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The Effect of Board Characteristics on Intellectual Capital: Case of Iran and Iraq

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Abstract

The present study is concerned about the relationship between the board characteristics and intellectual capital efficiency in companies listed on the Iran and Iraq Stock Markets. A multivariate regression model is used for this study. Research hypotheses were tested using a 903 firm-year observation sample from the Tehran Stock Exchange and 280 firm-year observations from the Iraq Stock Exchange during 2012-2018 for both counties based on multiple regression patterns and pooled data techniques. The results show that there is a significant relationship between board characteristics and efficiency of intellectual capital, which means there is a negative and significant relationship between the board independence, the board size, CEO ownership, and CEO gender, and intellectual capital and a positive and meaningful relationship between CEO change and intellectual capital both in Iran and Iraq. However, while the relationship between board independence and intellectual capital is negative in Iraq, such a relationship is positive and significant in Iran.

Keywords

Intellectual Capital, Human Capital Efficiency, Structural Capital Efficiency, Communicational Capital Efficiency, Board Characteristics

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1. Introduction

Within today's knowledge-based economy, intellectual capital is the essential property of every organisation and can contribute to performance from different aspects. Although the traditional accounting methods play a significant role in the measurement and reporting of tangible assets, within a knowledge-based economy where knowledge constitutes a considerable proportion of properties, conventional accounting methods cannot measure and report the existing expertise in the organisation that requires some remarkable changes. In intellectual capital accounting, properties have no physical property, but they have considerable benefits for the firm's future cash flow. Therefore, the inability of intellectual capital reporting is indicative of the failure of typical or traditional accounting. However, their valuation in commercial deals is not an easy task and not possible with current methods. Moreover, there is no theory or actual economic model for intellectual capitals (Gogan, 2014).

The position and role of the firm's intellectual capital, financial performance, and organisational value creation are consolidated in the literature of the global economy. Various empirical studies across multiple business sciences areas show that wise and experienced staff or managers contribute positively to the firm's value and performance. However, these studies focused on a firm's human resources' intellectual capital and took the board's intellectual capital for granted. Similarly, even the most comprehensive studies on corporate governance describe the structures and different processes of management. Still, they do not refer to intellectual capital criteria or the knowledge of the board. Hence, a significant gap remains in sound governance structures and restricts the understanding of corporate governance's impact on firm performance and value (Kalyta, 2011).

One of the key corporate governance topics currently available to firm management and shareholders is the board member characteristics (Carter, Simkins and Simpson, 2003). Smith (1937) declares that managers do not always move forward to maximise shareholders' interests. A conflict of interests between owners and management has brought about agency problems, leading to firms' intellectual capital being inefficient and failing in the competition. Hence, according to Jensen and Mechling (1976), supervisory mechanisms should be implemented to fill the gap between ownership and management. One of the existing mechanisms to reduce agency problems and information asymmetry between managers and shareholders is an efficient board as one of the corporate governance's internal mechanisms.

By considering the significance of board characteristics in today's business world, the present study concerns the effects of some board features on the intellectual capital of companies listed on the Iraq Stock Exchange. The concept of intellectual capital is not clear, and different definitions are proposed for that. In this regard, Rezaei et al. (2018) consider intellectual capital a working strategy used simultaneously in the entire organisation and is a tool for advancing an organisation's general plan. The conducted studies in the corporate governance system in different countries show that the enhancement of corporate governance and, more importantly, the presence of an efficient board would lead to the growth of the capital market in those countries, and there is a strong correlation between these two factors (Rodrigues, Tejedo-Romero and Craig, 2016). Given the facts mentioned above, the question here is whether the relationship between board characteristics and intellectual capital is significant or not. Thus in this paper, the main objective is to analyse the relationship between board characteristics and intellectual capital efficiency in companies listed on the Iraq Stock Exchange, compare the results with the studies carried out in Tehran Stock Exchange, and propose some keynotes in this field.

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2. Theoretical Principles, Literature Review, and Hypothesis Development

2.1. The Board Size

We mean the number of board members by the board size, which is a significant factor in its effectiveness. We can observe different approaches to the relationship between board size and its effectiveness by reviewing the literature. From the agency's point of view, we can argue that a giant board is most likely cognizant of the agency problems because many people supervise the management works (Nicholson and Kiel, 2003). Because the board's central role is to monitor the management, studies on the board size only focus on supervisory issues (Xie, Davidson and Dadalt, 2003).

2.2. The Board Independence

Board independence is the unbounded members of the board. An unbound member of the board is a member who has no executive responsibility in the firm. The number of unlimited board members has a positive relationship with supervisors' effectiveness in providing financial statements (Beekes, Pope and Young, 2004). According to Fama and Jensen (1983), firms' board plays a pivotal role in the governance system. The board's primary function is to create efficient governance for firms, provide independent supervision in executive managers' performance, oblige the managers to be responsible against shareholders, and balance different beneficiaries' interests. Therefore, people believe that when the board is more independent, it has more supervision of the executive managers (Beasley, 1996; Peasnell, Pope and Young, 2000; Klein, 2002).

2.3. CEO Change

CEO change includes any replacement in the CEO position, the CEO's replacement of the previous year with a new person in the current year. CEO certificate (CEO financial expertise): financially educated management members are another characteristic of the firm board. The CEO should have certain features and skills, especially in finance, and should be an expert, experienced, and at the same time competent to be able to carry out the responsibilities, ideally.

2.4. CEO Gender

The CEO is Male 1; otherwise, it would be 0 (if the CEO is female). Most of the studies on CEO gender diversity are based on how women's agency would improve the firm value. For example, some studies perceived that a firm with gender diversity would perform better in management because women benefit from some unique characteristics of resources and human capital for business (Campbell and Minguez-Vera, 2008), while other studies have found an opposite effect (Bohren and Storm, 2010; Adams and Ferreira, 2009) and some others discovered no relationship (Carter et al., 2010).

2.5. Intellectual Capital

Edvinsson and Sullivan (1997) define intellectual capital as the knowledge that can be turned into value. Marr (2004) describes intellectual capital as propulsion for a firm's competitive advantage and associates with firm capability in management and knowledge application. Moreover, the Canadian Association of Management Accountants defines intellectual capital as an item of knowledge preserved by people, shared for acquiring future profits (Lswati and Anshori, 2007). An issue for which there is a consensus is that intellectual capital indicates an intangible value of an organisation, which is hard to express. Bontis (1998), Edvinsson and Sullivan (1997), and Stewart

(1997), in their classification, divide intellectual capital into three components of human capital, structural capital, and relational or customer capital.

2.6. The Relationship between Corporate Governance Components and Intellectual Capital

Different studies (e.g., Safieddine, Jamali and Noureddin, 2009; Chen, Cheng and Hwang, 2005; Wang, 2008; and Salehi, Enayati and Javadi, 2014) show that corporate governance is a significant factor in attracting intellectual capital. The presence of an appropriate corporate governance system increases firms' capability for more absorption of intellectual capital (Safieddine, Jamali and Noureddin, 2009). Corporate governance benefits all the firm's financial beneficiaries, including investors, creditors, board members, management, staff, and different industries and economic sections. Appropriate corporate governance plays a significant role in improving efficiency and economic growth and, at the same time, elevates the trust of investors, which contributes to the country's economy. Firms benefit from a sound corporate governance system, and in case the firm is profitable, there is a higher motivation for using the corporate governance, the advantages of which affect either directly (via easy access to financial resources and lower capital expense) or indirectly (via gaining fame and more business opportunities) the economic system. In other words, the absence of an appropriate corporate governance system in firms would lead to an inability to attract and hold substantial intellectual capital (Safieddine, Jamali and Noureddin, 2009).

Ku Ismail and Al-musalli (2012) argue that intellectual capital performance in banks mentioned by GCC is lower. Contrary to our expectations, the number of independent managers negatively relates to intellectual capital performance in banks mentioned by GCC. All other variables have no relationship with intellectual capital. Ishak and Al-Ebel (2013) indicate that intellectual capital disclosure is positively associated with the board's effectiveness. These findings are significant for policy-makers regarding the board's effectiveness in supporting investors at the asymmetry level. Oba, Ibikunle and Damagum (2013) declare that the board's independence and audit committee independence cannot describe the independent variable. The board size has a positive and significant effect on the information disclosure quality of intellectual capital. Bohdanowicz and Urbanek (2013) conclude that managerial ownership, external ownership, institutional ownership, and ownership concentration positively affect intellectual capital and capital return productivity, especially structural capital. The study results show that the interaction between ownership structure and intellectual capital productivity is different in high-tech and low-tech industries. These findings suggest that the ownership structure plays a significant role in intellectual capital and creating productivity.

Elsaid and Ursel (2011) found that if the percentage of women on the board is higher, regardless of other succession characteristics, such as whether the new CEO is from inside or outside the company, the successor CEOs are more likely to be women. In addition, changes in CEOs from male to female are associated with reducing several firm risk metrics. Samaha, Khlif and Hussaineyc (2015) show that the board size, board composition, and audit committee positively and significantly affect voluntary information disclosure, while CEO duality has a negative impact on voluntary information disclosure. Attarita, Dampitakseb and Panmanee (2017) express that the audit committee sessions positively affect the intellectual capital return. Simultaneously, some factors like the size of the audit committee and the frequency of board sessions have a negative effect on intellectual capital efficiency. However, this is not obvious whether the proportion of board independence, the percentage of women on the board, or firms with a separate CEO and director contribute to the intellectual capital or not. Ku Ismail, Abu Bakar, and Al-Musalli (2016) figure out that state-owned firms have lower intellectual capital performance than private firms. Intellectual

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capital performance is also more economical for firms with equal CEO and director than firms that separate these positions.

Moreover, firms' governance and ownership structure play a pivotal role in intellectual capital performance among Malaysian firms. Liu, Pang and Kong (2017) declare that export increases the firm innovation; remarkably second, different types of human capital have different and mediating effects. More specifically, retired managers have a determining and mediating role in the relationship between export and innovation, while highly educated staff has adverse moderating and opposite effects. Torre et al. (2017) show that regardless of the intensity of organisational technology, voluntary turnover has a negative impact on the relationship between human capital and labour productivity. In contrast, non-voluntary turnover increases the relationship between human capital and labour productivity and is even more useful for organisations with more compact technological operations.

Debrah, Oseghale and Kweku (2018) indicate that Africa's long-term growth overview relies on human capital development. South African countries' stability requires education and labour training in the global market's skills centre. Mthanti and Oiah (2018) perceive that the relationship between human capital is strong at economic development levels. Sardo and Serrasqueiro (2018) argue that the return on the current period's intellectual capital positively affects European firms' financial performance with high, medium, and low technology. Besides, a non-linear relationship was found between growth opportunities and financial performance. Findings indicate that more efficient use of firms' intellectual capital affects the positive relationship between growth opportunities and financial performance. The results show that the effective use of intellectual capital impacts large firms' growth opportunities in the current period. Further, there is a non-linear relationship between ownership concentration and growth opportunities. Gomez-Mejia et al. (2019) indicated that female CEOs are considered more conservative and risk-averse than male CEOs. The results also confirm those female CEOs in low systematic risk areas, although more conservative, take more cautious risks that produce better long-term outcomes than their male counterparts. Shan (2019) found that managerial ownership and board independence have a negative impact on company performance. Also, board independence has a negative relationship with managerial ownership and vice versa. Ozbek and Boyd (2020) indicated that firm size has significant moderating effects on the relationship between governance structure and market performance. Shukla, Narayanasamy and Krishnakumar (2020) found that board size positively affects the Indian banks' accounting performance. In addition, board size is insignificant in determining the quality of Indian banks assets. Andreeva et al. (2021) found that when a country's environment has more access to skilled labour, a company's human and structural capital has less of an impact on its innovation performance. Troise et al. (2021) showed that relational capital positively influences collective investment decisions and explains the success of collective equity financing campaigns. While factors related to human capital and structural capital have a limited positive effect on investment decisions. Salehi et al. (2021) found that knowledge management positively and significantly affects intellectual and social capital relationships. Also, intellectual capital and social capital have a significant impact on innovation. D'Amato (2021) showed that companies with high levels of intellectual capital have less financial leverage and are more profitable and riskier than companies with low levels of intellectual capital. In addition, the results showed that the company's profitability and risk mediate the relationship between intellectual capital and financial leverage. Zahedi and Naghdi Khanachah (2021) found that knowledge management processes affect the development of an organisation's intellectual capital. Knowledge management processes also help

raise the level of innovation in the organisation through the development of intellectual capital. The results also showed that managers should focus on developing their human capital through young educated professionals to maximise internal capacity, create knowledge, and move towards improving the organisation's human capital. Potharla and Amirishetty (2021) indicated that the relationship between board size and board independence with a company's financial performance is non-linear inverted U-shaped. Chalu (2021) found that board size and gender diversity significantly negatively affected audit report delays. Khong, Hooy and Lye (2021) indicated that board independence has a negative effect on private information-based trading, and this effect can be strengthened by the disclosure quality, female independent Managers and board gender diversity, while the CEO duality weakens this effect. Alves (2021) found that the decline in the quality of profit associated with CEO duality is weakened when the board has a higher proportion of independent managers. Rashid (2021) indicated that board independence does not affect the corporate social responsibility activities and the relevant report. However, the lack of impact of board independence and corporate social responsibility reporting is offset by the power of shareholders. Domestic ownership, firm age, firm size, growth opportunities, and market capital positively impact such reports. Ting (2021) found that female CEOs have the same power and performance as male CEOs in a sample of Chinese banks. When women reach the top, they have more prestige and ownership than men. Female CEOs perform even better than male CEOs in non-governmental banks. Brueckner Bosak and Lang (2021) indicated that a comparison between male and female CEOs showed that female CEOs showed less power and more motivation than male CEOs.

Given the facts as mentioned earlier, the hypotheses of the study are as follows:

H_1: There is a significant relationship between board independence and intellectual capital in companies listed on the Stock Exchange of Iraq and Iran.

H_2: There is a significant relationship between board size and intellectual capital in companies listed on the Stock Exchange of Iraq and Iran.

H_3: There is a significant relationship between CEO change and intellectual capital in companies listed on the Stock Exchange of Iraq and Iran.

H_4: There is a significant relationship between CEO gender and intellectual capital in companies listed on the Stock Exchange of Iraq and Iran.

3. Research Methodology

This study is causal-correlational. The methodology is quasi-experimental, and retrospective within positive accounting studies carried out based on real information.

3.1. Statistical Population

The statistical population of the study is limited to the following firms:

1- Have no change in the fiscal year during the period of study (2012-2018) in Iraq and Iran,
2- Their financial information is available,
3- Are not affiliated with financial firms (banks, financial institutions) and investment or financial intermediaries, and;
4- Are active during the period of study.

Hence, the study period includes five consecutive years from 2012 to 2018 for listed firms on the Iraq Stock Exchange and 2012-2018 for listed firms on Iran Stock Exchange.

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Given the limitations, 129 firms were selected for Iran and 35 firms for Iraq to test the hypotheses.

Table 1. The number of firms in the statistical population

Description		Firms eliminated in total periods	Total no. of firms
Total listed firms on the Tehran Stock Exchange			445
Eliminating financial intermediaries, finance, insurance, and investment firms		88	
Firms with more than six months of transaction halt		112	
Firms entered the stock exchange during the period of study		4	
Elimination due to information unavailability		112	
Statistical population			129
Listed firms on Iraq Stock Exchange	No. of firms	Eliminated firms	Selected firms
Bank firms	39	39	
Insurance firms	5	5	
Investment firms	9	9	
Service firms	10	4	6
Industrial firms	25	10	15
Hotel and tourism firms	10	2	8
Agricultural firms	6	0	6
Telecommunication firm	2	2	
Financial transfer firm	17	17	
Total sample firms	123	88	35

3.2. Data Collection Method

The required information about the study was gathered from different resources. Data related to the research literature and theoretical issues were collected from library resources, including books, Persian and Latin journals, and internet websites, and data related to firms (balance sheets and profit and loss statement) were used as the research instrument. Primary and raw data and information required for hypothesis testing were collected by using the information bank of Tehran Stock Exchange, including Tadbir Pardaz and Rah Avaran-e Novin Software, as well as published reports of Tehran Stock Exchange via direct access (by analysing the disclosed reports in the Codal Website then manual collection) in the form of CDs and online website of rdis.ir and from other required resources.

3.3. Data Analysis

The data analysis method is cross-sectional and year-by-year (panel data). In this paper, the multivariate linear regression model is used for hypothesis testing. For analysing the obtained data, descriptive and inferential statistical methods were employed. The frequency distribution table was used to describe data, and at the inferential level, F-Limer, Hausman, normality, and multivariate linear regression tests were used for hypothesis testing.

3.4. Research Model

The following multivariate regression model is used for hypothesis testing:

Model (1)

$$VAIC_{it} = a_0 + a_1 BInd_{it} + a_2 Bsize_{it} + a_3 CEO.change_{it} + a_4 CEO.share_{it} + a_5 MTB_{it} + a_6 GCEO_{it} + a_7 Return_{it} + a_8 Loss_{it} + a_9 size_{it} + a_{10} LEV_{it} + a_{11} ROA_{it} + a_{12} ROE_{it} + a_{13} Growth.sales_{it} + a_{14} Age_{it} + a_{15} Year_{it} + a_{16} Industry_{it} + \varepsilon_{it}$$

Where:

VAIC: is the intellectual capital that Pulic's model calculates

BInd: is the board independence, which is equal to the unbounded members of the board to total members of the board

Bsize: is the board size that is equal to total board members

CEO change: is a CEO change that if the CEO is changed 1, otherwise, 0.

GCEO: is CEO gender that if the CEO is male 1, otherwise 0.

Size: is the firm size, which is the natural logarithm of firm assets

LEV: is the financial leverage of the firm, which is equal to total liabilities to total assets of the firm

ROA: Return on assets which are equal to net profit to total assets of the firm

ROE: return on equity, which is equal to net profit to book value of equity

Growthsales: growth in sales is equal to the sales of the current year minus that of the previous year divided by the sales of the last year of the firm

Age: firm age is equal to the time interval between data of establishment and the year understudy

Loss: a substantial loss that if the firm is losing 1, otherwise 0.

Return: stock return is equal to the market value of the current year minus that of the previous year plus the dividends divided by the market value of the last year

CEO_share: CEO ownership, which is equal to the amount of share available to the CEO divided by total shares published by the firm

MTB: book value to return on equity of the firm

Year: dummy variable of the year

Industry: dummy variable of the industry

It is worth mentioning that the above models were tested only once for Iranian and Iraqi firms' data, then their outputs will be analysed and discussed.

4. Data Analysis

4.1. Descriptive Statistics

In this paper, four models analyse board members' independence, size, board members, and gender on intellectual capital. The present study encompasses the panel data method in its database, including 129 Iranian and 35 Iraqi firms. For estimating the model, the variable of intellectual capital is used.

Moreover, for modelling the intellectual capital, some variables like board independence (Bind), board size (Bsize), CEO change (CEO change), CEO ownership (CEO share), book value to market equity of the firm (MTB), CEO gender (GCEO), stock return (Return), dummy variable of firm loss (Loss), firm size (Size), financial leverage (LEV), return on assets (ROA), return on equity (ROE), sales growth (Gross Sale), firm age (Age), and dummy variables of industry and year were added to the model as the descriptive variable. The primary source of these data is the Central Bank, Tehran Stock Exchange, Codal Website, and Rah Avard-e Novin Software. Tables 2 and 3 illustrate the information of the model variables for Iranian and Iraqi data.

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Table 2. Descriptive statistics for Iranian variables

Sign	Variable	Total mean	Std. dev.	Min	Max
$VAIC_{it}$	Intellectual capital	5.929	5.521	-13.119	44.384
$Blnd_{it}$	Board independence	0.732	0.172	0.000	1.000
$Bsize_{it}$	Board size	5.059	0.338	5.000	7.000
$CEO.Change_{it}$	CEO change	0.288	0.453	0.000	1.000
$CEO.Share_{it}$	CEO ownership	0.215	0.288	0.000	0.954
MTB_{it}	Book value to market equity of the firm	0.376	0.311	-3.286	1.906
$GCEO_{it}$	CEO gender	0.953	0.211	0.000	1.000
$Return_{it}$	Stock return	0.599	1.264	-0.663	9.234
$Loss_{it}$	Dummy variable of loss	0.126	0.332	0.000	1.000
$Size_{it}$	Firm size	14.200	1.518	10.533	19.150
LEV_{it}	Financial leverage	0.602	0.227	0.090	2.315
ROA_{it}	Return on assets	0.256	0.942	-16.846	0.631
ROE_{it}	Return on equity	0.256	0.942	-16.846	6.888
$Gross.Sale_{it}$	Sales growth	0.208	0.545	-0.845	7.705
Age_{it}	Firm age	38.031	12.806	10.000	65.000

Resource: the database of the study

Table 3. Descriptive statistics for Iraqi data

Sign	Variable	Total mean	Std. dev.	Min	Max
$VAIC_{it}$	Intellectual capital	5.974	15.266	-42.511	160.984
$Blnd_{it}$	Board independence	0.127	0.204	0.000	0.857
$Bsize_{it}$	Board size	8.428	3.288	5.000	21.000
$CEO.Change_{it}$	CEO change	0.632	0.483	0.000	1.000
$CEO.Share_{it}$	CEO ownership	1.828	23.052	0.000	304.136
MTB_{it}	Book value to market equity of the firm	0.661	1.154	-1.632	9.811
$GCEO_{it}$	CEO gender	0.926	0.263	0.000	1.000
$Return_{it}$	Stock return	-0.164	2.999	-13.394	18.883
$Loss_{it}$	Dummy variable of loss	0.365	0.483	0.000	1.000
$Size_{it}$	Firm size	22.375	1.312	19.256	26.298
LEV_{it}	Financial leverage	0.432	0.608	0.003	4.069
ROA_{it}	Return on assets	-0.039	0.318	-3.182	0.338
ROE_{it}	Return on equity	-0.171	3.024	-38.674	2.786
$Gross.Sale_{it}$	Sales growth	3.133	35.082	-5.506	459.783
Age_{it}	Firm age	31.457	13.314	11.000	70.000

4.2. The Results of the Unit root Test of Variables

By analysing the unit root for the Iranian data, all variables are mostly at no unit root level (stationary). The obtained LM statistic for each variable is reported in Table 3-4. Only the variables of $VAIC_{it}$, SCE_{it}, $Return_{it}$, AGE_{it} are at the unit root level.

The obtained LM statistic for the unit root test of this variable rejects the null hypothesis concerning the absence of unit root at 99% probability level for $VAIC_{it}$, SCE_{it}, and AGE_{it} with 90% probability for the variable of $Return_{it}$. With one-time differentiation, the variables of $Return_{it}$ and AGE_{it} have no unit root. Moreover, the second-time distinction of the variables of $VAIC_{it}$ and SCE_{it} is also with no unit root.

All variables are mostly at no unit root level (stationary). The obtained LM statistic for each variable is reported in Table 4. Only the variables of SCE_{it}, CCE_{it}, $GCEO_{it}$, and Age_{it} are at the unit root level. The obtained LM statistic for this variable's unit root test rejects the null hypothesis concerning the absence of unit root at a 99% probability level. With one-time differentiation, the variables of $GCEO_{it}$ and AGE_{it} have no unit root. Moreover, the second-time distinction of the variables of CCE_{it} and SCE_{it} is also with no unit root.

Table 4. The results of the Hadri unit root test for the Iranian data

Variable	Level	First-order differentiation	Second-order differentiation	Variable	Level	First-order differentiation
$VAIC_{it}$	0.000	0.045	1.000	$GCEO_{it}$	0.996	
ROE_{it}	0.999			$Return_{it}$	0.803	0.999
$Gross.Sale_{it}$	0.953		0.999	$Loss_{it}$	0.915	
Age_{it}	0.000	0.425		$Size_{it}$	0.591	
$Blnd_{it}$	0.999			LEV_{it}	0.731	
$Bsize_{it}$	0.929			ROA_{it}	0.982	
$CEO.Change_{it}$	0.999			$CEO.Share_{it}$	0.853	
MTB_{it}	0.669					

Note: the null hypothesis is the absence of a unit root in variables. LM statistic is reported. ***, **, and * show the significance level at 99, 95, and 90%.

4.3. Inferential Statistics

Table 6 depicts the model results (1) estimation of Iranian and Iraqi firms' data. The first column of this table shows the name of contributing variables to the above dependent variables.

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Table 5. The results of the Hadari unit root test for the Iraqi data

Variable	Level	First-order differentiation	Second-order differentiation	Variable	Level	First-order differentiation
$VAIC_{it}$	0.995			$GCEO_{it}$	0.009	0.866
ROE_{it}	0.321			$Return_{it}$	0.997	
$Gross.Sale_{it}$	0.755		0.988	$Loss_{it}$	0.540	
Age_{it}	0.000	0.315	0.849	$Size_{it}$	0.278	
$Blnd_{it}$	0.461			LEV_{it}	0.598	
$Bsize_{it}$	0.293			ROA_{it}	0.528	
$CEO.Change_{it}$	0.887			$CEO.Share_{it}$	0.779	
MTB_{it}	0.994					

Note: the null hypothesis is the absence of a unit root in variables. LM statistic is reported. ***, **, and * show the significance level at 99, 95, and 90%.

Table 6: The results of model estimation for Iranian firms

Variable	Model (1) for the Iranian firms Coefficient (Standard error)	Model (1) for the Iraqi firms Coefficient (Standard error)
Constant	-51.550*** (17.239)	-7.444* (4.154)
BIndit	2.198*** (0.829)	-3.583** (1.416)
Bsizeit	-2.220** (1.246)	0.124** (0.066)
CEO Changeit	0.668* (0.472)	0.248 (0.395)
CEO_shareit	-1.279* (0.998)	-0.298* (0.216)
MTBit	-7.241*** (0.699)	-0.203 (0.218)
GCEOit	-0.639 (2.102)	-0.457 (0.454)
Returnit	-0.682*** (0.286)	0.093* (0.069)
Lossit	-1.102* (0.643)	-0.978** (0.492)
Sizeit	4.938*** (1.387)	0.522** (0.197)
LEVit	4.606*** (1.440)	-0.041 (0.260)
ROAit	8.178*** (2.706)	0.562 (0.485)
ROEit	0.626** (0.313)	0.011 (0.009)
Growth Salesit	0.344* (0.198)	0.012*** (0.001)
Ageit	-0.083 (0.242)	-0.056*** (0.021)
Adj. R-squared	0.2936	0.5095

Note: ***, **, and * show the significance level at 99, 95, and 90%. Resource: research findings

As can be seen in the table, the results of the robust model estimation are reported. In these models, panel data and four classic econometrics hypotheses are evaluated, and reliable results will be reported. These four hypotheses include collinearity among variables, exogeneity of descriptive variables, the variance of homogeneity, and the absence of serial autocorrelation among the disruptive components.

Given the applied regressions, the intercept of the Iranian firms is significant for all models. This model's intercept for Iranian and Iraqi firms is -51.5500 and 14.1920, respectively, significant at the 99% level.

Given the model estimation for Iranian and Iraqi firms, the effect of board independence (Blnd) on intellectual capital is positive for the Iranian data at a 95% confidence level. In contrast, the impact of board independence on intellectual capital is negative for Iraqi data at a 95% confidence level. By a 1% increase in board independence, the Iranian firms' intellectual capital increased by 2.1985%, and the intellectual capital of Iraqi firms decreased by -3.5828%.

The board size (Bsize) causes the decrease of intellectual capital in Iran and its increase in Iraq. For example, by a 1 % increase of Bsize variable, intellectual capital decreased at the 95% level for the Iranian firms by -2.2205% and increased by 0.1242% at the 95 % level for the Iraqi firms.

CEO change (CEO change) would increase Iran's intellectual capital but not affect the Iraqi firms. The coefficient of this variable in the model for Iran and Iraq is 0.6684 and 0.2479, respectively.

CEO gender (GCEO) does not affect Iranian and Iraqi firms' intellectual capital because its p-value for the Iranian and Iraqi firms is more than 5%, which shows no significant relationship between this variable and intellectual capital in both countries.

5. Conclusion

The present study is concerned about board independence, the board size, CEO gender, CEO change, CEO ownership, and companies' intellectual capital on the Stock Exchange in Iran and Iraq. The hypothesis testing results revealed a significant relationship between board independence and intellectual capital in companies listed in Iran and Iraq. This relationship is positive for Iranian firms. Still, it is negative and significant for the Iraqi firms. The results of the present study are in line with that of the Ku Ismail and Al-musalli (2012) declare that there is a significant and negative relationship between board independence and intellectual capital in Iraq and in contrast with that of the Attarita Dampitakseb and Panmanee (2017) who show that there is no relationship between board independence and intellectual capital. The reason for such a difference can be the economic status and dominant atmosphere in both countries.

Moreover, this study demonstrates that board size lowers the intellectual capital in Iran and increases Iraq. This means that by a 1 % increase of the variable, the intellectual capital will decrease for the Iranian and Iraqi firms, which are in line with the findings of Ku Ismail and Al-musalli (2012), who suggest that there is a negative and significant relationship between board size and intellectual capital and is in contrast with that of the Oba, Ibikunle and Damagum (2013), state that there is no relationship between board size and intellectual capital. On the other hand, the present study also analyses the relationship between CEO change and intellectual capital, showing no relationship between CEO change and intellectual capital efficiency in both countries. This means that CEO change does not contribute to the amount of intellectual capital in both countries. These results are in contrast with that of Ku Ismail, Abu Bakar and Al-Musalli (2016), who posit that there is a positive and significant relationship between CEO ownership and intellectual capital and are in line with that of Ku Ismail and Al-musalli (2012) and Oba, Ibikunle and Damagum.

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(2013) who declare that there is no relationship between these factors.

Finally, it is worth mentioning that this paper is about the relationship between CEO gender and intellectual capital. The hypothesis testing results show that CEO gender (GCEO) or the CEO's masculinity has no impact on both countries' intellectual capital efficiency. This finding is in contrast with the results of Ku Ismail, Abu Bakar and Al-Musalli (2016), Safieddine, Jamali and Noureddin (2009), who states that there is a significant relationship between CEO gender and intellectual capital and is in conformity with that of the Ku Ismail and Al-musalli (2012), who assert that there is no relationship between CEO gender and intellectual capital. Further, some variables, including CEO duality, financial expertise, and board and CEO industry, the data of which were not available in Iraq; we were obliged to omit them from the research model.

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