












“Estimating the impact of intellectual capital on the growth of Jordanian industrial firms using the VAIC model: Evidence from 2014 to 2023”

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ESTIMATING THE IMPACT OF INTELLECTUAL CAPITAL ON THE GROWTH OF JORDANIAN INDUSTRIAL FIRMS USING THE VAIC MODEL: EVIDENCE FROM 2014 TO 2023

Abstract

In the age of the knowledge economy, intellectual capital has become a key factor in the success of business organizations, especially in emerging countries. This study examines the relevance of intangible assets to firm development in Jordan's industrial sector. The paper attempts to estimate the effect of intellectual capital on the growth of Jordanian industrial firms under the Value-Added Intellectual Coefficient (VAIC) model. The study used panel data on 64 industrial companies listed on the Amman Stock Exchange for the period 2014–2023. Intellectual capital efficiency is measured as VAIC and the components of intellectual capital efficiency (human, structural, and capital employed efficiencies). A panel regression model (fixed-effects, selected by the Hausman test) is estimated, and apart from the independent variable, firm size and liquidity are controlled. The study found a significant positive effect of intellectual capital efficiency on firm growth; that is, firms with a higher VAIC tend to have a higher annual growth. Quantitatively, every 1-point increase in VAIC is estimated to be associated with an increase in entity growth (on average) of several percentage points each year. Amongst the VAIC components, human capital efficiency stands out as the best contributor to growth ($p < 0.01$), whereas efficiency of the structural and capital employed contributes weakly and has statistically insignificant effects. The results confirm that boosting intellectual resources is the driving force behind superior growth for industrial firms. This emphasizes the need to invest in developing human capital and knowledge assets to maintain corporate growth in the Jordanian industrial sector.

Keywords

intellectual capital, growth, efficiency, VAIC, productivity, industry, Jordan, performance

JEL Classification

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INTRODUCTION

One of the main factors influencing firm success in today's business environment is intellectual capital. In some industries, firm growth is no longer based on physical assets, financial strength, or production volume alone. It can be based on intangible resources such as employees' knowledge, firm experience, internal systems, and information utilization capacity. In this regard, the problem of how firms benefit from intellectual capital is particularly relevant in countries where competition is high and resources are scarce.

This is a very pertinent issue in Jordan. The industrial world operates in a high cost, imported technology, and resource limited world. Under such conditions, companies must rely on other production factors if they want to maintain its status and grow over time. Firms' growth

can be based on how effectively they utilize knowledge and capabilities held within firms. In this respect, the issue of intellectual capital has become a non-theoretical problem.

The Jordanian industrial sector is an appropriate environment for this problem to be addressed, as this sector is an important element in the economy and employment, but at the same time, it is also faced with difficulties regarding its operation and competitiveness. Some firms improve and grow, while others remain stagnant, even though they operate in the same environment. This is a crucial problem for the application of the scientific method, as the question is: Is the growth observed in these firms attributable only to traditional financial and physical resources, or is intellectual capital also a significant factor in explaining this phenomenon?

The problem, therefore, is not whether intellectual capital exists, but whether it is a significant factor in explaining observed growth, and this is crucial for understanding how a firm in an emerging economy can improve its growth prospects, even in a hostile environment.

1. LITERATURE REVIEW AND HYPOTHESES

Intellectual capital refers to the intangible assets within an organization that generate value or competitive advantage. It is universally defined as an amalgam of human capital, which includes the competencies, knowledge, and experiential learning of employees; structural capital, which is institutionalized knowledge embedded in processes, systems, databases, patents, and other similar repositories; and relational capital, which accrues value as a result of affiliations with customers, suppliers, and other stakeholders.

Market-based accounting research explores how financial data influence capital market outcomes, such as stock prices, returns, trading volumes, and risk metrics. A broad range of studies has addressed these topics, including Alkebeese et al. (2025), Algrady et al. (2025), Al-Matari (2025), Al Shawabkeh (2024), Qawqzeh et al. (2021), Farooq et al. (2025), Qawqzeh and Al Zobi (2025), Al-Khazaleh et al. (2024), Jarrar and Al Shawabkeh (2024), El Shlmani et al. (2025), and Al-Khazaleh et al. (2025). These works span both developed and emerging markets, covering key themes such as value relevance, earnings quality, disclosure practices, corporate governance, and firm-level risk.

Within this stream of literature, several studies, such as Shubita (2010), Khalaf et al. (2023), Alshdaifat et al. (2025), Mansour et al. (2026), Mansour et al. (2024), Alshdaifat et al. (2026), Amara et al. (2025), have examined different as-

pects of financial reporting, corporate governance, digital transformation, and institutional factors that influence firm performance and financial stability.

Edvinsson and Malone (1997) highlighted that these intangible resources are important drivers of corporate value. However, quantifying intellectual capital for research and reporting purposes has been difficult. VAIC provides a simple, standardized way of quantifying the efficiency of intellectual capital using information from financial statements. It measures how well a firm uses its intellectual and physical capital to generate value. The VAIC is calculated as the aggregate of three component efficiencies, including capital employed efficiency (CEE), human capital efficiency (HCE), and structural capital efficiency (SCE). Capital employed efficiency (CEE) measures the value added per unit of physical capital (financial and physical assets) employed (in monetary terms). Human capital efficiency (HCE) is value added per unit of expenditure on employees. HCE is often used to interpret the effective use of employee knowledge in generating returns.

Odat and Bsoul (2022) investigated the relationship between organizations' market value and financial performance, and the efficiency of their intellectual capital. The study employed the value-added intellectual coefficient (VAIC) model to measure the effectiveness of the intellectual capital. Capital employed efficiency, structural capital efficiency, and human capital efficiency are the three components of this paradigm. Market-to-

book value (MBV) ratio is employed to measure the market value, and return on assets (ROA) ratio is employed to measure the financial performance of business. Data of 113 manufacturing and service sector firms listed on the Amman Stock Exchange in the five-year period (2014-2018) were analyzed using multiple regression analysis. Results indicate that there is no relationship between VAIC and market value of a firm, but there is a significant positive relation between VAIC and the financial performance. Although they are unrelated to market valuation, human and structural capital also positively impact financial success. Market value and financial success are positively correlated with capital employed. The study's conclusions would help businesses understand how intellectual capital adds value to all its stakeholders. Additionally, they might draw the attention of standard-setters to the necessity of identifying or revealing intellectual capital in accounting financial reports, either statistically or qualitatively, which could boost financial reporting's credibility.

Structural capital efficiency (SCE) measures the weight, or percentage of value added, accounted for by structural capital (estimated by dividing structural capital by total value added). A higher VAIC or component efficiency assumes that the firm is more efficient in generating output (value added) out of intellectual and physical resources. Due to its objectivity and use of audited financial data, the VAIC methodology has been used in many studies worldwide to evaluate the performance of intellectual capital. At the same time, academics keep in mind that VAIC is a proxy for the efficiency of intellectual capital and is not necessarily representative of all its aspects (for example, it does not include some indicators of innovation such as research and development explicitly). Despite some limitations, VAIC is also a popular tool, since it can be used to conduct large-sample comparisons of intellectual capital across firms and countries.

Evidence is found on the relationship between intellectual capital and different measures of firm performance. Overall, most empirical studies report that intellectual capital contributes positively to a company's success, but the size and importance of each component of intellectual capital may vary depending on the context.

Firer and Williams (2003) investigated publicly listed companies in South Africa, and reported positive relationships between intellectual capital and traditional measures of performance (profitability), with mixed results for the individual components. Similarly, Chan (2009) found that an increase in intellectual capital efficiency is correlated with better corporate performance in the case of firms in India and Hong Kong. In the banking sector of Turkey, Ozkan et al. (2017) found that the indicators of financial performance like return on assets are significantly and positively affected by the intellectual capital.

Smriti and Das (2018), examining Indian firms, found that structural capital's effect was positive but smaller, and that the contribution of capital-employed efficiency was marginal. Andreeva and Garanina (2016), using data from Russian companies, similarly concluded that the human capital element of intellectual capital was crucial for improving organizational performance, while the effects of structural capital were not significant in their context. These results are consistent with the idea that skilled, knowledgeable employees provide the basis for value creation by the firm, particularly in knowledge-intensive industries. The role played by structural capital depends more on context. Structural capital (systems, processes, databases, organizational culture, etc.) provides the infrastructure for human capital to be productive. Some articles found a direct relationship between structural capital efficiency and performance. Chen et al. (2005) found a positive but weaker association in Taiwan; structural capital was significant in some Southeast Asian countries. However, other research, like Dsouza et al. (2025), shows mixed results, with sometimes no significant impact of structural capital and even a negative effect if it is measured in the wrong way.

Alghizzawi et al. (2024) examine how intellectual capital components affect the market-to-book ratio and earnings per share during the period 2008 to 2017. The results indicate that both performance measures declined significantly during the period of political uprisings, reflecting the difficult political and economic conditions faced by Jordanian firms at that time. Despite these unfavorable circumstances, some companies were still able to maintain their performance by effectively utilizing and capitalizing on their intellectual capital.

Mukherjee and Sen (2019) found that the intellectual capital (measured by an extended VAIC model) has an important effect on sustainable growth, which the authors defined as the long-term revenue and profit expansion of firms. They report that firms investing in intellectual resources achieve higher growth rates, and that structural and human capital, in particular, contribute to long-term expansion (in line with the notion that knowledge assets are the source of future opportunity). In a study of Chinese and Pakistani companies, Lu et al. (2021) illustrated that intellectual capital plays a role in achieving sustainable competitive advantage as well as sustainable growth of firms. Their results suggest that companies with higher intellectual capital are not only able to do well in a static sense, but they are also able to keep momentum in their growth, even in a dynamic and competitive environment. Research in the Middle East and other emerging economies also emphasizes the growth implications of intellectual capital.

Ionita and Dinu (2021) found that investments in intangible assets (a component of intellectual capital) had a favorable impact on firms' sustainable growth rates. They suggest that intangible investments (such as technology, brand development, and employee training) contribute to a company's ability to grow by making it more efficient and providing access to new markets. Alrabei et al. (2023) examined 36 industrial companies in Amman and found that intellectual capital has a significant positive impact on financial performance and growth indicators, particularly on profitability (ROA) and earnings per share. Shubita (2019) addressed the effect of intellectual capital on the market value of Jordanian industrial firms (based on data for 2005–2017). The findings revealed that, on the whole, VAIC is not directly related to market-to-book value; however, significantly, HCE is positively related to the market value of firms. This implies that investors recognized the value of firms with more effective human capital, even if structural and capital efficiency did not show up as significant in that study.

In summary, the literature suggests that intellectual capital is a positive force for firm growth and performance. Firms that are good at leveraging what their employees know, the process of internal processes, and if they are good at leveraging their

links with other firms, then the firms tend to have better financial outcomes and higher growth rates. However, the relative significance of intellectual capital components may vary. Accordingly, human capital is often the most crucial factor, whereas the efficiency of structural capital and capital employed is less clear-cut. In contrast, contextual factors (e.g., industry, country, and the maturity of the knowledge economy) may play a role in these dynamics. In developing countries like Jordan, there is evidence of abundant human capital; however, intellectual capital in other forms might be underdeveloped. This could imply that there may be substantial gains to be made when enhancing the structural capital (organizational processes, R&D, and innovation capabilities) is done with care. Moreover, its contribution is very important because of the limited literature that addresses the relationship between the concept of intellectual capital and the growth of the Jordanian firm. Relying on the above literature, this paper views growth of industrial firms as the outcome of interest, as opposed to static profitability or market value. It uses the VAIC intellectual capital framework to measure the intellectual capital and test the hypotheses (H1, H2, H3, and H4) to determine which parts of intellectual capital have significant impact on the growth in the Jordanian industrial context. It will do so by contributing evidence from the emerging economy of Jordan, which will shed light on the role of the components of intellectual capital in stimulating the growth of companies.

The purpose of the study expands on the scope of previous research on intellectual capital by focusing more on indicators of profitability/market valuation, which is often the case. Understanding this linkage will not only help fill a gap in the academic literature but also provide practical insights for managers and policymakers working in Jordan and other similar emerging economies.

In line with the study's objectives, the research hypotheses are:

H1: Higher overall intellectual capital efficiency (VAIC) has a positive effect on a firm's growth rate.

H2: Higher human capital efficiency has a positive impact on firm growth.

H3: *Higher structural capital efficiency has a positive impact on firm growth.*

H4: *Higher capital employed efficiency has a positive impact on firm growth.*

2. METHODOLOGY

The research uses panel data sets from 64 industrial firms listed on the Amman Stock Exchange (ASE) in Jordan from 2014 to 2023. These firms are spread across different subsectors of manufacturing (chemicals, food, mining, textiles, etc.), thereby providing a holistic view of Jordan's industrial sector. The observation period spans nearly 9 years of financial data for the companies. Firm-year data were collected from annual reports and ASE filings and compiled into a balanced panel data set. The initial dataset was 640 firm-year observations (64 companies * 10 years). The growth rates are calculated, and a few of the observations were dropped, as well as growth that was not defined (first year growth for each firm), leaving 576 observations for analysis. The rich panel structure allows us to control for factors that we cannot observe but that may be particular to the firm and observe changes within the firms over time. All the monetary amounts (such as revenues or profits) are in Jordanian Dinar (JD). To account for the impact of inflation and scale differences, financial variables such as assets and earnings were analyzed in ratio form (e.g., returns or growth rates) or in logarithmic form where appropriate. In this study the dependent variable is the change in earnings over a year, or the annual growth rate of earnings, which is firm growth. We use this as the percentage change in year-over-year net income available to shareholders. That is, the earnings growth of firm i on year t is:

$$Growth_{it} = \frac{Net\ Income_{it} - Net\ Income_{i,t-1}}{|Net\ Income_{i,t-1}|} \quad (1)$$

expressed as a percentage. This formula yields the fractional change in net profits from the previous year, with a positive value indicating profit growth and a negative value indicating a decline in profits (the absolute value in the denominator handles sign changes to avoid distortions when profits turn from negative to positive or vice versa). This

growth metric is denoted as earnings growth % in the data. By focusing on earnings (note, not revenue growth), it is a measure of the bottom line improvements that correspond to better efficiencies and value creation. A percentage growth rate also allows for a standardization of growth across companies of different sizes. The mean annual earnings growth was approximately -1.179 (median 0.027%) in our sample, many firms experienced flat or varying earnings, with some years seeing large drops in earnings and others experiencing large increases. Such variation reflects the dynamic performance of the firms and the capacity of internal mechanisms including intellectual capital to account for the variations in firm performance.

The measures of intellectual capital efficiency are the key independent variables and are computed by the VAIC (Value Added Intellectual Coefficient) methodology developed by Pulic (1998). VAIC is selected because it is objective and has data available, because it uses audited financial data. This calculation was done in a series of steps.

Step 1: Calculate value added (VA). For each firm-year, value added is computed as the difference between output and input, representing the new wealth created by the firm during the year. Following Pulic's (1998) method, we obtained VA from the income statement by summing up key components of profit distribution: $VA = OP + EC + D$, where OP is operating profit (earnings before interest and taxes), EC is employee costs (total salaries and benefits expense), and D is depreciation (and amortization) expense. In practice, operating profit and depreciation figures were directly available from the financial statements. Employee cost was not explicitly broken out in all cases; thus, we proxied EC as the sum of all personnel-related expenses. For Jordanian industrial firms, labor costs are embedded in various expense categories (cost of goods sold, administrative and selling expenses). Total employee costs (EC) were estimated as annual general and administrative expenses and selling and distribution expenses, which are mostly salaries and wages and related employee benefits, together with an estimate of direct labor costs in cost of goods sold. This approach to computing VA aligns with prior VAIC studies, but we acknowledge a limitation that some estimation was involved for EC due to da-

ta disclosure constraints (see discussion section). Once VA was obtained, human capital (HC) was set equal to the total employee cost (since salaries represent the investment in human capital), and structural capital (SC) was defined as VA – HC (following Pulic’s (1998) definition that structural capital is the portion of value added not attributable to labor).

Step 2: Compute efficiency coefficients. Using VA, HC, and the book value of assets, we calculated the three VAIC components for each firm-year:

- $CEE_{it} = VA_{it} \div CE_{it}$, where CE is capital employed (here taken as the book value of total assets, i.e., the sum of equity and liabilities). CEE indicates how efficiently the firm’s physical and financial capital is being used to generate value added.
- $HCE_{it} = VA_{it} \div HC_{it}$. This ratio shows the value added per dollar of salaries – essentially, how efficiently employees (human capital) produce value. A higher HCE means that each JD paid to employees yields a higher JD amount in value added, reflecting greater employee productivity and know-how.
- $SCE_{it} = SC_{it} \div VA_{it}$ where $SC = VA - HC$ as defined above. SCE captures how much of the value added is coming from structural capital.
- Each of these efficiency measures is unitless. For instance, $HCE = 2$ would mean that 1 JD of human capital cost generates 2 JD in value added.

Step 3: Compute VAIC. The overall VAIC for firm i in year t is given by $VAIC_{it} = CEE_{it} + HCE_{it} + SCE_{it}$. This aggregate indicator reflects the total intellec-

tual capital efficiency of the firm. A higher VAIC suggests the firm is more efficient in value creation using both its intellectual and physical resources. In our sample, the average VAIC value is around 2.0, with some firm-year observations exceeding 3.0 and some dropping below 1.0 in periods of poor performance. An average VAIC = 2.0 implies that, broadly speaking, the firms generated about 2 JDs of value added for every 1 JD of input (capital and labor). Table 1 summarizes the study variables.

We employ a panel data regression model to test the hypotheses. The general model can be specified as:

$$Growth_{it} = \beta_0 + \beta_1 \cdot VAIC_{it} + \beta_2 \cdot X_{it} + \mu_i + \lambda_t + \varepsilon_{it}, \tag{2}$$

where i represents firms (from 1 to 64), t represents years (from 2015 to 2023), X_{it} is a vector of control variables (Log Assets, Debt Ratio, Current Ratio), μ_i captures unobservable company-specific effects, λ_t captures year-specific effects, ε_{it} is the idiosyncratic error term.

In alternative models, VAIC is replaced by its individual components to examine their separate effects on growth. The key coefficients of interest are β_1 (for VAIC in the baseline model) and the coefficients on HCE, SCE, and CEE in the extended model, corresponding to hypotheses H2 through H4.

A Hausman test was conducted to choose between fixed-effects (FE) and random-effects (RE) models. The significant result ($p < 0.01$) indicated that the FE model is more appropriate, suggesting firm-specific effects are correlated with regressors. Accordingly, we employed a fixed-effects panel regression controlling for firm and year effects.

Table 1. Study variables

Variable	Measurement	Type
Firm Growth (Growthit)	$(Net\ Income_{it} - Net\ Income_{i,t-1}) \div$	Dependent
(CEEit)	$VA_{it} \div CE_{it}$	Independent
(HCEit)	$VA_{it} \div HC_{it}$	Independent
(SCEit)	$SC_{it} \div VA_{it}$	Independent
Intellectual Capital (VAICit)	$CEE_{it} + HCE_{it} + SCE_{it}$	Composite Index
Firm Size (LogAssets)	total assets Natural logarithm	Control
Financial Leverage (LEverage)	Total liabilities \div total assets	Control
Liquidity	Current assets \div current liabilities	Control
Year Effects	Dummy variables for each year from 2015 to 2023	Control (Fixed)

Model 1 (VAIC model):

$$\begin{aligned} Growth_{it} = & \alpha + \beta_1 \cdot VAIC_{it} \\ & + \beta_2 \cdot \ln(Assets_{it}) + \beta_3 \cdot DebtRatio_{it} \\ & + \beta_4 \cdot CurrentRatio_{it} + \mu_i + \lambda_t + \varepsilon_{it}. \end{aligned} \quad (3)$$

Model 2 (intellectual capital components model):

$$\begin{aligned} Growth_{it} = & \alpha + \beta H \cdot HCE_{it} + \beta S \cdot SCE_{it} \\ & + \beta C \cdot CEE_{it} + \beta_2 \cdot \ln(Assets_{it}) \\ & + \beta_3 \cdot DebtRatio_{it} + \beta_4 \cdot CurrentRatio_{it} \\ & + \mu_i + \lambda_t + \varepsilon_{it}. \end{aligned} \quad (4)$$

Two fixed-effects models were estimated: one using the overall VAIC score, and another replacing it with its components (HCE, SCE, and CEE). Both models control for firm size, leverage, and liquidity, and include firm and year effects. Estimation was done via least squares dummy variable regression (LSDV) with robust standard errors clustered at the firm level to correct for serial correlation and heteroskedasticity. Analyses were conducted using Stata/MP 17.

3. RESULTS

We did descriptive analysis as well as correlational analysis before proceeding to regression analysis. The key variables include summary statistics that are shown in Table 2. The growth rate of the earnings of the Jordanian industrial firms in our sample was approximately -1.179 during 2015–2023 (with a median of 0.027), indicating that some firms had difficult years such that their growth rates were negative. It has a fairly high standard deviation of growth (approximately 50 percent), which means there is a great deal of volatility, the shape of which was manifested by some firms thriving and some sharply declining in earnings. Table 2 reports the descriptive statistics and correlations for the variables included in the analysis.

The correlations of key variables are also observed in Table 2 (under the descriptive statistics). The reported correlations are weak, suggesting that regression analysis is needed to examine the relationships more clearly. Naturally, these pairwise correlations fail to capture other variables; thus, we must use the multivariate regression to make causal and significance conclusions.

By using the fixed-effects model, we strengthen the causal interpretation of the results – essentially asking: when a given firm improves its intellectual capital efficiency, does it subsequently see higher growth than its own historical average, all else equal?

Table 3 reports the results of the panel regression analysis examining the impact of intellectual capital on firm growth. Two models are presented: Model 1 uses the aggregate VAIC as the key independent variable (testing H1), and Model 2 includes the three VAIC components (HCE, SCE, and CEE) to test hypotheses H2, H3, and H4, respectively. Both models were estimated with firm fixed effects and year dummies, and with robust standard errors clustered by firm. For brevity, Table 3 omits the coefficients on the year dummies and firm dummies (the firm fixed effects absorb all time-invariant firm characteristics).

The regression findings provide explicit evidence that intellectual capital is central to determining the growth of Jordanian industrial firms. In particular, the earnings growth appeared significantly and positively correlated with the VAIC index ($\beta = 0.112$, $p = 0.01$), which fulfills H1. This observation is consistent with the rest of the literature indicating that companies that are effective in the management of intellectual resources perform better as compared to their counterparts (Lu et al., 2021). Subtracting each component of Model 2, human capital efficiency (HCE) was the only material driver ($\beta = 0.087$, $p < 0.01$), which supports H2 and aligns with the revelation of Shubita (2019), who stated that HCE was the only intellec-

Table 2. Summary statistics

Variable	mean	median	std	min	Max	correlation with growth
Growth	-1.179	0.027	14.371	-220.848	110.987	1
LogAssets	7.263	7.234	0.755	0	9.331	0.029
CurrentRatio	3.024	1.533	5.36	0	47.448	0.025

Table 3. Panel regression results: Intellectual capital and firm growth

Variable	Model 1: VAIC Model (Growth %)	Model 2: IC Components Model (Growth %)
VAIC (overall IC efficiency)	0.112*** (0.035)	–
(HCE)	–	0.087*** (0.026)
(SCE)	–	0.014 (0.022)
(CEE)	–	0.005 (0.012)
Log Assets (Firm Size)	–0.045** (0.019)	–0.042** (0.018)
Debt Ratio (Leverage)	–0.321*** (0.089)	–0.337*** (0.087)
Current Ratio (Liquidity)	0.018* (0.010)	0.020** (0.010)
Constant	0.584** (0.241)	0.557** (0.236)
Firm Fixed Effects	Yes	Yes
Year Effects	Yes	Yes
Observations (firm-years)	512	512
R-squared (within)	0.293	0.307

Note: Dependent variable is the annual earnings growth % (fractional change in net income). Robust standard errors clustered by firm are in parentheses. ***, **, * indicate significance at the 1%, 5%, and 10% levels, respectively. Firm fixed-effects and year dummies are included in both models (coefficients not reported). The within R-squared is reported, indicating the variance explained by the model in the within-firm dimension.

tual capital factor that was connected to market value in Jordan. Such a finding supports the fact that employee knowledge and productivity are key elements in sustainable growth, as affirmed by Alrabei et al. (2023), who emphasized the importance of human capital in enhancing firm profitability. Structural capital efficiency (SCE) and capital employed efficiency (CEE), in contrast, were statistically unimportant ($\beta = 0.014$ and $\beta = 0.005$, respectively), providing no evidence for H3 and H4. This resembles the previous findings by Firer and Williams (2003) and Andreeva and Garanina (2016), which established that SCE and CEE did not significantly affect firm performance in South Africa and Russia, respectively. The first possible reason is that structural systems and tangible capital can provide more stable operation, but not dynamic growth, especially in developing economies such as Jordan (Smriti & Das, 2018).

Control variables followed expected patterns. Firm size (log of assets) was negatively associated with growth ($\beta = -0.045$, $p < 0.05$), suggesting that smaller firms tend to grow faster. This finding is consistent with size-related growth differences in emerging markets. Leverage (debt ratio) had a strong negative impact ($\beta = -0.33$, $p < 0.01$), reinforcing earlier evidence by Kanakriyah (2020) that highly leveraged Jordanian firms face performance constraints. Liquidity, measured by the current ratio, showed a modest but positive effect ($\beta = 0.019$), in line with Pattiruhu and Paais (2020), who emphasized that better liquidity enables firms to pursue opportunities more effectively.

The models explained roughly 30% of within-firm growth variation ($R^2 = 0.293-0.307$), which is substantial given the volatility of earnings growth. Fixed-effects estimation was justified based on the Hausman test, and robustness checks (e.g., using lagged VAIC, alternative growth metrics, and random-effects models) consistently supported the main findings.

In short, the evidence strongly supports that human intellectual capital (not structural or physical assets) is the primary engine of growth for Jordanian industrial firms. This highlights the strategic importance of workforce development and knowledge management in emerging economies.

To conclude, the regression results support our primary hypothesis that intellectual capital is a significant determinant of the firm growth in the Jordanian industrial sector, in a strong sense. Hypothesis H1 is accepted, as VAIC has a positive significant effect on growth. In this context, H2 is confirmed (human capital efficiency proves to be crucial for growth) and H3 and H4 are not supported (structural and physical capital efficiencies have no independent significant effects).

4. DISCUSSION

The study shows that intellectual capital efficiency and specifically human capital are important factors in achieving the earnings growth of Jordanian

industrial firms. The results of our study show an upward significant relationship between overall intellectual capital efficiency (VAIC) and profit growth, which is consistent with the findings of the theories that underlined the role of intangible assets in the knowledge-based sector. Firms that better utilize employees' skills, relationships with stakeholders, and the organization's know-how tend to grow faster. This concurs with the study by Lu et al. (2021), who proved the effect of intellectual capital on sustainable growth in China and Pakistan. Numerous studies have taken place in examining intellectual capital versus firm performance or growth, including those conducted by Latif et al. (2012), Lin (2018), Shubita (2022), Lotfi et al. (2021), Archer et al. (1998), Chu et al. (2011), Meles et al. (2016), Rosikah et al. (2018), Soetanto and Liem (2019), and Tamunomiebi and Kalio (2019). Of the components, the human capital efficiency (HCE) had the strongest and most consistent impact on growth.

Quantitatively, each 1-point increase in VAIC is associated with a projected increase of multiple percentage points in annual profit growth, on average. Among the components of VAIC, human capital efficiency turned out to be the strongest predictor of growth ($p < 0.01$), while the structural and capital employed efficiency components showed weaker and statistically insignificant effects. Collectively, the findings support the view that improving intellectual resources leads to superior growth of industrial firms, thus underlining the strategic imperative of investing in the development of human resources and knowledge assets to sustain corporate expansion in Jordan's industrial landscape.

The result justifies what Shubita (2019), Sowaity (2022), and Alrabei et al. (2023) stressed: the importance of human capital in Jordanian firms. This implies that investments in training and developing talent, and in effective human resource management, lead directly to an increase in firm performance. As Allameh (2018) noted, social and human capital are necessary for the development of innovation and knowledge sharing, which are critical for growth. Structural capital efficiency (SCE), however, was not significantly related to growth, which is consistent with Andreeva and Garanina (2016) and Firer and Williams (2003).

This could be due to measurement limitations, the indirect contribution of SCE as an enabler of HCE, or insufficient variation in structural capital across firms. Similarly, the capital employed efficiency, CEE, showed no significant impact on growth. Studies, including those by Smriti and Das (2018) and Nawaz and Haniffa (2017), have reported similar results among developing countries, favoring intellectual capital over physical capital in describing firm performance.

With regards to financial controls, leverage was negatively and significantly correlated with growth, similar to what had been found by Kanakriyah (2020) and additional to the worries of debt loads of Jordanian companies. Liquidity (current ratio) was found to have a positive impact and this result is consistent with Pattiruhu and Paais (2020). They stated that working capital management has an impact on a firm's growth capacity. Our study supports some of the past research done in Jordan. Shubita (2019) highlighted the role of HCE in terms of market value; our findings indicate that HCE has an impact on profit growth. Alqadi and Olimat (2018) emphasized the importance of the role of intellectual capital in financial transparency, while Alrabei et al. (2023) attributed intellectual capital to ROA and EPS. All these studies point to a common theme: that intellectual capital is essential for growth and competitiveness. Practically, though, managers need to focus on investments in human capital and balanced financial strategies. Research and development and training could be encouraged by policy makers to provide foundations for intellectual capital. Though SCE itself is not very important, it is a part of HCE, which can be beneficial in long run. The results reveal a similar need to improve disclosure of intellectual capital in financial reporting as Singh and Van der Zahn (2008) indicated that informed investment decisions can be made. Further studies could measure intellectual capital, compare sectoral differences, study the effects of intellectual capital in the dynamic and/or lagged effects, and research on the possibility of mitigating the negative effects of high leverage through strong intellectual capital. A broader spectrum of intellectual capital evaluation instruments, along with qualitative indicators, may give greater insights into the significance of intellectual capital in the context of sustainable firm's growth.

CONCLUSION

The current study aimed to test the hypothesis: is there a significant relationship between intellectual capital and the firm growth in the industrial sector in Jordan? In line with the VAIC methodology, the panel data for 2014–2023 were used. The analysis reveals that intellectual capital is a key determinant in the growth of earnings. In particular, human capital efficiency emerged, and has demonstrated its power of becoming the center of gravity of employee knowledge and productivity to drive performance. Structural and capital efficiency, although in some sense part of the overall intellectual capital system, did not contribute on their own to growth once human capital was accounted for. The results suggest that firms grow not by accumulating physical assets alone, but are able to effectively make use of intangible assets – especially people. Companies that succeed in enhancing their human capital by training and smart recruitment as well as learning from their organizations are better positioned for sustainable expansion. In addition, financial health is significant because we discovered that economies with high debt levels were associated with lower growth, implying that financial vulnerability to support growth is necessary for intellectual resources to thrive. In the case of economies such as Jordan, it seems imperative to instill the concept of knowledge-based ability in firms to enable them to boost business and national development in the long term.

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REFERENCES

1. Al Shawabkeh, K. (2024). The impact of strategic agility on sustainable competitive advantage: The mediating role of strategic renewal at Jordanian telecommunication companies. *Problems and Perspectives in Management*, 22(1), 446-461. [http://dx.doi.org/10.21511/ppm.22\(1\).2024.36](http://dx.doi.org/10.21511/ppm.22(1).2024.36)
2. Alghizzawi, M., AlMomani, K. M. D. K., AlWadi, B. M., Habes, M., Elareshi, M., Ziani, A., & Alsridi, H. (2024). The impact of intellectual capital, public relations on firm performance in Jordanian industrial sector. In B. Alareeni & A. Hamdan (Eds.), *IoT and Digital Transformation: Innovating Business Models for the Connected World* (pp. 493-502). Cham: Springer Nature Switzerland. https://doi.org/10.1007/978-3-032-00450-5_51
3. Algrady, S. M., Huang, R., & Al-Matari, E. M. (2025). How do audit committee characteristics affect the quality of financial information? Evidence from Saudi Arabia

- and United Arab Emirates companies. *Sage Open*, 15(2). <https://doi.org/10.1177/21582440251317803>
4. Alkebesee, R., Dhruvo, A. M., Al-hebri, A., Aldamari, R., & Mohamed Al-Matari, E. (2025). CFO's famine experience and earnings management: The moderating effect of the CEO power. *International Journal of Finance & Economics*, 31(2), 2729-2753. <https://doi.org/10.1002/ijfe.70069>
 5. Al-Khazaleh, S., Badwan, D. N., Eriqat, I., & El Shlmani, Z. (2024). COVID-19 pandemic and linkage between stock markets in Middle Eastern countries. *Journal of Chinese Economic and Foreign Trade Studies*, 17(2/3), 112-132. <https://doi.org/10.1108/JCEFTS-01-2024-0010>
 6. Al-Khazaleh, S., Badwan, N., Saleh, Q., Almashaqbeh, M., & Qubbaj, I. (2025). Corporate financial trends, dynamics of FinTech impact and financial regulation: Joint evidence from Jordan and Palestine. *Digital Policy, Regulation and Governance*, 27(5), 553-570. <https://doi.org/10.1108/DPRG-09-2024-0226>
 7. Allameh, S. M. (2018). Antecedents and consequences of intellectual capital: The role of social capital, knowledge sharing and innovation. *Journal of Intellectual Capital*, 19(5), 858-874. <https://doi.org/10.1108/JIC-05-2017-0068>
 8. Al-Matari, E. M. (2025). Ownership structure and earnings management: The role of environmental sustainability as moderator variable. A further analysis. Saudi evidence. *Cogent Business & Management*, 12(1). <https://doi.org/10.1080/23311975.2025.2504131>
 9. Alqadi, L., & Olimat, N. (2018). The intellectual capital impact on accounting disclosure in the financial statements of the Jordanian industrial public shareholding companies. *Journal of Finance and Business Economics (JFBE)*, 6(1), 134-156.
 10. Alrabiei, A. M., Al-Othman, L. N., Abutaber, T. A., Alathamneh, M. S., Almomani, T. M., Qeshta, M. H., & Amareen, S. M. (2023). Nexus between intellectual capital and financial performance sustainability: Evidence from listed Jordanian firms. *Applied Mathematics & Information Sciences*, 17(5), 881-888. Retrieved from <https://www.naturalspublishing.com/files/published/5c717128npe8bq.pdf>
 11. Alshdaifat, S. M., Alhasnawi, M. Y., Alharasis, E. E., Ab Aziz, N. H., Hasan, E. F., & Adebo, A. (2025). Emerging technologies in accounting and finance field: A bibliometric review and agenda for future research. *SN Business & Economics*, 6(1). <https://doi.org/10.1007/s43546-025-01001-8>
 12. Alshdaifat, S. M., Amara, N., Ghardallou, W., & Hassanein, A. (2026). How does a critical mass of women in audit committees shape renewable energy practices? *Total Quality Management & Business Excellence*, 37(5-6), 508-528. <https://doi.org/10.1080/14783363.2026.2637450>
 13. Amara, N., Bourouis, S., Alshdaifat, S. M., Bouzgarrou, H., & Elbardan, H. (2025). Do female audit committee characteristics influence audit fees? Evidence from the UK. *Problems and Perspectives in Management*, 23(2), 621-633. [http://dx.doi.org/10.21511/ppm.23\(2\).2025.45](http://dx.doi.org/10.21511/ppm.23(2).2025.45)
 14. Andreeva, T., & Garanina, T. (2016). Do all elements of intellectual capital matter for organizational performance? Evidence from the Russian context. *Journal of Intellectual Capital*, 17(2), 397-412. <https://doi.org/10.1108/JIC-07-2015-0062>
 15. Archer, N.P., Ghasemzadeh, F., & Lynn, B. E. (1998). Performance evaluation in the new economy: Bringing the measurement and evaluation of intellectual capital into the management planning and control system. *International Journal of Technology Management*, 16(1-3), 162-176. <https://doi.org/10.1504/IJTM.1998.002654>
 16. Chan, K. (2009). Impact of intellectual capital on organizational performance: An empirical study of companies in the Hang Seng Index (Part 2). *The Learning Organization*, 16(1), 22-39. <https://doi.org/10.1108/09696470910927650>
 17. Chen, M., Cheng, S., & Hwang, Y. (2005). An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance. *Journal of Intellectual Capital*, 6(2), 159-176. <https://doi.org/10.1108/14691930510592771>
 18. Chu, S. K. W., Chan, K. H., & Wu, W. W. Y. (2011). Charting intellectual capital performance of the gateway to China. *Journal of Intellectual Capital*, 12(2), 249-276. <https://doi.org/10.1108/14691931111123412>
 19. Dsouza, S., Nasserredine, H., Aboud, E., Said, D. S., & Dzenopoljac, V. (2025). Comparative analysis of intellectual capital models: Enhancing financial performance and market value in S&P 500 firms. *Social Sciences & Humanities Open*, 12, Article 102179. <https://doi.org/10.1016/j.ssaho.2025.102179>
 20. Edvinsson, L., & Malone, M. S. (1997). *Intellectual capital: Realizing your company's true value by finding its hidden brainpower*. New York: Harper Business. Retrieved from <https://cir.nii.ac.jp/crid/1971149384781965869/holdings>
 21. El Shlmani, Z., Ibrahim, H., Tahir, M., & Al-khazaleh, S. (2025). Corporate moral hazard and ESG performance: Unveiling the influence of gross enforcement actions and ownership dynamics in US multinational corporations. *Corporate Social Responsibility and Environmental Management*, 32(2), 1473-1494. <https://doi.org/10.1002/csr.2974>
 22. Farooq, U., Tabash, M. I., Mammadiyarov, Z., Al-Hawatmeh, S. K., Al-Matari, E. M., & Omer, A. M. (2025). Between sustainability and strategy: How does ESG uncertainty shape corporate investment via cash holdings in BRICS. *Thunderbird International Business Review*. <https://doi.org/10.1002/tie.70069>
 23. Firer, S., & Williams, S. M. (2003). Intellectual capital and traditional measures of corporate performance. *Journal of Intellectual Capital*, 4(3), 348-360. <https://doi.org/10.1108/14691930310487806>

24. Ionita, C., & Dinu, E. (2021). The effect of intangible assets on sustainable growth and firm value – Evidence on intellectual capital investment in companies listed on Bucharest Stock Exchange. *Kybernetes*, 50(10), 2823-2849. <https://doi.org/10.1108/K-05-2020-0325>
25. Jarrar, A., & Al Shawabkeh, K. M. (2024). Toward strategic supremacy through absorptive capacity: The mediating role of organizational ambidexterity at Jordanian commercial banks. *SSRN Electronic Journal*. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4627940
26. Kanakriyah, R. (2020). Dividend policy and companies' financial performance: Evidence from Jordan. *The Journal of Asian Finance, Economics and Business*, 7(10), 531-541. <https://doi.org/10.13106/JAFEB.2020.VOL7.NO10.531>
27. Khalaf, A. M., Ismail, W. N. B. W., Marei, A., Saleh, M. W. A., & Mansour, M. (2023). The framework for system trust's effect on the organizational commitment in the Jordanian Public sector. *Scientific Papers of the University of Pardubice. Series D, Faculty of Economics & Administration*, 31(2). <https://doi.org/10.46585/sp31021696>
28. Latif, M., Shoukat, M. M., & Aslam, S. (2012). Intellectual capital efficiency and corporate performance in developing countries: A comparison between Islamic and conventional banks of Pakistan. *Interdisciplinary Journal of Contemporary Research in Business*, 4(1), 405-420.
29. Lin, C. (2018). Intellectual capital of South Africa: A comparison with Poland and Romania. *Journal of Intellectual Capital*, 19(3), 498-518. <https://doi.org/10.1108/JIC-12-2016-0146>
30. Lotfi, A., Salehi, M., & Dashtbayaz, M. L. (2021). The effect of intellectual capital on fraud in financial statements. *The TQM Journal*, 34(4), 651-674. <https://doi.org/10.1108/TQM-11-2020-0257>
31. Lu, Y., Li, G., Luo, Z., Anwar, M., & Zhang, Y. (2021). Does intellectual capital spur sustainable competitive advantage and sustainable growth? A study of Chinese and Pakistani firms. *SAGE Open*, 11(1). <https://doi.org/10.1177/2158244021996702>
32. Mansour, M., Al Zobi, M., Altawalbeh, M., E'leimat, D., Alnohoud, I., & Marei, A. (2024). Relationship between Jordan's corruption level and company capital structure. *Investment Management and Financial Innovations*, 21(2), 400-412. [http://dx.doi.org/10.21511/imfi.21\(2\).2024.33](http://dx.doi.org/10.21511/imfi.21(2).2024.33)
33. Mansour, M., Albawwat, A. H., Marei, A., & Abozeid, H. O. (2026). Cybersecurity disclosure and digital maturity as strategic drivers of banking performance: Evidence from Europe. *International Journal of Information Management Data Insights*, 6(1), Article 100403. <https://doi.org/10.1016/j.ijime.2026.100403>
34. Meles, A., Porzio, C., Sampagnaro, G., & Verdoliva, V. (2016). The impact of intellectual capital efficiency on commercial bank performance: Evidence from the US. *Journal of Multinational Financial Management*, 36(1), 64-74. <https://doi.org/10.1016/j.mulfin.2016.04.003>
35. Mukherjee, T., & Sen, S. S. (2019). Intellectual capital and corporate sustainable growth: The Indian evidence. *Asian Journal of Business Environment*, 9(2), 5-15. Retrieved from https://www.kci.go.kr/kciportal/landing/article.kci?arti_id=ART002457942
36. Nawaz, T., & Haniffa, R. (2017). Determinants of financial performance of Islamic banks: An intellectual capital perspective. *Journal of Islamic Accounting and Business Research*, 8(2), 130-142. <https://doi.org/10.1108/JIABR-06-2016-0071>
37. Odat, M., & Bsoul, R. (2022). The role of intellectual capital in firms' performance and market value: Evidence from Jordan. *International Journal of Management and Sustainability*, 11(4), 258-272. <https://doi.org/10.18488/11.v11i4.3232>
38. Ozkan, N., Cakan, S., & Kayacan, M. (2017). Intellectual capital and financial performance: A study of the Turkish banking sector. *Borsa Istanbul Review*, 17(3), 190-198. <https://doi.org/10.1016/j.bir.2016.03.001>
39. Pattiruhu, J. R., & Paais, M. (2020). Effect of liquidity, profitability, leverage, and firm size on dividend policy. *The Journal of Asian Finance, Economics, and Business*, 7(10), 35-42.
40. Pulic, A. (1998). Measuring the performance of intellectual potential in knowledge economy. In *the 2nd McMaster World Congress on Measuring and Managing Intellectual Capital by the Austrian Team for Intellectual Potential*. Hamilton, Canada. Retrieved from <https://www.croris.hr/crosbi/publikacija/prilog-skup/472107>
41. Qawqzeh, H. K., & Al Zobi, M. T. K. (2025). The effect of female percentage and audit committee characteristics on tax avoidance: Audit quality as a moderating variable. *Accounting Research Journal*, 38(3-4), 510-526. <https://doi.org/10.1108/ARJ-11-2024-0367>
42. Qawqzeh, H. K., Bshayreh, M. M., & Alharbi, A. W. (2021). Does ownership structure affect audit quality in countries characterized by a weak legal protection of the shareholders? *Journal of Financial Reporting and Accounting*, 19(5), 707-724. <https://doi.org/10.1108/JFRA-08-2020-0226>
43. Rosikah, D., Prananingrum, D., Kartika, A., Muthalib, D. A., Azis, M. I., & Rohansyah, M. (2018). Effects of return on assets, return on equity, and earnings per share on corporate value. *The International Journal of Engineering and Science (IJES)*, 7(3), 6-14.
44. Shubita M. F. (2010). The incremental information content of earnings management. *International Research Journal of Finance and Economics*, 48, 62-73. Retrieved from https://www.researchgate.net/publication/287275819_The_incremental_information_content_of_earnings_management
45. Shubita, M. F. (2019). Intellectual capital and market value: Evidence from Jordan. *Investment Management and Financial Innovations*, 16(4), 37-45. [https://doi.org/10.21511/imfi.16\(4\).2019.04](https://doi.org/10.21511/imfi.16(4).2019.04)

46. Shubita, M. F. (2022). Intellectual capital and industrial firms' growth: Evidence from Jordanian manufacturing listed firms. *Problems and Perspectives in Management*, 20(3), 325-334. [http://dx.doi.org/10.21511/ppm.20\(3\).2022.26](http://dx.doi.org/10.21511/ppm.20(3).2022.26)
47. Singh, I., & Van der Zahn, J. L. W. M. (2008). Determinants of intellectual capital disclosure in prospectuses of initial public offerings. *Accounting and Business Research*, 38(5), 409-431. <https://doi.org/10.1080/00014788.2008.9665774>
48. Smriti, N., & Das, N. (2018). The impact of intellectual capital on firm performance: A study of Indian firms listed in COSPI. *Journal of Intellectual Capital*, 19(5), 935-964. <https://doi.org/10.1108/JIC-11-2017-0156>
49. Soetanto, T., & Liem, A. C. (2019). Intellectual capital in Indonesia: Dynamic panel approach. *Journal of Asia Business Studies*, 13(2), 240-262. <https://doi.org/10.1108/JABS-02-2018-0059>
50. Sowaity, S. M. A. (2022). Intellectual capital efficiency and corporate performance in Jordanian listed companies. *Open Journal of Accounting*, 11(3), 213-242. <https://doi.org/10.4236/ojacct.2022.113012>
51. Tamunomiebi, M., & Kalio, A. (2019). Intellectual capital development: The black gold of modern organisation. *European Journal of Business and Management*, 11(14), 50-58.