







# “Relationship between corporate governance and intellectual capital: Evidence from Jordan”

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# RELATIONSHIP BETWEEN CORPORATE GOVERNANCE AND INTELLECTUAL CAPITAL: EVIDENCE FROM JORDAN

## Abstract

The objective of this study is to examine the relationship between corporate governance and intellectual capital within Jordanian manufacturing firms. This study used a sample of Jordanian manufacturing firms and applied regression analysis to test the effects of board size, executive director duality, percentage of independent directors, and ownership concentration on intelligence capital performance. Thus, 64 Jordanian listed manufacturing firms represent the study sample for the study period (2014–2022). The study employs advanced statistical methods to evaluate how these governance mechanisms affect intellectual capital, including human, structural, and relational capital. The study results indicate that the board size and CEO duality had no significant impact on intellectual capital performance. A positive significant determinant is the firm performance measured by earnings per share with a coefficient estimate of 6.331 at  $p$ -value  $<0.0$ . The significant positive effect of firm performance on intellectual capital performance indicates that financial health is an important driver of intellectual capital utilization. Good firms are likely to have more resources to invest in human capital, technology, and innovation, which are necessary components of intellectual capital. Future research should continue to explore these dynamics across different contexts to inform more effective governance and management practices.

## Keywords

Jordan, intellectual capital, efficiency, board structure, adaptability, performance, ownership

## JEL Classification

L25, G34, M12

## INTRODUCTION

Intellectual capital is a key resource for manufacturing firms. Innovation and efficiency are rooted in intellectual capital; its ability to continuously evolve strengthens the company's position within a market that changes quickly. Detailed research is required to investigate the complex relationship between corporate governance and intellectual capital. An efficient corporate governance cocktail is a necessary condition to effectively manage and exploit intellectual capital for manufacturing organizations' performance and improvements in innovation.

There is an urgent need to investigate this relationship in depth, expecting to provide direction regarding arrant governance practices toward strengthening intellectual capital for organizational success. Policymakers, business leaders, and scholars who wish to explain the governance-intellectual capital nexus in a manufacturing setting could benefit from the results such studies can produce.

## 1. LITERATURE REVIEW AND HYPOTHESES

The relationship between intellectual capital and firm performance is complex. Depending on geographic region, this correlation might vary with regard to the efficiency in horizontal and vertical sector dimensions.

Transparency, accountability, and good management practices can boost economic growth and attract foreign investment; increased public awareness about corporate governance has strengthened its status within Jordan (Shubita, 2021; Shubita, 2023). In 2008, the Jordanian Corporate Governance Code achieved historical progeny by providing a pathway for listed companies to adhere to and benchmark best practices.

Shubita (2023) states that intellectual capital, mainly in the human and structural aspects, has a substantial impact on a firm's market price in Jordan. Companies with a lower amount of investment in intellectual capital are generally worth less on the market, which is evidence of higher valuation from stakeholders toward intangibles. This study demonstrates the significance of intellectual capital in improving market performance among Jordanian companies.

The interplay between corporate governance and intellectual capital has been tested from various angles. For instance, Youndt et al. (2004) explored how human resource practices, underpinned by strong governance, enhance intellectual capital development. Their findings highlight that governance mechanisms can drive the creation and utilization of intellectual capital by fostering a culture of continuous learning and innovation.

Board of directors has in general been explored by Pulic (2000), Ariff et al. (2016), Eissawi and Eltahan (2018), Tahir et al. (2018), and Zéghal and Maaloul (2010). Mansur and Tangl (2018) noted the gaps in the actual independence of board members among directors while exploring composition-functioning nexus on listed boards.

Al-Fayoumi and Abuzayed (2009) investigate the level of transparency in Jordanian firms using several dimensions related to previous findings. They

demonstrate that while the quality of imposed disclosure has undoubtedly increased over time, non-imposed disclosures are still inconsistent and lacking in terms of completeness would get serious effect with investor mind as well market efficiency.

Malkawi (2009) focused on shareholder rights and the equitable treatment of shareholders in Jordanian corporations. The results underscored the legal framework's adequacy in protecting shareholder rights but pointed out deficiencies in enforcement and practical application, especially in minority shareholder protection.

Chen et al. (2005) test on how intellectual capital might influence company performance and market value. They emphasize the need for strong governance structures that facilitate firm-level intellectual capital development and cultivation to enhance the overall good performance of firms. Although considerable literature has been devoted to corporate governance (Cadbury, 2002) and more lately, corporate governance on intellectual capital, understanding the dynamic processes related to these two dimensions is deficient within manufacturing firms. While there has been a wealth of research focusing on individual components of intellectual capital or specific governance mechanisms, only some have adopted the holistic perspective and assessed how governance works in unison to affect all three dimensions.

Corporate governance is the cornerstone of an organization; it guides organizational strategies and resource distribution (Moad. Shubita & Moh. Shubita, 2010). Recognizing that governance can improve agency-related value losses, such as a more competent series of flexible supervisors in conjunction with an active board of directors, should lead to better realization and utilization of firm resources (Zahra & Pearce, 1989). Daily et al. (2003) focused on the contingent effects of board composition on firm values, which is consistent with this argument but enlightening because the formation of independent governance is much needed for a growth-oriented innovation environment. Furthermore, Claessens and Yurtoglu (2013) show that governance reforms, specifically increasing transparency and accountability, do boost the efficient utilization of intellectual capital. Such reforms lead to improved resource allocation and strategy, leading to better company performance.

Xu et al. (2021), Lari Dashtbayaz et al. (2020), Haris et al. (2019), Forte et al. (2017), Riahi-Belkaoui (2003), Abualoush et al. (2018), Anghel et al. (2018), Alvino et al. (2021), Tarigan et al. (2019), Nawaz and Haniffa (2017), Lin (2018), and Tahir et al. (2018) suggest a strong linkage between corporate governance and intellectual capital with effective governance mechanisms playing a vital role in the development and utilization of intellectual capital. These studies synthesize findings from a range of studies, indicating a consensus in the literature about the significant link between corporate governance and intellectual capital. Effective corporate governance mechanisms are crucial for the development and efficient use of intellectual capital. The emphasis of this study is particularly on manufacturing firms, where these components are essential for fostering innovation and operational efficiency. The study used data from many different references to reinforce the consensus among researchers that good governance practices can enhance a firm's intellectual capital, resulting in better financial performance and long-term competitive advantage. According to this, governance setting and intellectual capital are co-dependent; thus, upgraded governance can feed the better management of intellectual data, especially within the manufacturing sector. It is indeed relevant in the case of manufacturing firms, where innovation and efficiency can make or break the company.

Shubita (2023) tests the impact of structural and human capital on leverage in Jordanian firms. The study reveals that firms with robust human and structural capital tend to have lower leverage levels, suggesting a more cautious approach to debt financing. This link indicates that well-developed intellectual capital can provide firms with a competitive edge, reducing their reliance on external financing. The findings underscore the intellectual capital importance as a determinant of financial strategies in Jordanian companies.

This study aims to investigate the relationship between different dimensions of corporate governance, specifically board characteristics, transparency and disclosure, shareholder rights, and independence in environmental issues on auditors with intellectual capital development as well its utilization within manufacturing companies.

The study hypotheses are formulated as follows:

$H_{01}$ : *Corporate governance does not have a significant effect on the intellectual capital of Jordanian manufacturing firms.*

$H_{02}$ : *Firm performance does not influence the effect of corporate governance on the intellectual capital of Jordanian manufacturing firms.*

## 2. METHOD

The study investigates corporate governance components and their impact on intellectual capital performance for Jordanian companies listed on the Amman Stock Exchange. These include all publicly listed manufacturing firms from 2014 to 2022. The selection of this timeframe ensures a comprehensive analysis of corporate governance practices and intellectual capital performance over a significant period. Thus, 64 firms represent the study sample. Data were collected from annual reports, which provide detailed information on corporate governance structures, financial performance, and intellectual capital components. The VAIC method is widely used in academic research to quantify intellectual capital efficiency (Pulic, 2000). The formulation of corporate governance mechanisms includes:

1. Board structure: Measured by board size and board independence.
2. Audit committee: Measured by the presence of an audit committee and the number of meetings held.
3. Ownership structure: Measured by ownership concentration and the proportion of institutional ownership (Regina, 2021).

The regression model can be specified as follows:

$$IC = \beta_0 + \beta_1 BS_{it} + \beta_2 DUAL_{it} + \beta_3 IND_{it} + \beta_4 CONS_{it} + \varepsilon_{it} \quad (1)$$

$$IC = \beta_0 + \beta_1 BS_{it} + \beta_2 DUAL_{it} + \beta_3 IND_{it} + \beta_4 CONS_{it} + \beta_5 DEBT_{it} + \varepsilon_{it} \quad (2)$$

$$IC = \beta_0 + \beta_1 BS_{it} + \beta_2 CEO_{it} + \beta_3 IND_{it} + \beta_4 CONS_{it} + \beta_5 EPS_{it} + \varepsilon_{it}, \quad (3)$$

where *IC* refers to intellectual capital measured using the VAIC model, *BS* – board size, *DUAL* – the separation between CEO and chairman of board of directors, *IND* – board of director independence, *CONS* – the percentage of shareholders that own more than 5%, *DEBT* – debt ratio which equal total debt over total assets, *EPS* – (firm performance indicator) earnings per share which equal net income over weighted number of outstanding shares,  $\beta_0 - \beta_5$  are regression factors, *i* – firm, *t* – year.

The hypotheses are tested using *t*-tests to determine the significance of the regression coefficients. All data used in this study are publicly available, ensuring transparency and replicability.

### 3. RESULTS

Table 1 shows descriptive measures. The descriptive analysis of the dataset provides a comprehensive overview of the variables under investigation, offering insights into their central tendencies, variability, and distributional characteristics (Mansour et al., 2024).

VAIC shows an average value of 1.006 with a high standard deviation of 11.04, indicating substantial variability in intellectual capital performance across the sampled firms. The minimum value of VAIC is -138, while the maximum value reaches 67.3, suggesting significant disparities among firms. The negative skewness of -6.194 and a high kurtosis of 84.04 points to a distribution that is heavily tailed on the left side with several extreme outliers.

Board size (*BS*) is another critical variable, with a mean of 7.78 and a standard deviation of 2.557. The smallest board consists of three members, while the largest has 19, reflecting a wide range in board structures among the firms. The skewness and kurtosis of -6.194 and 84.041, respectively, mirror those of VAIC, indicating similar distributional properties.

CEO duality (*CEODUAL*) reveals that, on average, 79% of the sampled firms have a combined CEO and board chairperson role, as indicated by the mean of 0.79 and a standard deviation of 0.410. The variable ranges from 0 to 1, representing the binary nature of this measure. The skewness of -1.403 suggests a distribution skewed toward firms without CEO duality, while a kurtosis of 0.222 implies a relatively normal distribution.

The proportion of independent directors (*IND*) has a mean value of 95.9, but the standard deviation is significantly high, 2074, indicating considerable variation. The minimum value is 0.00, while the maximum is 0.45, suggesting a peculiar distribution. The positive skewness of 1.018 and a low kurtosis of 0.222 points to a distribution with a long right tail but relatively few extreme values.

Ownership concentration (*CONS*) shows a mean of 0.519 and a standard deviation of 0.337, with values ranging from 0.00 to 1. The negative skewness of -0.292 indicates a slight skew to the left, while a kurtosis of -1.259 suggests a relatively flat distribution compared to a normal distribution.

Overall, these descriptive statistics show marked variation and skews in the data that underscores notable differences in corporate governance

**Table 1.** Descriptive statistics

Variable	Observations	Mean	Std.	Minimum	Maximum	Skewness	Kurtosis
VAIC	473	1.006	11.04	-138	67.3	-6.194	84.04
BS	388	7.78	2.557	3	19	-6.194	84.041
CEODUAL	473	0.79	0.410	0	1	-1.403	0.222
IND	471	95.9	2074	0.00	0.45	1.018	0.222
CONS	474	0.519	0.337	0.00	1	-0.292	-1.259
DEBT	484	0.48	0.55	0.04	6.58	5.708	21.639
EPS	474	0.5298	10.07	-2.55	219.03	21.639	470.088

*Note:* Intellectual capital performance is measured using VAIC model; *BS* – board size, *CEODUAL* – the separation between CEO and chairperson of board of directors, *IND* – board of director independence; *CONS* – the percentage of shareholders that own more than 5%; *DEBT* – debt ratio which equal total debt over total assets; *EPS* – earnings per share which equal net income over a weighted number of outstanding shares.



**Table 2.** Pearson matrix

Variable	BS	CEODUAL	IND	CONC	DEBT	EPS
VAIC	0.049	0.092*	0.061	0.091*	-1.29**	0.022
BS		0.129*	0.436**	-0.150**	-0.146**	0.222**
CEODUAL			0.392**	0.651**	-0.409**	-0.081
IND				0.200**	-0.181**	-0.024
CONC					-0.292**	-0.056
DEBT						-0.037

Note: \* Significant at 0.05, \*\* Significant at 0.01. Intellectual capital performance is measured using VAIC model; BS – board size, CEODUAL – the separation between CEO and chairperson of board of directors, IND – board of director independence; CONC – the percentage of shareholders that own more than 5%; DEBT – debt ratio which equal total debt over total assets; EPS – earnings per share which equal net income over a weighted number of outstanding shares.

practices and financial performances between Jordanian firms. This variability highlights the importance of further work in order to establish how these disparities may influence intellectual capital performance. Pearson correlation analysis was performed to explore the relationships among these variables.

In the Pearson correlation matrix (Table 2), several notable relationships can be highlighted, namely the overall index of VAIC and its positive correlation with CEO duality ( $r = 0.092$ ;  $p < 0.05$ ) and ownership concentration ( $r = 0.092$ ;  $p < 0.05$ ). From these relationships, firms where CEO also serves as the board chairperson and those with higher ownership concentration can experience a small improvement in intellectual capital efficiency.

Board size (BS) demonstrates several significant correlations. It has a positive correlation with CEO duality ( $r = 0.129$ ,  $p < 0.05$ ), proportion of independent directors ( $r = 0.436$ ,  $p < 0.01$ ), and earnings per share ( $r = 0.222$ ,  $p < 0.01$ ). These correlations suggest that larger boards are more likely to have combined CEO and chairperson roles, a higher proportion of independent directors, and better

performance. However, board size also shows a negative correlation with ownership concentration ( $r = -0.150$ ,  $p < 0.01$ ) and the debt ratio ( $r = -0.146$ ,  $p < 0.01$ ), implying that larger boards might be associated with more dispersed ownership and lower levels of debt.

CEO duality (CEODUAL) exhibits a strong positive correlation with the proportion of independent directors ( $r = 0.392$ ,  $p < 0.01$ ) and ownership concentration ( $r = 0.651$ ,  $p < 0.01$ ), suggesting that firms with combined CEO and board chair roles also tend to have a higher proportion of independent directors and more concentrated ownership.

The first model (Table 3) is employed to quantify the effects of various governance factors. This model aims to determine how board size (BS), CEO duality (CEODUAL), the proportion of independent directors (IND), and ownership concentration (CONC) influence the VAIC. The regression model results provide insights into the significance and strength of these relationships, shedding light on which governance practices might enhance or detract from intellectual capital performance.

**Table 3.** Regression analysis: Model 1

Variable	Factors	E	t	Significant
Constant	-1.495	3.754	-0.398	0.691
BS	0.256	0.270	0.949	0.343
CEODUAL	-0.201	3.121	-0.064	0.949
IND	0.023	0.166	0.138	0.890
CONC	1.816	2.387	0.761	0.447
R <sup>2</sup>	0.004		Adj R <sup>2</sup>	-0.006
F-Statistics	0.405		Sig	0.805

Note: BS – board size, CEODUAL – the separation between CEO and chairperson of board of director, IND – board of director independency; CONS – the percentage of shareholders that own more than 5%.

Board size (BS) has a coefficient of 0.256 with an error of 0.27, leading to a *t*-value of 0.949 and a *p*-value of 0.343. This positive coefficient suggests that an increase in board size might lead to an increase in VAIC, but the relationship is not statistically significant. Therefore, one cannot conclusively say that board size impacts intellectual capital performance in this sample.

The coefficient for CEO duality (CEODUAL) is -0.201 with a standard error of 3.121, resulting in a *t*-value of -0.064 and a significance level of 0.949. The negative coefficient implies that having a combined CEO and board chairperson role might slightly reduce VAIC. However, this effect is not statistically significant, indicating that CEO duality does not have a clear influence on intellectual capital performance.

For the proportion of independent directors (IND), the coefficient is 0.023 with a standard error of 0.166, leading to a *t*-value of 0.138 and a *p*-value of 0.890. This positive coefficient suggests a slight increase in VAIC with a higher proportion of independent directors, but the relationship is not statistically significant.

Ownership concentration (CONC) has a coefficient of 1.816 with a standard error of 2.387, resulting in a *t*-value of 0.761 and a *p*-value of 0.447. While the positive coefficient suggests that higher ownership concentration could be associated with higher VAIC, the relationship is not statistically significant. Consequently, ownership concentration does not have a definitive impact on intellectual capital performance in this context.

The overall model has an *R*<sup>2</sup> value of 0.004 and an adjusted *R*<sup>2</sup> of -0.006. These low values indicate

that the model explains very little of the variance in VAIC. The *F*-statistic is 0.405 with a significance level of 0.805, suggesting that the model as a whole is not statistically significant and that the included governance variables do not collectively explain changes in intellectual capital performance.

The regression analysis reveals that none of the examined corporate governance components show statistically significant relationships with intellectual capital performance in Jordanian firms. The low values further indicate that these governance factors do not collectively account for much of the variance in VAIC. These findings suggest that other factors, perhaps beyond the scope of traditional corporate governance variables, may play a more critical role in determining intellectual capital performance. Further research is needed to identify and explore these potential influences to provide the drivers of intellectual capital efficiency in the industry sector.

Board size (BS) shows a positive coefficient of 0.179 with a standard error of 0.269, leading to a *t*-value of 0.665 and a significance level of 0.786 (Table 4). This suggests a weak positive relationship between board size and VAIC, but the result is not statistically significant, indicating that board size does not have a clear impact on intellectual capital performance in Jordanian manufacturing companies.

CEO duality (CEODUAL) has a coefficient of -0.783 with a standard error of 3.104, resulting in a *t*-value of -0.252 and a significance level of 0.801. The negative coefficient implies that having a combined CEO and board chairperson role might slightly reduce VAIC, but this effect is not statistically significant. Therefore, CEO duality does not appear to significantly influence intellectual capital performance.

**Table 4.** Regression analysis: Model 2

Variable	Factors	E	t	Significant
Constant	2.002	3.950	0.507	0.613
BS	0.179	0.269	0.665	0.786
CEODUAL	-0.783	3.104	-0.252	0.801
IND	0.026	0.165	0.160	0.873
CONC	2.222	2.374	0.936	0.350
DEBT	-0.071	0.027	-2.661	0.008
<i>R</i> <sup>2</sup>	0.023		Adj <i>R</i> <sup>2</sup>	0.010
<i>F</i>	1.745		Sig.	0.123

Note: BS – board size, CEODUAL – the separation between CEO and chairperson of board of directors, IND – board of director independence; CONS – the percentage of shareholders that own more than 5%; DEBT – debt ratio which equal total debt over total assets.

Ownership concentration (CONC) has a positive coefficient of 2.222 with a standard error of 2.374, leading to a *t*-value of 0.936 and a significance level of 0.350. While this positive coefficient suggests that higher ownership concentration might be associated with higher VAIC, the relationship is not statistically significant. Thus, ownership concentration does not significantly influence intellectual capital performance.

Debt policy (DEBT), included as a control variable, exhibits a negative coefficient of  $-0.071$  with a standard error of 0.027, resulting in a *t*-value of  $-2.661$  and a significance level of 0.008. This suggests that higher debt levels are associated with lower intellectual capital performance. This finding underscores the adverse impact of debt on the effective utilization of intellectual capital in Jordanian manufacturing companies.

The second model has an  $R^2$  value of 0.023 and an adjusted  $R^2$  of 0.010, indicating that the model explains only a small portion of the variance in VAIC. The *F*-statistic is 1.745 with a significance level of 0.123, suggesting that the model as a whole is not statistically significant. This implies that, except for debt policy, the included corporate governance variables do not collectively explain significant changes in intellectual capital performance.

The regression analysis with debt policy as a control variable reveals that only debt policy shows a statistically significant relationship with intellectual capital performance among the corporate governance components examined. The higher debt levels led to low VAIC, which means that excessive debts decreased the efficiency of intellectual capital in manufacturing companies. None of the

other governance variables seem to be significant, i.e., they do not determine the intellectual capital performance in Jordan. Overall, these results raise possible concerns about the value creation potential of certain IT investments in the manufacturing sector and emphasize that increased leverage might be necessary to fully exploit intellectual capital resources while also suggesting alternative (potentially non-traditional corporate governance) drivers or taxonomies for aiding manufacturers as they navigate their way toward improved intellectual capital performance.

The third regression model introduces firm performance as a control variable to assess its influence on the relationship between corporate governance components and intellectual capital performance in Jordanian manufacturing companies. By including earnings per share (EPS), the study aims to determine whether firm performance influences how board size, CEO duality, board of director independence, and ownership concentration CONC affect VAIC. This analysis seeks to reveal the significance of firm performance in moderating the effects of governance practices on intellectual capital performance.

The constant term in this model has a coefficient of 2.597 with a standard error of 3.633, resulting in a *t*-value of 0.715 and a significance level of 0.475 (Table 5). This indicates that the baseline level of VAIC, when all other factors are held constant, is not statistically significant.

CEO duality (CEODUAL) has a positive coefficient of 0.627 with a standard error of 2.975, resulting in a *t*-value of 0.211 and a significance level of 0.833. The positive coefficient implies that hav-

**Table 5.** Regression analysis: Model 3

Variable	Factors	Error	t	Significant
Constant	2.597	3.633	0.715	0.475
BS	-0.101	0.263	-0.384	0.701
CEODUAL	0.627	2.975	0.211	0.833
IND	-0.053	0.159	-0.335	0.738
CONC	-2.005	2.352	-0.852	0.395
EPS	5.585	0.882	6.331	0.00
$R^2$	0.099		Adj $R^2$	0.088
F	8.374		Sig.	0.00

*Note:* BS – Board Size, CEODUAL – the separation between CEO and chairperson of board of directors, IND – board of director independence; CONS – the percentage of shareholders that own more than 5%; EPS – earnings per share which equal net income over weighted number of outstanding shares.



ing a combined CEO and board chairperson role might slightly increase VAIC, but this effect is not statistically significant. Therefore, CEO duality does not appear to significantly influence intellectual capital performance.

Ownership concentration (CONC) has a negative coefficient of  $-2.005$  with a standard error of  $2.352$ , leading to a  $t$ -value of  $-0.852$  and a significance level of  $0.395$ . While this negative coefficient suggests that higher ownership concentration might be associated with lower VAIC, the relationship is not statistically significant. Thus, ownership concentration does not significantly influence intellectual capital performance.

Firm performance included as a control variable exhibits a positive coefficient of  $5.585$  with a standard error of  $0.882$ , resulting in a  $t$ -value of  $6.331$  and a significance level of  $0.00$ . This indicates a significant positive relationship between earnings per share and VAIC, suggesting that higher firm performance is associated with higher intellectual capital performance. This finding highlights the crucial role of firm performance in enhancing intellectual capital efficiency in Jordanian manufacturing companies.

The overall model has an  $R^2$  value of  $0.099$  and an adjusted  $R^2$  of  $0.088$ , indicating that the model explains about  $9.9\%$  of the variance in VAIC. The  $F$ -statistic is  $8.374$  with a significance level of  $0.00$ , suggesting that the model as a whole is statistically significant. This implies that, collectively, the included variables, especially firm performance, do explain some of the changes in intellectual capital performance.

The regression analysis with firm performance as a control variable reveals that among the corporate governance components examined, only firm performance shows a statistically significant relationship with intellectual capital performance. Higher firm performance, as indicated by earnings per share, is associated with higher VAIC, highlighting the importance of firm performance in driving intellectual capital efficiency in Jordanian manufacturing companies. The other governance variables do not exhibit significant effects, suggesting that they do not play a decisive role in shaping intellectual capital performance in this context. These findings underscore the need to consider firm performance when assessing

the influence of corporate governance on intellectual capital, as it appears to be a key determinant of performance in the manufacturing sector.

The hypotheses testing results provide insights into the relationships between corporate governance components, firm performance, and intellectual capital performance in Jordanian manufacturing companies. For the first hypothesis, the corporate governance components (board size, CEO duality, the proportion of independent directors, and ownership concentration) do not have a significant effect on the intellectual capital of Jordanian manufacturing firms. However, the second hypothesis, which posited a positive influence of firm performance (measured by earnings per share) on intellectual capital performance, was strongly supported. The significant positive relationship between earnings per share and VAIC underscores the critical role of firm performance in enhancing intellectual capital efficiency. These results highlight that while traditional corporate governance mechanisms may not significantly affect intellectual capital performance, firm performance emerges as a key factor driving intellectual capital efficiency in the manufacturing sector.

The autocorrelation tests of the three models were judged by the Durbin-Watson statistic, cozing to understanding whether this model has such an issue with lag residual (Table 6). Model 1 shows the Durbin-Watson of  $1.828$ , and Model 2 has  $1.836$ . Those values are close to  $2$ , meaning that there is not a large amount of auto-correlation in any residual set. The residuals from all these regression models are pretty much uncorrelated with each other, making the regression results more robust and indicating that this model is correctly specified without a whole lot of serial correlation problems.

**Table 6.** Autocorrelation

Model	Durbin Watson
Model 1	1.828
Model 2	1.836
Model 3	1.918

The multicollinearity results (Table 7) for the three models, assessed using the variance inflation factor (VIF), indicate the extent to which independent variables are correlated with each other (Mansour et al., 2023). For Model 1, the VIF

is 1.257; for Model 2, it is 1.272; and for Model 3, it is 1.317. Since all VIF values are well below the commonly accepted threshold of 10, this suggests that multicollinearity is not a significant concern in any of the models. Low VIF values indicate that the independent variables are not highly correlated with each other, which enhances the reliability of the regression coefficients and ensures that the results are not distorted by multicollinearity. These findings confirm that the models are well-specified and that the independent variables can be interpreted without the complications of multicollinearity.

**Table 7.** Multicollinearity

Model	Variance Inflation Factor (VIF)
Model 1	1.257
Model 2	1.272
Model 3	1.317

## 4. DISCUSSION

The regression analyses reveal several vital insights and raise questions about the conventional understanding of corporate governance's role in intellectual capital management.

The first model, which included board size, CEO duality, the proportion of independent directors, and ownership concentration without control variables, demonstrated no significant impact of these corporate governance components on intellectual capital performance. This suggests that, in isolation, traditional governance mechanisms do not strongly influence intellectual capital efficiency in the manufacturing sector.

When firm performance, measured by earnings per share, was introduced as a control variable in the third model, it emerged as a significant positive determinant of intellectual capital performance. This indicates that higher firm performance substantially enhances intellectual capital efficiency, highlighting the crucial role of financial performance in leveraging intellectual capital. This result aligns with the resource-based view, which posits that financial resources are essential for developing and sustaining intellectual capital (Shubita, 2024).

The second model, which included debt policy as a control variable, also did not show significant

impacts of the traditional corporate governance components on intellectual capital performance. However, the negative and significant coefficient of debt policy suggests that higher debt levels may hinder intellectual capital efficiency. This finding aligns with previous research indicating that high leverage can constrain a firm's ability to invest in and develop intellectual capital due to the financial strain of debt repayments.

The findings contrast with some prior research that has identified a significant link between intellectual capital performance and corporate governance mechanisms. For instance, Lari Dashtbayaz et al. (2020) and Haris et al. (2019) found positive links between board independence, CEO duality, and intellectual capital efficiency in different contexts. However, this study focused on Jordanian manufacturing companies and revealed that these governance components may not have a uniform impact across different sectors and regions.

The lack of significant impact from traditional governance components could be attributed to several factors (Alodat et al., 2024). First, the manufacturing sector in Jordan may have unique characteristics that diminish the influence of effective governance mechanisms in other industries or regions. Second, the relatively small size and concentrated ownership structures typical of Jordanian manufacturing firms might limit the variability and impact of board-related governance mechanisms. Third, cultural and regulatory differences may play a role in shaping the effectiveness of corporate governance practices in this context.

The significant positive effect of firm performance on intellectual capital performance highlights the need for a holistic approach to corporate governance that integrates financial performance with intellectual capital structure. Longitudinal research can provide deeper insights into how changes in governance practices and economic health affect the effective use of intellectual capital over time. In addition, qualitative research can shed light on the underlying mechanisms and contextual factors that determine the effectiveness of corporate governance in managing intellectual capital. Future research should further examine these relationships in different contexts to identify more effective governance and management practices.

## CONCLUSION

The study attempted to form a holistic picture of determinants affecting intellectual capital performance. It emerged that traditional parts of corporate governance do not have a direct and significant influence on intellectual capital performance if considered in isolation. However, the inclusion of firm performance as a control factor revealed that it is significantly and positively associated with intellectual capital performance (earnings per share). Consequently, the key implication of this study is how important financial performance is in enhancing the efficiency of intellectual capital. Moreover, the measurement for debt ratio is negatively significant and demonstrates that increasing debt has implications against intellectual capital performance; when a firm uses financial debt at high levels, it might prevent the effective use of intellectual capital or manipulate its market.

Finally, the traditional levers of corporate governance do not seem to always provide a leading basis for intellectual capital efficiency across different sectors and regions, which underscores that perhaps one needs a more context-dependent way of managing companies. Moreover, another incentive that reflects the relationship between financial performance and intellectual capital is found as a license for companies to invest in their human resources tools. Finally, this study provides additional evidence that excessive liabilities can be detrimental to the effective employment of intellectual capital. It argues that firms also need to adjust conclusions about their debt policies to not hamper the creation of intellectual assets.

This study enriches the literature on corporate governance, financial performance, and intellectual capital by going beyond its individual characteristics in contexts where they have been explored less and providing important lessons for agents aiming to boost their intellectual capital efficiency in the manufacturing sector.

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