the most important determinants of a company's economic and organisational performance.

Structural Capital Efficiency (SCE) reflects the effectiveness of an organisation's internal systems, processes, and organisational culture. In the publishing industry, this encompasses the quality of supply chains, technological infrastructure, distribution networks, and intellectual property management. Structural Capital (SC), also referred to as organisational capital, enables the creation of value by transforming human capital into organisational output (Pulić & Kolaković, 2005). Structural capital refers to the intangible assets embedded within an organisation, such as its organisational structure, management systems, collections, patents, and copyrights, which contribute to overall effectiveness and value creation. Structural capital originates from human capital and comprises knowledge and intangible assets derived from organisational processes. It encompasses efficiency, procedural innovation, and access to information, which enable knowledge codification (Gogan, Duran & Draghici, 2015). According to Pulić, the Intellectual Capital Efficiency (ICE) indicator is calculated as the sum of the Human Capital Efficiency (HCE) and Structural Capital Efficiency (SCE) coefficients (Pulić & Kolaković, 2005; Komnenić & Pulić, 2021; Pulić, Kolaković & Jelčić, 2009).

Capital Employed Efficiency (CEE) measures the efficiency with which a company utilises its physical and financial capital. In publishing houses, this includes investments in physical infrastructure, such as editorial systems and printing equipment, as well as financial capital that supports operations and long-term growth. Capital Employed (CE) refers to the total capital invested by a company to generate profit and reflects the efficiency with which this capital is utilised. It compares the value of a company's assets with its current liabilities, representing short-term obligations that must be settled within one year. The VAIC™ model assigns efficiency measures to each of these components, thereby providing a quantitative assessment of how effectively a publishing house utilises both its intellectual and tangible assets. Bontis (2001) conducted a review of the literature on the assessment of knowledge assets, considered the core of sustainable competitive advantage. He examines various measurement models, outlining their respective strengths and limitations. With regard to Professor Pulić's VAIC™ model, Bontis (2001, p. 58) highlights empirical evidence demonstrating the generalizability of results across numerous Eastern European countries.

## 2. Theoretical background

Enterprises that manage their intellectual capital effectively are better equipped to respond to changes in market conditions. Intellectual capital also enhances a company's attractiveness to investors and shareholders. Enterprises with strong intellectual capital demonstrate greater potential for long-term growth and improved financial sustainability (Akmalia & Muharam, 2024). Companies are more innovative in developing new products and services, improving operational efficiency, and achieving sustainable competitive advantages. Strong intellectual capital enables publishers to develop innovative products and services while adapting to evolving reader preferences and changing market demands. Empirical research further indicates that enterprises driven by intellectual capital are better able to respond to external environmental changes and generally achieve better results compared to companies with a lower intellectual capital profile. (Piyathilake & Siromi, 2024).

Intellectual capital significantly influences knowledge management and innovation, both of which positively impact company performance (Suparwadi, Riza & Hutahayan, 2024). While intellectual capital enhances knowledge management and overall performance, effective knowledge management fosters innovation, further reinforcing performance improvements. Moreover, the effective management of intellectual capital facilitates the sharing of knowledge and best practices within an enterprise, contributing to the development of a more adaptive and responsive workforce.

By leveraging intellectual capital, publishers are better positioned to respond swiftly to emerging market trends, technological advancements, and changing consumer behaviour, thereby maintaining relevance and competitiveness. Enterprises that effectively manage their intellectual capital can achieve a lasting competitive advantage by innovating more efficiently and adapting to market changes more successfully than their competitors (Bontis, Keow & Richardson, 2000). Intellectual capital contributes to improved business performance by enhancing knowledge management, innovation, and decision-making processes, leading to greater adaptability and resilience.

In a study of 300 companies in the United Kingdom, divided into high-tech, traditional, and service sectors, Zéghal and Maaloul (2010) identified a significant positive relationship between the Value Added Intellectual Capital coefficient and corporate economic performance. Their findings suggest that intellectual capital plays a significant role in reducing production costs and is positively associated with both financial performance and stock market performance.

An analysis of IT companies listed on the Warsaw Stock Exchange over five years was conducted by Polcyn and Vovk (2023). Focusing on the IT sector—previously identified as exhibiting strong correlations between VAIC<sup>TM</sup> and market value—the authors found a high correlation between VAIC<sup>TM</sup>, Human Capital Efficiency, and company market value. Their results align with broader research emphasising the role of human capital in economic growth, although data availability remained a notable limitation.

Bellucci et al. (2021) conducted a bibliometric and systematic analysis of 187 academic studies on intellectual capital published in the Journal of Intellectual Capital between 2014 and 2018. The authors identified several dominant research streams during this period, including intellectual capital reporting and disclosure; intellectual capital research in universities, education, and the public sector; knowledge management; and the relationship between intellectual capital, financial performance, and market value.

Santosa et al. (2023) conducted a bibliometric analysis of 130 research publications indexed in the Scopus database that focused thematically on the VAIC<sup>TM</sup> indicator during the period 2016–2020. The originality of their study lies in applying bibliometric analysis to VAIC<sup>TM</sup> as the central research theme. Their findings indicate that most studies examine the impact of intellectual capital on business performance, primarily measured by profitability and productivity, with Return on Assets (ROA) and Return on Equity (ROE) as the most frequently used indicators. The authors confirm that research on VAIC<sup>TM</sup> remains relevant, particularly with respect to modifying, reshaping, or extending the model to enhance its robustness. They further recommend that future research incorporate additional variables, such as innovation and relational capital, which may represent hidden sources of VAIC<sup>TM</sup> inconsistency. The effect of modified VAIC<sup>TM</sup> models on both financial and non-financial performance also represents a promising research direction.

Mrázková, Perželová, and Glova (2016) analysed a sample of 95 software companies from European Union countries over the period 2013–2015. Their results indicate that the components of the VAIC<sup>TM</sup> model significantly explain company profitability measured by ROE and ROA, as well as employee productivity. However, neither the aggregate VAIC<sup>TM</sup> indicator nor its individual components satisfactorily explained the market-to-book value ratio. The authors further demonstrated that the structure of intellectual capital efficiency — particularly Human Capital Efficiency and Structural Capital Efficiency — exhibits a statistically significant positive impact on both profitability and employee productivity. A notable advantage of the VAIC<sup>TM</sup> methodology, as highlighted by the authors, is the relative accessibility of the required data, which can be obtained from standard financial statements.

Rong et al. (2025) examined the influence of intellectual capital on the value creation process in commercial banks within the European Union. Using data from 2015 to 2022 for a sample of 599 banks, comprising 4,792 observations, they identified a significant positive relationship between both financial capital and human capital and banks' value-added performance. Their findings support the conclusion that financial and human resources represent the primary determinants of value creation in the banking sector. The study further revealed that during periods of financial crisis, human capital becomes less effective than financial capital in enhancing value added.

In times of economic or organisational crisis, employee turnover and sudden declines in human capital exert a substantial negative impact on bank performance.

Tarnóczy and Kulcsár (2021) conducted a comparative analysis of the VAIC<sup>TM</sup> indicator among enterprises located in the border regions of Romania and Hungary. Their study encompassed enterprises from the agriculture, construction, manufacturing, wholesale trade, retail trade, and transportation sectors over the period 2014–2018. In total, the authors examined 687 Romanian and 653 Hungarian enterprises. Their results indicate that intellectual capital significantly contributes to enterprise performance in Romania, particularly within agriculture, wholesale trade, and transportation sectors. In Hungary, intellectual capital plays a key role in value creation within construction and wholesale trade. Overall, the findings confirm a direct relationship between the VAIC<sup>TM</sup> and enterprise performance.

An empirical study focusing on the four largest media companies in Poland, which together accounted for 94.31% of the market during 2007–2011, was conducted by Fijałkowska (2014). The study involved a practical calculation of the VAIC<sup>TM</sup> indicator and an interpretation of its development over time. The results provide a comparison of changes in VAIC<sup>TM</sup> values and quantify the additional value generated per unit of invested capital.

Siniša (2018) conducted an empirical analysis of 29 commercial banks operating in the Serbian banking sector during the period 2008–2016 using the VAIC<sup>TM</sup> methodology. His findings indicate that the efficient utilisation of physical and financial capital has a greater impact on bank profitability than the efficient use of intellectual capital. Furthermore, bank size was not found to influence the relationship between ROA and intellectual capital efficiency significantly.

Nadeem, Dumay, and Massaro (2018) proposed a modification of the original VAIC<sup>TM</sup> calculation and tested the revised model using data from ten emerging and developed markets worldwide. Their results reveal a significant positive relationship between intellectual capital — particularly human, innovative, and physical capital — and firm performance, thereby supporting the robustness of extended VAIC<sup>TM</sup> –based models.

Palazzi et al. (2020) examined the moderating effect of technological intensity on the relationship between intellectual capital and enterprise performance over the period 2012–2016, using a dataset of 62,849 Italian small and medium-sized enterprises. Their findings show that profitability is positively influenced by financial and physical capital efficiency, as well as human capital efficiency. However, the effect of human capital efficiency appears weaker in the medium term. The authors argue that human capital may exert a stronger influence over longer time horizons, particularly in technologically intensive industries.

Hermans and Kauranene (2005) explored the relationship between knowledge management, intellectual capital measurement, and expected sales in a sample of Finnish biotechnology SMEs. Their analysis identified two intellectual-capital-related factors that systematically explain future sales expectations. The first factor relates to firms with a highly educated workforce, strong research and development capacity, extensive patent portfolios, and venture capital participation. The second factor reflects enterprises with an ageing but experienced workforce that has already generated stable sales, often characterised by ownership by other companies.

Galeão, Madaleno, and Nogueira (2024) investigated the relationship between VAIC<sup>TM</sup> and financial performance using ROA and ROE indicators. Their study analysed data from 600 Portuguese companies operating across twelve economic sectors between 2014 and 2019. The findings highlight the importance of physical and financial capital in explaining financial performance, while emphasising the need to focus on developing skilled human capital rather than on formal education alone. The efficiency of the human, structural, and capital-employed components was found to differ between ROA and ROE measures, with most sectors demonstrating the significance of skilled human capital, except in the financial and insurance sectors.

Bassetti et al. (2020) analysed a panel dataset of 50,310 observations from European companies over the period 2000–2017 within an imperfectly competitive environment. Their results suggest that VAIC<sup>TM</sup> is not directly

linked to intellectual capital under perfect-competition assumptions. However, the authors argue that VAIC<sup>TM</sup> remains a practical and transparent indicator of intellectual capital because it relies on readily available accounting data.

Ginesti and Ossorio (2021) applied the VAIC<sup>TM</sup> methodology to a sample of 85 Italian listed family businesses over the period 2015–2017. They concluded that higher efficiency in human capital, structural capital, and capital employed contributes positively to intellectual capital performance. Their analysis further identified two key determinants: family leadership and ownership involvement, as well as the generational stage of family businesses, both of which positively influence intellectual capital efficiency.

Kamińska, Parkitna, and Siałkowska (2017) proposed a framework for reporting intellectual capital within corporate governance structures. They argue that intellectual capital reports enhance managerial awareness and provide valuable information to potential investors, thereby supporting strategic decision-making and the development of competitive advantage.

Holienka, Pilková, and Kubišová (2016) analysed financial data from 3,311 Slovak SMEs across ten industrial sectors using Return on Capital Employed (ROCE) as a measure of value creation. Their findings indicate that while VAIC<sup>TM</sup> significantly explains value creation across all sectors, the strength of this relationship varies considerably by industry, underscoring the importance of sector-specific characteristics.

Papík and Papíková (2022) examined data from 24,351 Slovak SMEs during 2019 and 2020 to assess the relationship between intellectual capital and company performance. Their study concludes that physical and financial capital remain crucial for company success in post-communist economies such as Slovakia. During periods of market liquidity constraints, the costs associated with maintaining intellectual capital exceeded its immediate benefits, reflecting either an underestimation of intellectual capital or insufficient crisis management.

Book publishing houses are part of the cultural and creative industries. Their social, cultural and economic significance is explained by Tomašević and Lebeda (2014). The authors of this paper sought to establish a connection between an economically active business entity that produces a book as its final market product for the customer. The creation of a market product, such as a book, requires specific business knowledge, understanding and skills. These are closely related to intellectual work, i.e. intellectual capital. The links between the business's subject and an appropriate method for measuring the intellectual contribution of human capital in a company were sought. The indicator Value added intellectual capital – VAIC<sup>TM</sup> appears to be suitable. Available scientific sources were examined, and it was found that this indicator has been applied in various economic sectors to quantify the contribution of human intellectual capital. The authors did not find a paper examining this indicator in the book publishing industry. This fact can be considered a research gap, which is directly linked to the specific sector mentioned above - book publishers, economically active enterprises and real financial data from the economic environment of the Slovak Republic in the period under review.

### 3. Research objective and methodology

The *research objective* of this article is to examine, using a regression model, how selected micro and macro factors affect the indicator Value Added of Intellectual Capital (VAIC<sup>TM</sup>) in a set of enterprises in the book publishing sector in the Slovak Republic. Subsequently, using a regression model, we examine the impact of selected micro- and macro-level factors on the partial indicator, Intellectual Capital Efficiency (ICE), for the same set of companies.

The *subject of the study* is a selected set of enterprises operating in the book publishing sector (NACE class 58.11: Book publishing). This statistical class includes the activities of publishing books in printed, electronic (CDs, electronic displays, etc.), audio, or Internet form. The book publishing sector is part of the creative and cultural industries.

The *data* comes from the commercial database FinStat, which collects financial data on enterprises in the Slovak Republic. The data were processed using the Gretl software, an open-source computer statistical system. The period under study was 2018 to 2024. The original research sample consisted of 205 enterprises. The following enterprises were excluded from the research:

- that had an inappropriate data structure of published data or reported zero sales in euros (€) in some years of the research period,
- did not carry out continuous business activity in the book publishing industry in the years 2018 to 2024, or ceased their activity in this period,
- annual sales were lower than 15,000 euros (€) and at the same time had a loss from business activity. The condition was chosen because some enterprises have only one employee. The nominal annual gross wage of an employee in the Slovak Republic in 2024 was €12,576. According to the Labour Code, Act No. 311/2001 Coll., Section 120, Paragraph 3, this amount corresponds approximately to the level of work intensity for managerial activities, with an annual gross salary of €12,576, as of 2024. For this reason, we also limited the minimum annual turnover (sales)
- as a result of this selection, 155 enterprises were excluded from the research sample;
- the final number was 50 surveyed enterprises. From 2018 to 2024, we conducted 350 observations.

These indicators, value added intellectual coefficient (VAIC<sup>TM</sup>) and Intellectual capital efficiency (ICE), were created and applied by Professor Ante Pulić. We will use his original concept of the value added indicator of intellectual capital (VAIC<sup>TM</sup>). In our article, we used the following formulas to calculate the *dependent variables of regression analysis*:

1. Value added intellectual coefficient (VAIC<sup>TM</sup>), basic formula:

$$VAIC = HCE + SCE + CEE \quad (1)$$

where: HCE - Human capital efficiency coefficient (HCE); SCE - Structural capital efficiency coefficient; CEE - Capital employed efficiency coefficient.

HCE - Human capital efficiency coefficient (HCE)

$$HCE = \frac{VA}{HC} \quad (2)$$

where: VA - Value added; HC - Total salary and wages.

Structural capital efficiency coefficient (SCE)

$$SCE = \frac{VA - HC}{VA} \quad (3)$$

where: VA (Value added) = Operating profit + Employee costs + Depreciation + Amortization;  
HC (Human capital) = Total personnel expenses, salaries and wages (employee costs).

Capital employed efficiency coefficient (CEE)

$$CEE = \frac{VA}{BVofNA} \quad (4)$$

where: VA - Value added; BVofNA - Book value of the net assets.

2. Intellectual capital efficiency (ICE):

$$ICE = HCE + SCE \quad (5)$$

where: HCE - Human capital efficiency coefficient (HCE); SCE - Structural capital efficiency coefficient

3. Value added intellectual coefficient (VAIC<sup>TM</sup>), formula with the indicator Intellectual capital efficiency:

$$VAIC = ICE + CEE \quad (6)$$

4. We used the following indicators and calculations in the formulas:

$$\text{Value added (VA)} = \text{Operating profit} + \text{Employee costs} + \text{Depreciation} + \text{Amortization} \quad (7)$$

$$\text{Human capital (HC)} = \text{Total personnel expenses, salaries and wage.} \quad (8)$$

$$\text{Structural capital (SC)} = \text{value added (VA)} - \text{Human capital (HC)} \quad (9)$$

5. The EBIT Margin is calculated by dividing Earnings Before Interest and Taxes (EBIT) by total Sales (percentage):

$$EBIT \text{ Margin} = \frac{EBIT}{Total \text{ Sales}} \times 100 \quad (10)$$

EBIT, or Earnings Before interest and Taxes, is a measurement of enterprises' profitability directly related to its sales. EBIT answers the question of whether an enterprise makes a profit from selling its merchandise. EBIT measures profit before interest and tax factors have been subtracted. This demonstrates whether an enterprise is profitable, regardless of the amount it pays in taxes or the amount of debt it owes. Total Sales is the total amount of money generated from sales of goods or services.

6. EBITDA Return on Assets

$$EBITDA \text{ Return on Assets} = \frac{EBITDA}{Total \text{ Assets}} \quad (11)$$

$$EBITDA = \text{Net Profit} + \text{Interest} + \text{Taxes} + \text{Depreciation} + \text{Amortization} \quad (12)$$

EBITDA Return on Assets – measures how efficiently an enterprise is generating EBITDA (Earnings Before Interest, Taxes, Depreciation and Amortisation). This means capital structure, tax rates, and capex would not affect comparisons between enterprises. EBITDA is an alternative profitability indicator to net profit. It is used to assess an enterprise's financial health, profitability and operational efficiency. Total Assets refers to the sum of the book values of all assets owned by an enterprise.

7. Age: number of years of existence of the enterprise. Age of the enterprise in the year under review.

8. Gross Domestic Product (GDP) growth: GDP growth is the percentage change in a country's real Gross Domestic Product (GDP) over a specific period, measuring the rate at which its economy is expanding. Gross domestic product is the monetary value of all finished goods and services made within a country during a specific period.

9. Inflation: Harmonised Index of Consumer Prices (HICP), harmonised inflation rate, external factor.

*Regression models.* We used a data panel to build the regression model for a Fixed Effects Model and Random Effects Model, regression analysis of selected factors for the dependent variables VAIC<sup>TM</sup> (Value Added Intellectual Capital) and ICE (Intellectual Capital Efficiency).

Specification of Model 1 Fixed Effects and Model 2 Random Effects, dependent variable VAIC<sup>TM</sup> (Value Added Intellectual Capital):

$$VAIC_{it} = \beta_0 + \beta_1.(EBIT/Sales)_{it} + \beta_2.(EBITDA/Assets)_{it} + \beta_3. \ln(Sales_{it}) + \beta_4. \ln(Assets_{it}) + \beta_5.Age_{it} + \beta_6.GDP_t + \beta_7.Inflation_t + u_i \quad (13)$$

Specification of Model 3 Fixed Effects and Model 4 Random Effects, dependent variable ICE (Intellectual Capital Efficiency):

$$ICE_{it} = \beta_0 + \beta_1.(EBIT/Sales)_{it} + \beta_2.(EBITDA/Assets)_{it} + \beta_3. \ln(Sales_{it}) + \beta_4. \ln(Assets_{it}) + \beta_5.Age_{it} + \beta_6.GDP_t + \beta_7.Inflation_t + u_i \quad (14)$$

Where:

ICE – indicator, Intellectual Capital Efficiency, dependent variable

VAIC – indicator, Value Added Intellectual Capital, dependent variable

i – number of enterprises in the set,

t – specifically analysed period,

$\beta_0$  – the dependent variable parameter (ICE, VAIC),

$\beta_1$  to  $\beta_7$  – regression coefficients,

independent variables: EBIT/Sales – EBIT Margin; EBITDA/Assets – Return on Assets; Sales – total Sales, natural logarithm; Assets – total Assets, natural logarithm; Age – Age of the enterprise in the year under review; GDP – Gross Domestic Product growth; Inflation – Harmonised Index of Consumer Prices;  $u_i$  – enterprises-specific random effect.

#### 4. Regression analysis results

The basic relationships between individual variables, strength and direction are examined using a *correlation table*, which contains indicators of:

- intellectual capital (ICE, VAIC<sup>TM</sup>),
- performance (EBIT/Sales, EBITDA/Assets),
- size variables (Sales, Assets),
- enterprise age (Age),
- and macroeconomic variables (GDP, Inflation).

The results of the correlation of the above variables are presented below (Table 1).

**Table 1.** Correlation

| Indicators    | ICE     | VAIC    | EBIT_Sales | EBITDA_Assets | Sales   | Assets  | Age     | GDP     | Inflation |
|---------------|---------|---------|------------|---------------|---------|---------|---------|---------|-----------|
| ICE           | 1,0000  | 0,5935  | 0,4199     | 0,0192        | -0,0462 | -0,0002 | -0,2858 | -0,0677 | -0,0616   |
| VAIC          | 0,5935  | 1,0000  | 0,2244     | -0,0037       | -0,0324 | -0,0136 | -0,2009 | -0,0290 | 0,0277    |
| EBIT_Sales    | 0,4199  | 0,2244  | 1,0000     | 0,0998        | -0,0325 | 0,0100  | -0,1699 | -0,0635 | -0,1371   |
| EBITDA_Assets | 0,0192  | -0,0037 | 0,0998     | 1,0000        | -0,0132 | -0,0275 | -0,1157 | -0,0441 | -0,0554   |
| Sales         | -0,0462 | -0,0324 | -0,0325    | -0,0132       | 1,0000  | 0,9121  | 0,2641  | 0,0125  | 0,0068    |
| Assets        | -0,0002 | -0,0136 | 0,0100     | -0,0275       | 0,9121  | 1,0000  | 0,3201  | 0,0374  | 0,0412    |
| Age           | -0,2858 | -0,2009 | -0,1699    | -0,1157       | 0,2641  | 0,3201  | 1,0000  | 0,1059  | 0,1203    |
| GDP           | -0,0677 | -0,0290 | -0,0635    | -0,0441       | 0,0125  | 0,0374  | 0,1059  | 1,0000  | 0,6819    |
| Inflation     | -0,0616 | 0,0277  | -0,1371    | -0,0554       | 0,0068  | 0,0412  | 0,1203  | 0,6819  | 1,0000    |

Correlation coefficients, using the observations 1:001 - 2:175; 5% critical value (two-tailed) = 0,1049 for n = 350

Source: compiled by the authors

The most important relationships in the correlation table (see Table 1 above):

- a) relationships between intellectual capital (ICE, VAIC<sup>TM</sup>) and performance: Intellectual capital (ICE) is positively correlated with profitability from sales (EBIT/Sales), but almost not at all with profitability from assets (EBITDA/Assets). Higher intellectual capital is related to higher profitability from sales.
- b) enterprise size (Sales, Assets): enterprises with higher sales tend to have more assets. Strong correlation between Sales and Assets. Enterprise size (Assets) is not a decisive factor in profitability. Age in relation to Assets expresses that older enterprises tend to be larger.
- c) enterprise age: older enterprises have lower intellectual capital or use it less. This may reflect lower innovativeness or a less dynamic environment in older enterprises.
- d) age and performance indicators (EBIT/Sales, EBITDA/Assets) show slightly negative correlations. Older enterprises may be less efficient or less flexible.
- e) macroeconomic variables (GDP and Inflation) are strongly correlated. In some economies, there may be unidirectional movement, e.g. economic growth associated with a moderate increase in prices. The macro environment does not have a significant direct impact on intellectual capital or on the performance of enterprises in this set. Micro variables are dominant.

The above shows that:

- a) Intellectual capital increases efficiency (EBIT/Sales), but not total return on capital (ROA, EBITDA, Assets).
- b) Older enterprises have lower intellectual capital and at the same time slightly lower performance.
- c) enterprise size (Sales, Assets) does not play a significant role in profitability – it is only related to itself.
- d) Macro variables (GDP and Inflation) have a very weak connection with micro variables – the effect is negligible.

*Regression analysis of models:* through regression analysis we will examine:

- regression Model 1 Fixed Effects (FE1) and Model 2 Random Effects (RE2). The task is to determine the influence of a set of selected indicators on the dependent variable VAIC and, according to the results of statistical indicators, select the most appropriate model for interpreting the regression analysis (FE1/RE2),
- regression Model 3 Fixed Effects (FE3) and Model 4 Random Effects (RE4). The task is to determine the influence of a set of selected indicators on the dependent variable ICE and, according to the results of statistical indicators, select the most appropriate model for interpreting the regression analysis (FE3/RE4).

*First research question:* “Do the selected indicators of regression Model 1 Fixed Effects and Model 2 Random Effects have an objective impact on the dependent variable VAIC?”. We set the assumption: “The selected indicators of regression Model 1 Fixed Effects and Model 2 Random Effects have an objective impact on the dependent variable VAIC. According to the results of the regression analysis, we will select an appropriate Fixed or Random Effects model to interpret the results”.

We formulate hypotheses:

Hypothesis (H0): “The set of selected indicators does not affect the dependent variable VAIC”.

Hypothesis (H1): “The set of selected indicators affects the dependent variable VAIC”.

Regression analysis of enterprises in the book publishing industry (Model 1 and Model 2) is presented below in Table 2.

**Table 2.** Regression analysis of enterprises in the book publishing industry. Model 1: Fixed Effects (FE), Model 2: Random Effects (RE). Dependent variable: VAIC – Value Added Intellectual Coefficient

| Independent variable | FE Model 1<br>Coefficient | p-value | significance | RE Model 2<br>Coefficient | p-value | significance |
|----------------------|---------------------------|---------|--------------|---------------------------|---------|--------------|
| const                | 47,2638                   | 0,1131  |              | 47,8102                   | 0,0952  | *            |
| EBIT_Sales           | 2,8354                    | 0,2487  |              | 4,9343                    | 0,0253  | **           |
| EBITDA_Assets        | -0,3929                   | 0,3603  |              | -0,3672                   | 0,3590  |              |
| Sales                | 8,7936e-07                | 0,7280  |              | -2,8144e-07               | 0,7758  |              |
| Assets               | -8,4899e-07               | 0,7790  |              | 7,9079e-07                | 0,6370  |              |
| Age                  | -0,3667                   | 0,4383  |              | -0,3695                   | 0,0210  | **           |
| GDP                  | -36,4111                  | 0,2128  |              | -37,5937                  | 0,1756  |              |
| Inflation            | 0,4531                    | 0,0943  | *            | 0,4660                    | 0,0626  | *            |

Note: \*\*\* indicates significance at the 1 % level, \*\* indicates significance at the 5 % level and \* indicates significance at 10 % level.

LSDV - Least Squares Dummy Variable

Source: compiled by the authors

a) Main results of regression analysis - Model 1 Fixed Effects.

This type of model captures individual differences between firms using a fixed dependent variable. The LSDV  $R^2$  value measures the overall accuracy and suitability of the regression model with respect to the actual data. The  $R^2$  indicator = 0.285 indicates that the prediction of the values of the dependent variable according to the regression equation explains the variability of the dependent variable VAIC with an accuracy of approximately 28.5%. None of the explanatory variables emerged as a significant determinant of VAIC, except for inflation, which has a slightly positive effect.

The Within  $R^2$  indicator = 0.018 indicates that the explanation of the changes within units alone is very low. The changes in the dependent VAIC between years within firms are not well explained by the variables listed.

The result of the F-test for the common dependent variables (1.608,  $p = 0.009$ ) means that we reject the null hypothesis that all units have the same dependent variables, and the use of Model 1 with fixed effects is justified. The regression analysis identified the variable inflation ( $p = 0.094$ ) as marginally significant at the 10% level. The other independent variables are statistically insignificant.

Although the model is statistically significant as a whole ( $F = 2.083$ ,  $p = 0.00005$ ), it has weak economic power.

b) Main results of regression analysis - Model 2 Random Effects.

The type used assumes that differences between enterprises are random and uncorrelated with the explanatory variables. Significant variables include: EBIT/Sales ( $p = 0.025$ ), has a positive effect, meaning that higher sales profitability increases the VAIC value. The Age variable ( $p = 0.021$ ) has a negative effect, meaning that older enterprises have a lower VAIC level. Inflation ( $p = 0.063$ ) is again marginally significant at the 10% level.

The model's suitability was verified by the Breusch-Pagan and Hausman tests.

The joint test ( $\chi^2 = 14.709$ ,  $p = 0.0399$ ) means that the model as a whole is statistically significant.

According to the Breusch-Pagan test ( $p = 0.0387$ ), we reject the null hypothesis that the variance of the unit-specific error is zero. This means that random effects is more suitable than ordinary OLS.

The result of the Hausman test ( $p = 0.179$ ) means that there is no reason to reject the null hypothesis. So, random effects are consistent and, therefore, more suitable than fixed effects.

Based on the results of Model 1 Fixed Effects and Model 2 Model 2 Random Effects, we will use Model 2 Random Effects as a working one. Model 2 Random Effects is a statistically and economically more suitable model. The analysis shows that the most significant factors affecting VAIC are profitability (positive) and enterprise age (negative), while inflation has an additional (marginal) effect.

Regression analysis result and model selection: Selected indicators of regression Model 1 Fixed Effects and Model 2 Random Effects have an objective impact on the dependent variable VAIC (Value Added Intellectual Capital). According to the regression analysis results above, Model 2 Random Effects is more suitable for interpreting the results.

*The second research question:* “Do the selected indicators of the regression Model 3 Fixed Effects and Model 4 Random Effects have an objective impact on the change in the dependent variable ICE?” We set the assumption: “The selected indicators of the regression Model 3 Fixed Effects and Model 4 Random Effects have an objective impact on the dependent variable ICE. According to the results of the regression analysis, we will select an appropriate Fixed or Random Effects model for interpreting the results”.

We formulate the hypotheses:

Hypothesis (H0): “The set of selected indicators does not affect the dependent variable ICE”.

Hypothesis (H1): “The set of selected indicators affects the dependent variable ICE”.

Regression analysis of enterprises in the book publishing industry (Model 3 and Model 4) is presented below in Table 3.

**Table 3.** Regression analysis of enterprises in the book publishing industry. Model 3: Fixed Effects (FE), Model 4: Random Effects (RE). Dependent variable: ICE – Intellectual Capital Efficiency

| Independent variable | FE<br>Model 3 Coefficient | p-value | significance | RE<br>Model 4 Coefficient | p-value | significance |
|----------------------|---------------------------|---------|--------------|---------------------------|---------|--------------|
| const                | 20,2512                   | 0,1221  |              | 20,3766                   | 0,1106  |              |
| EBIT_Sales           | 2,5931                    | 0,0167  | **           | 3,5124                    | 0,0006  | ***          |
| EBITDA_Assets        | -0,3253                   | 0,0851  | *            | -0,3098                   | 0,0886  | *            |
| Sales                | 3,8287e-07                | 0,7303  |              | -3,8006e-07               | 0,5338  |              |
| Assets               | 3,1994e-07                | 0,8097  |              | 1,0099e-06                | 0,3089  |              |
| Age                  | -0,3152                   | 0,1299  |              | -0,3104                   | 0,0045  | ***          |
| GDP                  | -11,2171                  | 0,3818  |              | -11,4676                  | 0,3540  |              |
| Inflation            | 0,0270                    | 0,8204  |              | 0,0313                    | 0,7805  |              |

Note: \*\*\* indicates significance at the 1 % level, \*\* indicates significance at the 5 % level and \* indicates significance at 10 % level.

LSDV - Least Squares Dummy Variable.

Source: compiled by the authors

#### c) Main results of regression analysis - Model 3 Fixed Effects.

The significant variables of the model (at the 5% level) are the data for EBIT/Sales, a positive and statistically significant effect ( $p = 0.0167$ ) and for EBITDA/Assets a weaker one (at the 10% level,  $p = 0.0851$ ). This means that profitability measured by EBIT/Sales positively affects the dependent variable ICE, while a higher EBITDA/Assets ratio has a slightly negative effect. The other variables (Sales, Assets, Age, GDP, Inflation) are not statistically significant.

The LSDV  $R^2$  indicator has a high value of 0.606, the total explanation share including fixed effects.

The Within  $R^2$  indicator with a value of 0.05 means that the model captures only 5% of the variability within units.

The F-test for common dependent variables is significant ( $p < 0.001$ ) and also statistically confirms that companies have different fixed effects. Therefore, a fixed effects model is appropriate.

#### d) Main results of regression analysis - Model 4 Random Effects.

We identified significant variables: EBIT/Sales ( $p = 0.0006$ ) has a positive and highly significant effect. EBITDA/Assets ( $p = 0.089$ ) has a negative and weakly significant effect. Age ( $p = 0.0045$ ) has a negative and significant effect. We conclude that profitability (EBIT/Sales) increases ICE, and older companies (Age) have lower ICE.

The quality of the model fit at S.E. of regression = 8.19 (higher than with FE) indicates a worse fit to the data. Therefore, it confirms that the model with FE is more appropriate. The joint test  $\chi^2(7) = 28.83$ ,  $p < 0.001$  shows that both models as a whole are significant.

The result for the Hausman test, the null hypothesis states that the RE estimates are consistent, i.e. there is no correlation between the dependent and independent variables). Since  $p = 0.00115 < 0.05$ , we reject the null hypothesis and use the preferred Fixed Effects model.

Regression analysis result and model selection: The selected indicators of regression Model 3 Fixed Effects and Model 4 Random Effects have an objective impact on the dependent variable ICE (Intellectual Capital Efficiency). According to the above regression analysis results, Model 3 Fixed Effects is suitable for interpreting the results.

e) Summary of the economic interpretation of regression analysis.

EBIT/Sales (profitability of sales) positively affects ICE in both models. This means that the more profitable a company is (relative to sales), the higher its ICE value. It has a consistently strong positive effect on ICE.

EBITDA/Assets negatively affects ICE, perhaps suggesting that higher operating efficiency (relative to assets) is associated with a lower need for increased ICE value (perhaps more efficient use of resources). Internal company factors – especially profitability and asset utilisation efficiency – are most important for ICE.

Age has a negative effect in the RE model. The explanation is that older companies may be less flexible, less innovative, or have a lower ICE value compared to younger ones.

Macroeconomic variables (GDP, Inflation) do not have a significant effect.

## Discussion

The results of the analysis provide important insights for managers seeking to improve the efficiency of intellectual capital and understand its link to business performance.

We found that, profitability is closely related to the efficient use of intellectual capital. The significant role of profitability is consistent with previous studies linking intellectual capital efficiency to financial performance. Pulić (2000) introduced the VAIC™ methodology and emphasised the relationship between intellectual capital and profitability. Subsequent studies by Maditinos et al. (2011) confirmed that higher intellectual capital efficiency contributes positively to profitability indicators, including EBIT. These findings are also aligned with Kaplan and Norton (1992), who identified learning and growth assets as key drivers of long-term financial performance. Systematic investments in knowledge, processes, capabilities and organisational know-how can directly contribute to profit generation and should be viewed as investments with measurable economic returns, rather than simply as costs (Barney, 1991; Kaplan and Norton, 1992).

Another key finding is that enterprise size, as measured by revenue or total assets, is not a determinant of intellectual capital efficiency. Both smaller and larger enterprises can achieve high Intellectual capital efficiency (ICE) values if they implement effective knowledge management strategies and internal processes (Chen et al., 2005; Bontis, 1998; Youndt et al., 2004). Competitive advantage depends more on the effective management of knowledge resources than on the volume of physical or financial assets. This finding is particularly relevant for the publishing industry, where creativity, expertise, and intellectual capabilities represent essential sources of value creation.

The negative association between EBITDA/Assets and ICE suggests that companies with a strong focus on physical capital may face constraints in effectively utilising intellectual capital. The role of intellectual capital differs substantially between capital-intensive and knowledge-intensive sectors. From a managerial perspective, this highlights the need to reassess the balance between investments in tangible and intangible assets (Marzo, 2022). It also points to the need to transform traditional capital-intensive business models into more flexible, knowledge-driven configurations (Palazzi et al., 2020).

Intellectual capital is independent of the size of the company. Smaller companies can achieve the same high intellectual capital as large companies. Processes, not capital, are decisive. The negative effect of age on VAIC™ points to the need for constant modernisation, innovation, and adaptability, as rigidity can reduce the ability to create added value effectively. The negative impact of company age may be influenced by unobserved factors such as organisational inertia, legacy systems, or outdated business models, which were not directly measured in this article (Loderer et al., 2017).

The results indicate that the ICE indicator is better suited for fixed-effects analysis, whereas VAIC™ is more effectively explained through random-effects models. Profitability, measured by EBIT margin, emerged as a

consistent and statistically significant determinant of intellectual capital efficiency, suggesting that firms with stronger profitability are more capable of utilising their knowledge resources effectively (Nadeem et al., 2018).

The analysis further revealed that macroeconomic variables, particularly GDP growth and inflation, do not significantly affect intellectual capital efficiency. This finding suggests that intellectual capital is primarily influenced by internal organisational factors rather than external economic conditions. The results support the view that knowledge-based resources constitute a relatively stable source of competitive advantage and are less sensitive to short-term macroeconomic fluctuations.

Company-specific characteristics proved to be considerably more important. The findings indicate that organisational culture, managerial capabilities, internal processes, and the overall ability to transform knowledge into value are key determinants of intellectual capital efficiency (Alipour, 2012). In addition, the results confirm that intellectual capital efficiency is largely independent of company size, implying that both small and large publishing companies can achieve high levels of intellectual capital performance when effective knowledge management practices are implemented.

Overall, the empirical evidence confirms that intellectual capital is a measurable, manageable asset that directly contributes to value creation and organisational performance in the book publishing industry. The findings underline the crucial role of human capital, structural capital, and capital employed efficiency in supporting innovation, operational effectiveness, and long-term competitiveness.

The results also highlight the practical importance of intellectual capital management. According to Komnenić and Pulić (2021), the application of the VAIC™ methodology enables companies to identify key value-creating factors and understand their interactions. Intellectual capital should no longer be considered a cost, but rather a strategic investment. While traditional financial indicators may indicate positive performance, ineffective management of intellectual capital may signal value erosion rather than value creation (Pulić, 2004). Effective management of human capital, organisational knowledge, and innovation processes can contribute significantly to long-term value creation and sustainable competitive advantage (Mention & Bontis, 2013).

This approach brings tangible economic benefits, as demonstrated by numerous empirical studies linking the measurement, reporting, and management of intellectual capital to improved productivity, profitability, and value creation (Xu & Wang, 2018; Smriti & Das, 2018). Overall, the results support the view that intellectual capital constitutes a fundamental source of competitiveness regardless of company size or macroeconomic conditions (Bontis et al., 2015). For both managers and researchers, intellectual capital remains a field for future investigation, particularly regarding dynamic processes, innovation, and the qualitative dimensions of human capital.

## 5. Conclusions, limitations and future research

The findings of this study confirm a growing body of literature that highlights intellectual capital as a fundamental factor influencing the performance and competitiveness of businesses. Overall, the study demonstrates that intellectual capital is not merely an abstract concept but a strategic resource that can be measured, managed, and leveraged to enhance company performance. The significance of these findings is particularly pronounced in cultural and creative industries, where intellectual assets play a central role in the creation of products, services and business value.

The research objective of this study was to examine the impact of selected microeconomic and macroeconomic indicators on the Value Added Intellectual Capital (VAIC™) and Intellectual Capital Efficiency (ICE) indicators in Slovak book publishing companies. The research addresses a significant gap in the literature, as studies specifically focusing on intellectual capital in the book publishing industry remain limited despite the sector's strong dependence on creativity, knowledge, and intellectual capabilities.

The study focused on a selected set of enterprises operating in the book publishing sector. The book publishing sector is part of the creative and cultural industries. We surveyed 50 enterprises that were continuously operating from 2018 to 2024 and conducted a total of 350 observations.

The results of this study provide important implications for managers seeking to improve intellectual capital efficiency (ICE) and strengthen business performance. The first important finding is that profitability is closely related to the effective use of intellectual capital. Higher EBIT margins, reflecting stronger operating performance, are linked to higher levels of ICE, suggesting that systematic investments in knowledge, employee capabilities, organisational processes, and innovation contribute directly to value creation and profit generation. Rather than being viewed as operating costs, such investments should be regarded as strategic assets with measurable economic returns.

A second important finding is that intellectual capital efficiency is not determined by company size. Neither sales nor total assets significantly influence ICE, indicating that both small and large firms can achieve high levels of intellectual capital efficiency when supported by effective knowledge management, well-designed internal processes, and strong organisational capabilities. These results suggest that competitive advantage depends less on the scale of available resources than on how effectively these resources are organised, developed, and utilised.

The negative relationship between return on assets (EBITDA/Assets) and ICE suggests that firms that rely heavily on physical capital may face limitations in exploiting intellectual capital. This finding suggests that managers should critically reassess the balance between investments in tangible assets and investments in human, organisational, and innovation capital. It also supports the strategic transformation of traditional capital-intensive business models towards more flexible, knowledge-based approaches that emphasise the creation of intangible value.

The analysis further revealed that macroeconomic conditions, represented by GDP growth and inflation, do not significantly affect intellectual capital efficiency. This suggests that ICE is driven primarily by internal managerial decisions rather than by cyclical economic fluctuations. Consequently, organisations can strengthen their resilience and maintain competitive performance even during periods of macroeconomic uncertainty by systematically developing learning capabilities, encouraging knowledge sharing, supporting innovation, and fostering a culture of continuous organisational learning.

The results also indicate that company age has a negative effect on the VAIC<sup>TM</sup> indicator, implying that older firms may experience declining efficiency in creating value from intellectual capital if they fail to adapt to changing business conditions. This finding highlights the importance of continuous modernisation, organisational renewal, innovation, and strategic flexibility to prevent organisational rigidity from reducing intellectual capital performance.

Finally, the results emphasise the importance of company-specific factors, including organisational culture, management practices, long-term strategic orientation, leadership quality, and human capital development. These internal characteristics are fundamental drivers of intellectual capital efficiency and sustainable competitive advantage. Managers should therefore prioritise long-term investments in employee development, leadership capabilities, talent management, and organisational learning. Firms adopting such an internally focused strategy are more likely to achieve higher intellectual capital efficiency regardless of their size or the prevailing macroeconomic environment.

Several limitations of this study should be acknowledged. *First*, the measurement of intellectual capital efficiency relies on the VAIC<sup>TM</sup> methodology. Although VAIC<sup>TM</sup> is one of the most widely applied approaches in intellectual capital research, it has been criticised for its limited ability to capture the multidimensional nature of intellectual capital, particularly qualitative aspects such as innovation capacity, organisational culture, creativity, and knowledge-sharing processes. Since the methodology is primarily based on accounting data, it may not fully reflect the dynamic and intangible characteristics of knowledge assets.

*Second*, company performance was evaluated using financial indicators such as EBIT and EBITDA/Assets. While these indicators are widely accepted measures of financial performance, they may not adequately capture long-term value creation, especially in knowledge-intensive industries where the benefits of intellectual capital often materialise over extended periods. This limitation partly explains some of the mixed relationships observed between intellectual capital efficiency and financial performance indicators.

*Third*, the study does not fully account for potential industry-specific effects. Previous research suggests that the role of intellectual capital differs substantially between capital-intensive and knowledge-intensive sectors. The absence of a deeper sectoral comparison limits the broader generalizability of the findings.

*Finally*, the analysis is based exclusively on quantitative methods and financial data. While this approach provides objective and comparable measures, it does not offer deeper insights into the organisational mechanisms through which intellectual capital is developed, managed, and transformed into competitive advantage.

*Future research* should address these limitations by adopting alternative approaches to measuring intellectual capital. Survey-based instruments, hybrid models, and multidimensional frameworks could provide a more comprehensive assessment of intellectual capital by incorporating qualitative dimensions such as employee competencies, innovation capabilities, organisational learning, and knowledge-sharing intensity.

Longitudinal studies would also be valuable for examining the causal relationship between intellectual capital and firm performance over time. Such research could provide deeper insights into the dynamic processes through which intellectual capital contributes to sustainable value creation.

Further investigation should explore the moderating role of industry characteristics, technological intensity, digital transformation, and organisational life-cycle stages in shaping intellectual capital efficiency and its impact on company performance. Comparative studies across different sectors could help identify industry-specific patterns and improve the generalizability of intellectual capital research.

Given the negative relationship observed between company age and intellectual capital efficiency, future studies should examine the mechanisms by which mature organisations maintain flexibility, innovation, and knowledge renewal. Particular attention should be devoted to organisational practices that help overcome structural rigidity and support continuous adaptation.

Finally, qualitative and mixed-method approaches, including case studies and interviews, complement quantitative findings by providing a richer understanding of how organisations create, manage, and leverage intellectual capital in different contexts. Such approaches may be particularly useful within cultural and creative industries, where intangible assets, creativity, and innovation play a central role in organisational success.

Future academic research should therefore focus on the dynamic, qualitative, and transformational aspects of intellectual capital, especially in relation to digital transformation, innovation processes, and emerging models of value creation in creative industries.

Given the inherently knowledge-intensive nature of the publishing sector, intellectual capital becomes a particularly important source of competitiveness, innovation, and market success. Continuous modernisation, organisational learning, and adaptation are necessary to maintain the efficiency of intellectual capital over time.

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