The Impact of Corporate Governance on Intellectual Capital. Empirical Evidence from Romanian Companies

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Abstract
This study aims to analyse the effects of corporate governance on the intellectual capital of companies. The sample is composed of 64 companies listed on the Bucharest Stock Exchange in the time span 2016-2021. The data were collected from companies' annual reports and from Thomson Reuters database. In this way, we investigated the relationship between corporate governance, measured as the compliance with the Bucharest Stock Exchange Code of Corporate Governance, and intellectual capital, measured by two different methods: Economic Value Added (EVA) and Value Added Intellectual Coefficient (VAIC). The results showed that there is a positive and statistically significant relationship between intellectual capital and corporate governance. The main results of our study indicate that there is a positive and statistically significant relationship between corporate governance and intellectual capital in all the cases. Furthermore, all the control variables, namely total assets, employee number, and leverage, show positive and statistically significant results. It has been found that intellectual capital and good corporate governance practices can contribute to the wealth creation of firms. Strategic planning, organisation, transparency, and accountability are the cornerstones of a good corporate governance system. These elements improve the quality of the internal control and risk management processes and increase investors' and other stakeholders' trust. The importance of intellectual capital has been acknowledged by companies as a vital component of their competitive advantage. The outcomes of the present study can be used by policymakers in order to increase the efficiency of companies and to determine the need to invest in human capital.

Key words: corporate governance; intellectual capital; value added;

JEL classification: G32; O34; O15;

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1. Introduction

Intellectual capital and corporate governance are widely regarded as two essential aspects to consider in order to improve firm performance in the developed world. However, in developing countries such as Romania, practitioners have not paid enough attention to these key elements.

Intellectual capital has received a lot of attention in recent years. The term's increasing use by academics, practitioners, and managers attests to this. Intellectual capital has no universally accepted definition, and it is extremely difficult to identify and quantify. To obtain a better understanding, it is divided into three parts: human, structural, and relational (Soriya and Kumar, 2022). The performance of intellectual capital investments is essential

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because it influences a company's long-term competitive advantage (Saleh et al., 2009). Intellectual capital is rapidly becoming recognized as a significant asset, resulting in increased intellectual capital measurement, reporting, and disclosures by firms in many developed countries (Kamath, 2019). Intellectual capital provides a competitive advantage because it is a unique and superior resource that cannot be easily replicated (Soewarno and Tjahjadi, 2020). Most previous studies on this subject have conducted extensive research on the impact of intellectual capital or corporate governance on companies' performance and value using different measurement methods across a wide range of industries (Smriti and Das, 2021; Vetchagool, 2022), concluding that a good governance system and the efficient use of intellectual capital led to an increase in the firm's performance and value.

Despite the fact that intellectual capital improves performance and adds value to an organization as a strategic resource, most companies struggle with its management and control due to its complexity. As a result, recent research has highlighted the significance of comprehending the corporate role in effectively implementing, managing, and sustaining the firm's intellectual capital (Nadeem et al., 2019; Smriti and Das, 2021; Vetchagool, 2022).

In summary, it appears that, due to an insufficiency of studies, the relationship between corporate governance and intellectual capital remains ambiguous and requires further investigation. This study aims to fill this gap in the existing literature by examining the influence of corporate governance on intellectual capital considering a sample of 64 companies listed on the Bucharest Stock Exchange between 2016 and 2021. We calculated the quality of corporate governance as a score based on the alignment with provisions and recommendations of the Bucharest Stock Exchange's Code of Corporate Governance within the "Comply or Explain Statement". Intellectual capital is measured by calculating indicators "Economic Value Added" and "Value Added Intellectual Coefficient". The main findings of this research indicate that there is a positive impact of Corporate Governance on Intellectual Capital.

The motivation of our study lies in the desire to conduct research topical issues such as corporate governance and intellectual capital, which are both elements that contribute to the growth of the value of the company.

By changing management styles and developing relevant strategies and policies to protect investors and users of financial information, intellectual capital would help to improve corporate governance levels while also reducing the agency problem (Al-Musalli and Ismail, 2012). This research is expected to be useful to academics, researchers, policymakers, and practitioners in Romania and other similar developing countries by investigating the impact of the corporate governance score, which includes multiple governance characteristics and comprehensively evaluates a company's corporate governance system, on intellectual capital. Another novelty element, besides considering the adherence to the corporate governance code of the Bucharest Stock Exchange code as a measure of corporate governance in relation to intellectual capital, is represented by the selection of the sample, which represents various sectors of the Romanian economy.

The remaining part of this study is organized as follows. Section 2 discusses the prior literature as well as the formulation of the hypothesis. The research methodology and data are presented in Section 3. The fourth section outlines and discusses empirical findings, followed by the conclusions and recommendations in Section 5 of the paper.

2. Theoretical Background

Corporate governance and intellectual capital are both topics of discussion that are receiving increasing attention in the specialized literature. Internal corporate governance mechanisms refer to how organizational structures and procedures can guide managerial and board attention and behaviour toward issues of increasing a firm's wealth. In this case, the main focus is on how company governance can be supported to care for intangibles and intellectual capital in all of their nuances, by considering the risks and opportunities associated with their management, and by understanding how the actors involved in their creation and development process interact and how this interaction can be influenced to improve corporate performance (Zambon et al., 2019). Corporate governance and intellectual capital are strongly linked, and intellectual capital is the latent force that improves an organization's ability to attract additional intellectual capital (Safieddine et al., 2009). Good corporate governance improves the company's ability to attract talented employees, implement innovative technology infrastructure, and maintain positive relationships with stakeholders (Tran et al., 2020).

To participate in today's markets and enhance their performance, all types of organizations require knowledge and information (Khavandkar et al., 2013). Intellectual capital is a valuable corporate asset capable of generating long-term competitive advantages and higher profit growth. In the literature, it is acknowledged as an essential component of value creation in the modern economy. As a result of the affirmation of its importance in the process of creating organizational value, there is a tendency to shift the focus of tangible capital management to the intangible. All the dimensions of the intellectual capital: Human Capital, Structural Capital and Relational Capital have a positive and significant impact on the business performance (Silva et al., 2021). Moreover, intellectual capital efficiency has a positive impact on growth opportunities and firm value (Sardo and Serrasqueiro, 2018; Ni et al., 2021).

Corporate governance is generally related to a set of policies, laws, and instructions that influence how a company is managed and controlled, it comprises a series of guidelines that ensure transparency and fairness in the company's relationship with its shareholders and has a close relationship with intellectual capital. Good corporate governance can help a company face risks and difficulties as a strategy for increasing the value of the company by projecting the right image to stakeholders. In other words, the firm value will increase with the better implementation of good corporate governance practices (Indriastuti et al., 2021).

Although most research on this topic examine corporate governance and intellectual capital in relation to firm value and performance, few studies have attempted to empirically investigate the impact of corporate governance on intellectual capital. Engagement in corporate social responsibility and corporate governance structures have an impact on the firm's efficiency in managing intellectual capital (Gangi et al., 2019). After analysing a sample of 171 listed firms on the Saudi stock exchange, considering the corporate governance principles as independent variable and intellectual capital components which were measured using HCE, SCE and CEE as dependent variable, Buallay and Hamdan (2019) concluded that the corporate governance index is significant with the three intellectual capital components. Human capital efficiency and structural capital efficiency are higher for firms with a high level of corporate governance adoption, whereas capital employed efficiency is higher for firms with a lower level of corporate governance adoption. In contrast, Al-Sartawi (2018) investigated the relationship between corporate

governance and intellectual capital in 274 firms in Gulf Cooperation Council countries and found that there is a weak and negative link between corporate governance and intellectual capital.

Previous studies have found mixed evidence regarding the impact of corporate governance, analysed considering different board characteristics, on intellectual capital. For instance, according to Lari Dashtbayaz et al. (2020) board independence and financial expertise are negatively related to communicative capital, but the relationship between audit committee independence and communicative capital is positive and significant. Furthermore, the study revealed a positive relationship between board independence and human capital. Regarding structural capital, the findings showed a positive relationship with audit committee independence and a negative relationship with audit committee size. On the other hand, the findings of a study conducted by Aslam and Haron (2020) on 129 Islamic banks revealed that corporate governance measures, such as board size and non-executive directors, have a positive effect on the quality of intellectual capital efficacy. CEO duality, Shariah board, and audit committee, contrastingly, are negatively associated with intellectual capital efficacy. Further to that, the authors found a positive correlation between foreign ownership and intellectual capital efficiency. Soriya and Kumar (2022) used panel data regression analysis to investigate the relationship between intellectual capital efficiency and corporate governance attributes in 116 companies from 2012 to 2018. According to the findings of their study, board size is negatively associated with intellectual capital and its components; however, CEO duality is not found to be associated with intellectual capital performance. This research also demonstrates that board independence, Indian promoters, institutional ownership, and foreign ownership are negatively correlated with intellectual capital performance and human capital efficiency. Tran et al. (2020) considered various corporate governance characteristics including board size, a number of independent members in the board, board remuneration, major shareholder holding more than 20 per cent of the outstanding shares and duality of the CEO and measured intellectual capital using the modified value-added intellectual coefficient model (MVAIC) for a sample of 45 Vietnamese listed firms during 2011-2018 and found that key characteristics of corporate governance, except for board remuneration, may provide a negative effect on the efficient use of intellectual capital. On the other hand, Yan (2017) concluded that board composition positively affects intellectual capital. Appuhami and Bhuyan (2015) examined the relationships between corporate governance and intellectual capital using multiple regression analysis and revealed that board composition, CEO duality, and the composition of remuneration committees positively impact intellectual capital. Moreover, Ebrahim et al. (2021) investigated the relationship between various corporate governance mechanisms and intellectual capital performance and found that there is a significant correlation between the size of the Board of Directors, the independence of the Board of Directors and the performance of intellectual capital. They did not discover any correlation between the quantity of meetings, diversity of nationalities, diversity of educational levels, and intellectual capital performance.

The audit committee is a fundamental component of corporate governance that plays a significant role in decision-making within a company. Buallay (2018) observed that audit committee characteristics have a significant positive impact on intellectual capital. Furthermore, even if we consider the influence of audit committee characteristics on intellectual capital components measured individually (human capital efficiency, structural capital efficiency, relational capital efficiency, and capital employed efficiency), the relationship remains positive. Likewise, Bamahros' (2021) research shows that audit

committee chair independence and audit committee chair duality have a significant positive effect on intellectual capital performance in the context of Saudi Arabian listed banks.

The diversity of scientific work conclusions on the identification and confirmation of the relationship between corporate governance and intellectual capital, as well as the lack of studies on this subject in the Romanian context, indicate that there is still a gap in the literature that needs to be filled. Thus, based on the specific objectives, methods, and country contexts, the review of previous literature can be summarized as having mixed results, but the largest number of studies show that corporate governance has a positive effect on intellectual capital. Therefore, the following hypothesis was formulated: *Good corporate governance has a positive impact on intellectual capital.*

3. Methodology

The objective of the present research is to investigate the impact of corporate governance on intellectual capital in the Romanian context. We considered intellectual capital as a dependent variable, corporate governance as an independent variable, and employees, total assets, inventory assets, and leverage as control variables.

3.1. Variables

Dependent variable: Intellectual Capital

Intellectual capital can be measured using a variety of qualitative and quantitative methods. There are three major types of approaches used to assess intellectual capital: direct methods, methods based on return on assets, and non-financial methods. Direct methods comprise the Technology Broker Method (Snyder and Pierce, 2005) and the Citation-Weighted Patents Method (Sullivan, 1998). Return on assets methods include Economic Value Added (Iazzolino et al., 2014), Market Value Added, and Value Added Intellectual Coefficient (Pulic, 1998; Pulic, 2000; Iazzolino et al., 2014; Gogan and Draghici 2013). Also there are non financial method developed for measuring the intellectual capital as follows: Balanced Scorecard (BSC)(Kaplan & Norton 1996; 2010), Performance Prism (Starovic & Marr, 2004) , Knowledge Assets Map Approach (Abdolvand, 2022), Skandia Navigator (Baima et al., 2020), The intangible assets monitor (Andriesse and Tissen, 2000), Ramboll's holistic company model Bates Gruppen Company IQ measurement system (Boom 2020). A well-functioning corporate governance framework is a vital component of any organization's success. It enables it to make informed decisions and improve its performance in all aspects of its business. When companies are driven by competitive pressures and market forces, they are evaluated by investors with the help of various financial indicators. These include profits, market value, and earnings per share. Also a good corporate governance practices as measured by creating enormous wealth through the EVA (Economic Value Added) tool have an impact on the company's trust. Value management is a process that aims to enhance a company's shareholder wealth by identifying the drivers of value. This concept is carried out through the use of various instruments and techniques. According to the financial theory, every company has a final goal to maximize its shareholder wealth, unfortunately, this goal sometimes is neglected or misunderstood. A value-based management system is a framework that aims to help companies enhance their value by taking into consideration various factors such as the Economic Value Added (EVA). The calculation algorithm of EVA is represented by the difference between Net Operating Profit After Tax and the product between Weighted Average Cost of Capital (Dabrowska et al., 2021):The added value of the market is not an

instrument in itself, and it cannot assess the effectiveness of a particular action. Using Economic Value Added techniques can motivate managers to develop strategies that will create shareholder value. It can also help them identify areas of potential growth (Sichigea and Vasilescu, 2015).

Value Added Intellectual Coefficient (VAIC) due to the fact that it is quantitative method, takes into account the various efficiency figures of a company, measures the effectiveness of various resources in an enterprise and takes into account the data collected from financial statements to analyze the efficiency of an enterprise can be considered being the most appropriate and suitable method that can be used to measure a company's intellectual capital was chosen. The VAIC method considers both the firm's overall productivity and the efficiency of its intellectual capital. (Fijalkowska, 2014). The goal of this measure is to provide a comprehensive view of an organization's performance. It takes into account various factors such as the effectiveness of its resources and the data collected from its financial transactions. Through this concept, companies can identify the areas of their operations where they can improve and create value. It can also be used by management to continuously improve their performance (Fijalkowska, 2014). The concept of the VAIC model was created by Pulic in 1998. The Value Added Intellectual Coefficient (VAIC) represents a set of tools that measure an organization's added value by taking into account the various elements of its intellectual capital. These include the amount of capital employed, human capital, and structural capital (Ståhle et al., 2011; Berzkalne and Zelgalve, 2013). VAIC is calculated as a sum of Capital Employed Efficiency (which is calculated as a ratio between Value Added and Capital Employed), Human Capital Efficiency (calculated as a ratio between Value Added and Human Capital) and Structural Capital Efficiency (calculated as a ratio between Value Added and Structural Capital) (Ståhle et al., 2011). According to authors (Berzkalne and Zelgalve 2013; Rus et al., 2019; Chizari et al., 2016; Castro et al., 2021; Radonić et al., 2021; Marzo 2021; Xu and Liu, 2020) for the reasons of measuring the intangible capital of a company, we use Value Added Intellectual Coefficient (VAIC) as being our dependent variable.

Independent variable: Corporate Governance

The corporate governance score is the study's independent variable. It refers to the level of compliance with the principles and recommendations of the Bucharest Stock Exchange Code of Corporate Governance (2015), that is structured in four sections: “Section A. Responsibilities”, “Section B. Risk management and internal control system”, “Section C. Fair rewards and motivation” and “Section D. Building value through investors’ relations”.

This data was provided by the “Comply or Explain Statement” that is part of the annual report. The “Comply or Explain Statement” consists of 41 questions, to which the companies’ representatives must respond with “yes” or “no” and, in the case of “no”, an explanation is required. Following the approach proposed by Achim and Borlea (2020), we will assign 1 point for each answer that is "yes" and 0 point for a response that is "no," giving the corporate governance score as follows:

$$CG = \sum_{j=1}^{11} Res_j + \sum_{j=1}^{12} Risc_j + Rew + \sum_{j=1}^{17} Invest_j \quad (1)$$

where:

CG is the value of the company's corporate governance score.

Res_j is the score obtained by answering questions *j* in Section A;

$Risc_j$ is the score obtained from answering the *j* questions in Section B;

Rew is the score obtained from answering the single question of Section C;

$Invest_j$ is the score obtained from answering questions *j* in Section D.

The value of a company's governance score ranges from 0 to 41.

Control Variables

The others variables, in our study represents control variables, which are represented by company's size measured through total assets and number of employees, efficiency measured by inventory assets, and also by debt's company measured by leverage. All these variables are usually utilized in the literature and our study follows these elements as well, widely known in the literature (Usman, 2003; Hidayat and Firmansyah, 2017; Kuncova et al., 2016). The size of a company is the total amount of assets that it has. It can be categorized into different categories such as total assets and stock market.

Table 1. Variables description

Variable	Way of expressing	Unit	Formula
Dependent variable (Intellectual capital)			
Value Added Coefficient (VAIC)	The VAIC represents an efficiency measure of a firm by how it uses its intellectual, financial, and physical capital to enhance its value. It is calculating by the sum of Human, Structural and Capital Employed Efficiency. HCE is the ratio between Value Added and Human Capital; SCE is the ratio between Structural Capital; Value Added CEE is the ratio between Value added and Capital Employed	Monetary Units	VAIC= CEE+HCE+SCE CEE=$\frac{VA}{CE}$ HCE=$\frac{VA}{HC}$ SCE=$\frac{VA}{SC}$
Economic Value Added (EVA)	*EVA* is calculated making the difference between Net Operating Profit After Tax and the product between Invest Capital and Weighted Average Cost of Capital	RON	*EVA=NOPAT-(WACC x Invested Capital)*
Independent variables			
Corporate Governance Score (CG)	CG refers to the level of compliance with the principles and recommendations of the Bucharest Stock Exchange Code of Corporate Governance	It ranges from a minimum of 1 to a maximum of 41 points	CG = $\sum_{j=1}^{11} Resj + \sum_{j=1}^{12} Riscj + Rew + \sum_{j=1}^{17} Investj$
Control variables			
Employees	Employees represents the total number of employees from a company	Number of people	
Total Assets	Total Assets represents the total number of assets and measure the company's size	RON	
Inventory assets	Inventory assets represent goods or services meant to be sold in order to obtain a positive financial result.	%	$Inventory\ assets = \frac{Turnover}{Total\ assets} x\ 100\%$
Leverage	Leverage measures a company's ability to meet its financial obligations and is given by the difference between total debts and equity	%	Inventory assets $= \frac{Total\ debts}{Shareholders\ equity} x\ 100$

Source: own research

The size of a company can be categorized into three categories: total assets, capital, and income. The higher the number of these assets, the stronger the organization is. Other

factors such as the number of employees and the value of its assets can also be taken into account to determine its strength (Brigham and Houston, 2011; Fahmi, 2014). The higher a company's size, the better it can manage its leverage ratio. This is because a positive leverage ratio can help a company achieve its profitability (Usman, 2003; Hidayat and Firmansyah, 2017; Kuncova et al., 2016). In addition to the evidence provided by the literature, we chose these control variables because they are closely related to the dependent variable, and consequently it is considered relevant to include them in the model in order to carry out a complete analysis.

3.2. Sample and data

This study focuses the Romanian companies listed on the Bucharest Stock Exchange in the Standard and Premium categories.

Regarding the methodology of the empirical evidence, we studied the impact of Corporate Governance on Intellectual Capital. The analyse was performed on time span 2016-2021, based on indicators needed for computing the Intellectual Capital and Corporate Governance Index, indicators available on Thomson Reuters database, Bucharest Stock Exchange and also from financial statements of the companies. Our sample is composed from 64 companies listed on Bucharest Stock Exchange acting in all industries from Romania. Some data were refined by logarithm and others were rescaled in order to obtain a homogenous panel data which in the end contained 4619 observations. The entire empirical study was performed in EViews software, and the method used was Panel Least Square Method with Random Effects, Fixed Effects and also with Ordinary Least Square, according to Hausmann Test and Log Likelihood test. The variables were tested for multicollinearity through the Variance Inflation Factor (VIF) and multicollinearity problems were detected (Tables 5, 9,11).

3.3. Method

We estimate the panel linear regression models in which intellectual capital is determined as a function of the corporate governance and controls variables mentioned above, for company i in year t. The general form for our model is:

$$Intellectual\ Capital\ _{i,t} = \beta_0 + \beta_1 Corporate\ Governance\ _{i,t} + \beta_{(j)2} + Controls\ (j)_{i,t} + C_i + \varepsilon_{i,t} \quad (2)$$

where:

Intellectual Capital is the dependent variable for company *i* in period *t* represented by Value Added Coefficient (VAIC);
Corporate Governance (CG) is the independent variable for the company *i* in period *t*;
Controls(j) represents the control variables for the company *i* in period *t* employees, total assets and leverage;
β_0 is the intercept;
β_1 - the objective of the coefficient is to indicate the extent to which the variable intellectual capital is associated with the corporate governance if it will be significantly statistic;
$\beta_{(j)2}$ is the regression coefficient for the *j* variable;
i represent companies from panel date;
t period of time (2016-2021);
ε is the residual error for company *i* at year *t*.

4. Results

4.1. Descriptive statistics

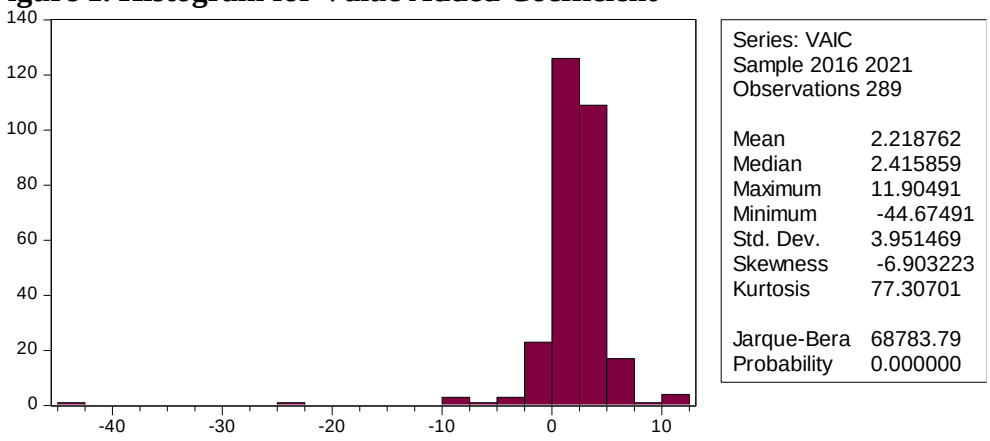
The main descriptive statistics of the variables are presented in the ***Table 2***. For the present sample, Corporate Governance has an average of 25.48177 points ranging from 0 (AAGES S.A. in 2016, COMCM S.A. 2016-2021, Grupul Industrial Electrocontact S.A. in 2016-2021, Compania Energopetrol S.A. 2016-2017, Societatea Comerciala de Constructii Napoca S.A. in 2021 and RETRASIB in 2021) to 41 points (ATB 2018-2021, EL 2016-2021, MedLife in 2020 and C.N.T.E.E. TRANSELECTRICA in 2017). Regarding to the Value Added Coefficient, it has an average of 2.218762 points and is ranged between -44.67491(Armătura) to 11.90491 (Rompetrol Rafinare) points.

Table 2. Descriptive statistics

	VAIC	CG
Mean	2.218762	25.48177
Median	2.415859	28.50000
Maximum	11.90491	41.00000
Minimum	-44.67491	0.000000
Probability	0.000000	0.000000
Observations	289	384

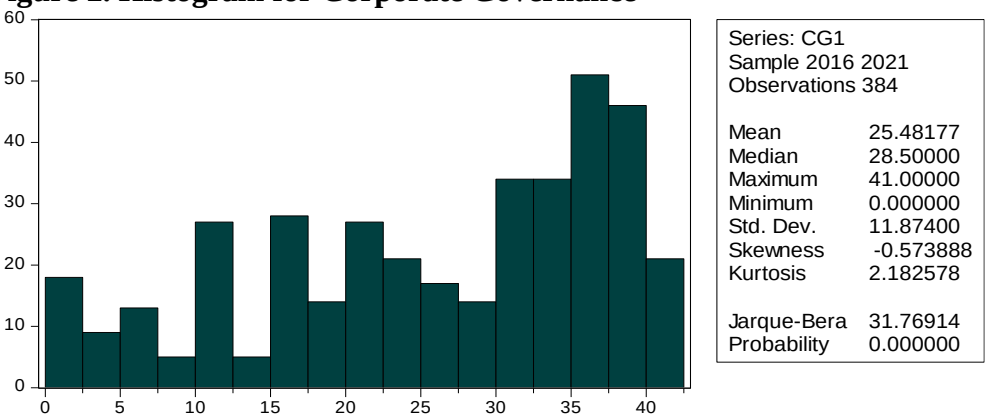
Source: own research

Figure 1. Histogram for Value Added Coefficient



Source: own research

Figure 2. Histogram for Corporate Governance



Source: own research

As it can be observed distributions of the Corporate Governance (***Figure 2***) and of VAIC (***Figure 1***) are abnormal. But regarding to the VAIC we can observe that at one moment it in contrast with the distribution of Corporate Governance it tends to become normal. This can be explained by the fact the Corporate Governance Score has as a basis qualitative measures which are given by the 'Comply or Explain Statement' and the Value Added Coefficient is realized by financial data, so it has quantitative measured at its base.

Correlation matrix

For estimating the sign of the relationship between Corporate Governance and Intellectual Capital we analysed the correlation between the dependent and the independent variables (***Table 3***).

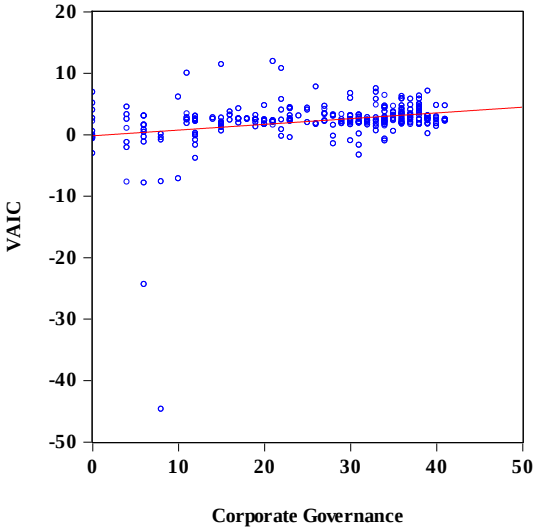
Table 3. Correlation matrix

Correlation	Value Added Intellectual Coefficient	Corporate Governance
VAIC	1.000000	
CG1	0.277603	1.000000

Source: own research

The positive (direct) correlations between Value Added Coefficient and Corporate Governance mean that an increase of intellectual capital leads to an increase of corporate governance. Regarding to the ***Table 3***, the correlation matrix between Corporate Governance measured by Corporate Governance Score and Intellectual Capital measured by Value Added Coefficient is 0.277603 which denotes a moderate correlation.

Figure 3. Plot of Intellectual Capital (VAIC) against Corporate Governance



Source: own research

4.2. Estimations

Regarding to the empirical evidence the results are presented in ***Table 4***. The table show estimations for 3 models where was tested the impact between the dependent and the independent variables and turn by turn were added controls variables.

Table 4. Regression results for VAIC as a function of CG and other explanatory variables

	OLS				FEM				REM			
VAIC	(0)	(1)	(2)	(3)	(0')	(1')	(2')	(3')	(0'')	(1'')	(2'')	(3'')
CG	3.8176 ***	3.6236 ***	1.6835 ***	3.0275 ***	0.7703	0.6357	-0.2604	1.0185	3.5600 ***	3.4170 ***	1.5442 *	2.9368 ***
Employees		0.0004 **				-0.0006				0.0004 *		
Total Assets			0.7671 ***				3.0447				0.7968 ***	
Leverage				0.4276 ***				0.4058 ***				0.4173 ***
Observations	289	283	289	287	289	283	289	287	289	283	289	287
R^2	0.0770	0.0889	0.1461	0.2206	0.3553	0.3556	0.3744	0.4684	0.0450	0.0536	0.1066	0.1968
R-Adj.	0.0738	0.0824	0.1401	0.2151	0.2099	0.2065	0.2300	0.3446	0.0416	0.0469	0.1004	0.1911
Prob.(F-statistics)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.000443	0.0000	0.0000
Hausman Test	-	-	-	-	-	-	-	-	0.2176	0.3980	0.1167	0.5783
Cross-section random									0.1493	0.1415	0.1024	0.1737
Idiosyncratic random									0.8507	0.8585	0.8976	0.8263

Source: own research

Notes: *** 1% significant coefficients, ** 5% significant coefficients and * 10% significant coefficients

Table 5. Multicollinearity tested by Vector Inflation Factor (VIF)

	OLS				FEM				REM			
Models	(0)	(1)	(2)	(3)	(0')	(1')	(2')	(3')	(0'')	(1'')	(2'')	(3'')
VIF	1.0000	1.0340	1.3448	1.0195	1.0000	1.0080	1.0251	1.0005	1.0000	1.0290	1.3257	1.0072

Source: own research

Regarding tot the regression constructed between Intellectual Capital measured through Value Added Intellectual Coefficient and Corporate Governance measured by Corporate Governance Score from ***Table 4***, when the variables were tested through Random Effects Method, we find positive and statistically significant coefficients of corporate governance (at *p*-value <1%) in relationship with the intellectual capital in all models [(0) to (6)]. The other control variables [models (1), (2) and (3)] are significantly and also positive statistically. 4,5 % (R^2 = 0.045) from the variation of the Intellectual Capital is due to the Corporate Governance. Then, at one point increase in the level of intellectual capital leads to an increase of 3.56 points in the size of the corporate governance. Regarding to the model Goodness-of-fit, R^2 for all models is ranged between 4% and 19% and an important thing that must be mentioned is that when control variables "total assets" and "leverage" are introduced in the models the variation increase and reach values till approximately 20%. When the variables are tested through Ordinary Least Square (OLS) also we can observe that in all models we can find positive and statistically significant coefficients of corporate governance (at p-value <1%) in relationship with the intellectual capital and the variation increase in this case in all models [(0') to (6')] with approximately 0.03 %. Also, the variables were tested for multicollinearity through the Variance Inflation Factor (VIF) and multicollinearity problems were detected (***Tables 5, 9, 11***).

In our processing we have used the Spearman's correlation coefficient, which statistically is represented by Cross-section random (Rho). It takes values between -1 and +1, values that indicate the type of the relationship between the variables. If the correlation is positive, the dependent variable is moving in the same way with the independent. When Rho is close to +1 it indicates a perfect positive correlation between variables, meanwhile it is close to -1 is showed a perfect negative correlation. For the present study, the Spearman correlation ranges between 0.10 and 0.17, this denoting a moderate magnitude of the relationship between variables and also is presented a positive relationship between them. Regarding to the Idiosyncratic random term, for or analysis we have values oscillating near 0.8. This indicates that there is a higher variation with which the factors impact the dependent variable.

4.3. Robustness tests

In order to reinforce our results, we conducted a sequence of robustness checks: (1) We chose an alternative measure for the independent variable. Thus, to ensure the robustness of the results in our study, the model was re-estimated by measuring the intellectual capital through Economic Value Added (EVA) (Rus et al., 2019). (2) We controlled for other effects by adding to our regressions another control variable such as inventory assets and finally, (3) we tested an additional split sample. Our results remain stable after conducting robustness checks. ***Table 6*** presents the results when the dependent variable is changed with EVA instead of VAIC.

Table 6. Regression results for EVA as a proxy for Intellectual Capital

	OLS				FEM				REM			
EVA	(0)	(1)	(2)	(3)	(0')	(1')	(2')	(3')	(0'')	(1'')	(2'')	(3'')
CG	-6.3270 **	-5.6686*	-6.6755*	-6.4734 ***	22.6254 ***	21.1122 ***	21.1320 **	21.3702 **	-3.0209	-2.2673	-3.3182	-2.8284
Employees		-0.0004				-0.0321				-0.0003		
Total Assets			0.3218				1.0369				0.2888	
Leverage				-3.0749				-3.6058 ***				-3.8613
Observations	64	64	63	64	64	64	63	64	64	64	63	64
R^2	0.0575	0.0681	0.0577	0.0876	0.7947	0.8029	0.7944	0.8152	0.0093	0.0164	0.0101	0.0653
R-Adj.	0.0423	0.0376	0.0263	0.0576	0.5025	0.5035	0.4903	0.5344	-0.0065	-0.0157	-0.0228	0.0346
Prob.(F-statistics)	0.05612	0.10016	0.1068	0.0596	0.0046	0.0057	0.0069	0.0032	0.4462	0.6025	0.7372	0.1274
Hausman Test	-	-	-	-	-	-	-	-	0.0006	0.0022	0.0035	0.0035
Redundant Fixed Effects					0.0067	0.0075	0.0083	0.0052	-	-	-	-
Cross-section random									0.4333	0.4401	0.4381	0.4706
Idiosyncratic random									0.5667	0.5599	0.5619	0.5294

Source: own research

Notes: *** 1% significant coefficients, ** 5% significant coefficients and * 10% significant coefficient

Table 7. Multicollinearity tested by Vector Inflation Factor (VIF)

	OLS				FEM				REM			
Models	(0)	(1)	(2)	(3)	(0')	(1')	(2')	(3')	(0'')	(1'')	(2'')	(3'')
VIF	1.0000	1.0590	1.0971	1.0010	1.0000	1.0316	1.4178	1.0087	1.0000	1.0600	1.1125	1.0013

Source: own research

Regarding to the first robustness test, when we choose to measure the intellectual capital instead by Economic Value Added instead of Value Added Coefficient we can observe that the most suitable method was of Fixed Effects according to Redundant Fixed Effects. Here we can find all coefficients being positive and statistically significant in all models [(0') to (6)] and also something that should be mentioned, in this case when we choose EVA we can observe that the relationship between intellectual capital and corporate governance is negative. Our results are in line with Tran et al. (2020), Shahzad et al. (2022), and Sadiq et al. (2020).

Regarding to the second robustness test we choose to introduce a new control variable: Inventory assets. In all models with the exception of model (3) there is a significantly and positive relationship between intellectual capital and corporate governance. All these results are in line with the results of ***Table 4***, when was not introduced the control variable Inventory Assets.

Table 8. Regression results for VAIC as a function of Corporate Governance (testing an additional sample)

	OLS			
VAIC	(0)	(1)	(2)	(3)
CG	3.9432***	3.7262***	1.8590***	2.0432***
Employees		0.0004**		
Total Assets			0.7548***	
Leverage				0.4265***
Observations	289	283	289	287
R^2	0.0821	0.0932	0.1516	0.2206
R-Adj.	0.0789	0.0858	0.1457	0.2151
Prob.(F-statistics)	0.0000	0.0000	0.0000	0.0000
Cross-section random	0.0174	0.0130	0.0330	0.0015
Idiosyncratic random	0.9826	0.9870	0.9670	0.9985

Source: own research
Notes: *** 1% significant coefficients, ** 5% significant coefficients and * 10% significant coefficients

Table 9. Multicollinearity tested by Vector Inflation Factor (VIF)

	OLS			
Models	(0)	(1)	(2)	(3)
VIF	1.0000	1.03475	1.3526	1.0198

Source: own research

For the third robustness we choose to test an additional sample. As we can observe the results remain unchanged, more than that in some cases the variation increases and all the coefficients for all variables are significantly statistics at a *p*-value equal to 1%.

Table 10. Regression results for VAIC adding Inventory Assets

	OLS				FEM				REM			
VAIC	(0)	(1)	(2)	(3)	(0')	(1')	(2')	(3')	(0'')	(1'')	(2'')	(3'')
CG	3.6265 ***	3.4130 ***	1.6078 ***	2.8954 ***	0.8356	0.7487	-0.2293	1.0852	3.3583 ***	3.2031 ***	1.4473	2.7716 ***
Inventory assets	1.2019 ***	1.3029 ***	0.9554 ***	0.8695 ***	2.2374 **	2.3689 **	2.5357 ***	2.1904 ***	1.3386 ***	1.1413 ***	0.0850* **	1.0775 ***
Employees		0.0004 **				-0.0006				0.0004 *		
Total Assets			0.7398 ***				3.1590 ***				0.7701* **	
Leverage				0.4183 ***				0.4040 ***				0.4108 ***
Observations	289	283	289	287	289	283	289	287	0.0578	0.0684	0.1144	0.2041
R^2	0.0916	0.1059	0.1552	0.2281	0.3656	0.3658	0.3861	0.4770	0.0512	0.0584	0.1051	0.1957
R-Adj.	0.0853	0.0963	0.1463	0.2199	0.2192	0.2157	0.2412	0.3525	0.1511	0.1411	0.1071	0.1804
Prob.(F-statistics)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0001	0.0000	0.0000
Huasman Test	-	-	-	-	0.0005	0.0014	0.0050	0.0001	0.2989	0.4613	0.1011	0.4977
Cross-section random									0.1511	0.1411	0.1071	0.1804
Idiosyncratic random									0.8489	0.8589	0.8929	0.8196

Source: own research

Notes: *** 1% significant coefficients, ** 5% significant coefficients and * 10% significant coefficients

Table 11. Multicollinearity tested by Vector Inflation Factor (VIF)

	OLS				FEM				REM			
Models	(0)	(1)	(2)	(3)	(0')	(1')	(2')	(3')	(0'')	(1'')	(2'')	(3'')
VIF	1.0132	1.0477	1.3518	1.0313	1.0001	1.0085	1.0252	1.0007	1.0107	1.0401	1.3281	1.0175

Source: own research

5. Conclusions

The objective of our study is to investigate the impact of the corporate governance on Intellectual Capital for the Romanian firms. The study considered 64 companies listed on the Bucharest Stock Exchange in the Standard and Premium categories between 2016 and 2021.

We calculated intellectual capital using two methods: Economic Value Added and Value Added Intellectual Coefficient and we considered to the level of compliance with the principles and recommendations of the Bucharest Stock Exchange Code of Corporate Governance. In carrying out our study we used Panel Least Square Method with Random Effects, Fixed Effects and also with Ordinary Least Square. The main results of our study indicate that there is a positive and statistically significant relationship between corporate governance and intellectual capital in all the cases. We observed the presence of negative coefficients when using the OLS method, however this is changed when adding fixed effects to the model where all coefficients are positive and significant. According to the results of the tests, the fixed effects model was found to be the most appropriate, so the positive result is considered valid. Furthermore, all the control variables namely total assets, employee number, and leverage, show positive and statistically significant results. 4.5 % from the variation of the Intellectual Capital is due to the Corporate Governance. Afterward, a one-point increase in intellectual capital leads to a 3.56-point increase in the size of the corporate governance score. As for the model Goodness-of-fit, R^2 for all models ranges between 4% and 19%, and when control variables "total assets" and "leverage" are introduced in the models, the variation increases. Moreover, the Spearman correlation shows a moderate magnitude of the relationship between the variables and a positive relationship between them.

In order to reinforce our results, we conducted a sequence of robustness checks: in the first table we considered another measure for intellectual capital, in the second we added to our regressions another control variable: inventory assets and in the third table we tested an additional sample. After the execution of those tests our findings were confirmed in most of the cases. Therefore, our hypothesis is accepted, to put it in other words, we discovered that a good corporate governance system improves the efficiency of intellectual capital. Because the obtained results are linked to the statistical methods employed and the sample examined, generalization should be done with good judgement. The outcomes may vary depending on the country and the statistical methods used.

The findings of this study are expected to be useful to academics and researchers interested in this topic; they can also be used by policymakers to improve company efficiency and determine the need to invest in human capital. And, at the very least, our findings can be useful for practitioners in Romania and other similar developing countries because they comprehensively evaluate a company's corporate governance system, on intellectual capital.

Conducting the current research has been limited by a few factors. Firstly, our study was limited by the analysed period. The analysis's time frame was limited due to the fact that the corporate governance score is based on the new Corporate Governance Code of the Bucharest Stock Exchange, which became effective in 2016. We intend to investigate the connection between corporate governance and intellectual capital in the future using a larger sample of companies and over a longer time frame. Secondly, we considered only the corporate governance score as independent variable, as future research directions, it

would be interesting to consider different corporate governance mechanisms such as the size of the board, the independence of the board or the ownership structure.

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