THE EFFECT OF INTELLECTUAL CAPITAL ON CORPORATE PERFORMANCE

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Abstract

The primary goal of this study is to investigate the relationship between intellectual capital and corporate performance by focusing on the characteristics of board members. For this purpose, the diversity in the educational background, and the education level of board members, were utilized as indicators of intellectual capital, while gender diversity was also used as a characteristic of members on the board of directors.

The study population consisted of companies listed on the Tehran Stock Exchange in the period from 2011 to 2017. The research method was descriptive-correlational and the relationship between research variables was explained using regression models based on the panel data.

The findings suggested that the intellectual capital of the board of directors in companies listed on the Tehran Stock Exchange did not have any effect on their performance in practice. Therefore, according to the results of the study, managers should be appointed irrespective of their gender, because gender diversity has no effect on the performance of companies competing in Iran business environment.

Keywords: Intellectual capital, characteristics of board of directors, corporate performance.

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1. INTRODUCTION

Today, companies continue to survive in an environment characterized by the tough competition triggered by globalization, and the emergence of new information and communication technologies. Additionally, having many other rivals requires companies to have high competitiveness; this is the golden rule of globalization. To obtain such a characteristic, a combination of tangible, and intangible resources such as intellectual capital, are required (Bchini, 2015; Massingham and Tam, 2015). Two critical academic concepts that demonstrate the importance of knowledge in an organization are intellectual capital and knowledge management (Kianto et al., 2014). The former refers to intangible resources such as human capital, structural capital, and relational capital that create value for an organization (Spender et al., 2013). The latter, however, deals with processes related to the knowledge and management of operations in the organization (Hessig, 2010). Today, companies operating in knowledge-based industries have recognized the intensity of knowledge and innovation as key factors of competitiveness in this sphere. Unlike traditional industries, knowledge-based industries do not rely on traditional production factors to achieve profitability, but rather they generate profits by investing in intangible assets (Hsiung & Wang, 2012). The intellectual capital is often perceived to be made up of three dimensions, namely, human capital, structural capital, and relational capital (Díaz-Fernández et al., 2015). Human capital refers to the stock of implicit knowledge in an organization, including individuals' skills, experience, as well as the behavior of employees, and the capacity for innovation and learning (Beattie & Smith, 2010). In this regard, human capital is perceived as the heart and soul of the organization (Chang and Hsier, 2011). Human capital can be defined as a company's potential for success in relation to its workforce, the ability of individual workers, and the capacity of employees (Gamerschlag & Möller, 2011). An organization loses its human capital when people decide to leave the organization (Cézanne & Saglietto, 2014). Structural capital refers to systems and instruments that ensure the circulation of knowledge in an organization, as well as the tangible and intangible assets created by the organization (such as inventions and acknowledgments), along with the processes, infrastructure, etc. (Cruzasso et al., 2010; Salehi et al., 2014a). Structural capital, unlike human capital, remains intact as individuals leave the organization. In fact, structural capital is the outcome of the past performance of human capital (Al-Musali & Ku Ismail, 2015). The relational capital includes all resources that are related to an organization's external relations, such as relations with customers and business partners (Bchini, 2015). In addition to the above three

dimensions (human capital, structural capital, and relational capital), some other dimensions have recently been proposed as part of intellectual capital, including renewable capital (Kedmenec & Oreški, 2015), trust capital (Cesaroni et al., 2015), and entrepreneurial capital (Rose, 2016). Renewable capital encompasses creative solutions, products and services. Trust capital signifies the trust entrenched in the internal and external relations of an organization, and entrepreneurial capital refers to the competencies and obligations associated with entrepreneurial activities in an organization (Kianto et al., 2014). According to the above mentioned points, the purpose of this study is to investigate how intellectual capital affects a company's performance by emphasizing the role of the characteristics of the board of directors. Therefore, the primary question of the study is as follows: "Does intellectual capital affect performance of companies listed on the Tehran Stock Exchange with reference to the mediating role of the characteristics of the board of directors?"

2. REVIEW OF LITERATURE AND HYPOTHESES DEVELOPMENT

2.1. Relationship Between Educational Background and Corporate Performance

Intangible assets are a collection of non-material resources that are put to use in the production process and are essential for the design and sale of new products. These assets can include in-house properties, such as internal plans and software, and also external assets such as patents and technology licenses (Arrighetti et al., 2014). The effect of intellectual capital on a company' performance is in line with the resource-based theory. According to this theory, for a company to achieve superb performance, its resources, including both tangible and intangible assets, need to be identified and managed (Lewika, 2011).

Educational background has the potential to influence the knowledge, attitude, and vision of team members involved in the implementation of a task. Educational background can also be directly related to the background knowledge of team members. Furthermore, educational background may be useful to the overall team performance, for diversity in educational background contributes to the diversification of the team members, and thus more knowledge associated with the team's main task will be at the disposal of team members. Since academic background broadens the horizon of work-related attitudes, it can be argued that educational background is of paramount importance (Bell et al., 2011; Beattie and Smith, 2013).

Ma & Guo (2010) found that the heterogeneity of management team members in terms of tenure, education, and field of expertise, has a significant effect on innovation performance. A study by Bell et al. (2011) suggested that diversity of

work experience was weakly related to team performance. Also, the diversity of educational background was significantly correlated with the performance of a senior management team. According to the findings of Faems & Subramanian (2013), diversity in educational background had a significant effect on the function and performance of the companies studied. Huang (2013) revealed that a CEO's educational background had a significant effect on their company's performance in terms of social responsibility. Garnero et al. (2014) found that the diversity of the educational background of a workforce had a direct and positive impact on the company's productivity. Díaz-Fernández et al. (2015) investigated the effect of the intellectual capital of the senior executive team on corporate performance, reporting that the diversity of the senior executives' educational background had a significant and positive effect on the function of these companies (based on the return on assets (ROA)). Li (2016) reported that heterogeneity in the work experience of management team members had a positive effect on innovation function. The study of Yoon et al. (2016) revealed that the diversity of the senior management's educational background did not have a significant effect on the organizational creativity of Korean companies. However, the diversity of work experience and age diversity were significantly related to organizational creativity. In a similar study, Ooi et al. (2015) showed that

educational background and corporate performance were not significantly related.

H₁: There is a relationship between educational background diversity and corporate performance.

2.2. Relationship Between the Level of Education and Corporate Performance

In regard to the board of directors' intellectual capital, the key question is whether the diversity of the board of directors, especially in terms of the level of education, improves corporate performance (Rose, 2007; Salehi et al., 2014b). Theoretically, it is contended that intellectual capital management requires greater innovation, perception and flexibility in the decision making process, and these features are more likely to be seen in a board of directors with greater diversity (Al-Musali & Ku Ismail, 2015). Knowledge is recognized as one of the fundamental assets of any organization in achieving a competitive advantage. It is vital for a company to maintain its knowledge at a level that increases its productivity (Jarniou, 2014). The level of education often refers to the highest academic level achieved by individuals. While, the level of education is considered as a diversity variable, having members with various degrees does not necessarily ensure the broad horizons required to improve performance. It is expected that teams whose members have a higher level of education, outperform

teams with a lower level of education. Assuming that team members' level of education reflects work-related knowledge, a team should seek to recruit people with high qualifications and educational level (rather than diversifying the level of education) to enhance its work-related knowledge (Bell et al., 2011).

In the study of Manner (2010), it was found that companies in which the CEO had a bachelor degree in Human Sciences or executives were highly experienced had a positive social function. Li and Shi (2010) reported a positive relationship between the degree of managerial education and innovation function. Boerner et al. (2011) showed that the diversity of educational background had a significant and positive effect on the corporate performance. Magoutas et al. (2011) suggested that the employees' level of education had a major effect on the performance of Greek companies. In the study of Wellalage & Locke (2013), it was found that, although age and racial diversity had a positive impact on the financial performance of companies, diversity in educational levels tended to deteriorate the company's performance. Kim and Rasheed (2014) exhibited that the variety of work-related components (e.g. tenure and work experience) improved the corporate performance. Francis et al. (2015) revealed that the presence of directors with academic background in the board of directors would improve corporate performance. Chen and Liang (2016) demonstrated that knowledge diversity had a positive

and significant effect on corporate performance. Subramanian et al. (2016) reported that when engineers of a company were homogenous in terms of the level of education, the company's performance was improved. However, with heterogeneous level of education, the innovation performance declined. The study of Al-Musali & Ku Ismail (2012) indicated that the diversity of education level did not have a significant effect on the intellectual capital performance of banks active in the Gulf Cooperation Council.

H2: There is a relationship between the level of education and the corporate performance.

2.3. Relationship Between Gender Diversity, Educational Background and Corporate Performance

The board diversity refers to various combinations of characteristics, attributes and skills of each board member in relation to the decision-making process. In a broad sense, different types of diversity that may be seen among board members include age, gender, race, culture, religion, professional backgrounds, knowledge, technical skills, business and industrial background, and work experience. In this paper, gender diversity (Gendiv) of board members has been treated as a feature of the board of directors (Walt & Ingley, 2003; Alison et al., 2015).

Buyl et al. (2011) investigated the effect of the CEO's expertise and background features, on the relationship between functional

diversity and corporate performance. Arguing that characteristics of a CEO have a sway over the sharing of distributed knowledge among the members of the executive team, it is contended that a CEO's characteristics would affect the relationship between functional diversity and corporate performance. Based on the results of this research, the characteristics of a CEO have an effect on this relationship. In the study of Faems & Subramanian (2012), it was shown that the interplay of gender diversity and educational background diversity, influenced the technological performance of Singaporean companies.

H₃: Gender diversity of board members affects the relationship between educational background diversity and corporate performance.

2.4. Relationship Between Gender Diversity, Education Level and Corporate Performance

Buengeler et al. (2013) examined the effect of leadership style on the relationship between education level diversity and the performance of an executive team. In this study, the interaction of two types of leadership, namely cooperative and directive leadership, in this relationship were explored. The findings suggested that when cooperative and directive leadership were dominant, the link between education level diversity and performance was especially positive. Julizaerma and Zulkarnain (2012) examined the association between gender diversity in the board of directors and firm performance. They articulate a positive association between gender diversity and firm performance. This suggests that directorship of women may influence firm performance. Alexa et al. (2016) found that firms with greater gender diversity in their top management teams show lower risk and deliver better performance. Moez et al., (2018) suggest that female directorship significantly increases ROA and ROE, and significantly decreases Tobin's Q. Having collected a set of nine different attributes of female directors, capturing their monitoring capabilities and contribution to the board's human capital (demographic and board relational attributes), it was found that the only relationship which could be eliminated was the negative relationship between Tobin's Q and female directorship. Ahmadi et al.'s (2019) results showed a significant relationship between gender diversity of board members and a firm's performance. Joana et al. (2016) examined whether board gender diversity has a positive effect on firm performance, but found no significant association in this regard. Accordingly, the theoretical background argues that gender diversity may play an indicative role in a firms' performance improvement. Therefore, the following hypothesis is conducted in this sense.

H₄: Gender diversity of board members affects the relationship between the level of education and the corporate performance.

2.5. Relationship Between Gender Diversity and Performance

The characteristics of the board of directors have been utilized in a diverse sense in a variety of sources. As far as the characteristics of the board of directors are concerned, concepts such as the number of board members, dichotomy of the role of the CEO, and independence of board of directors, are commonly proposed (Moradi and Salehi, 2012, Fuladi & Shukor, 2012 and Pham et al., 2015). In other studies, however, the characteristics of the board of directors often denote demographic features (Carter et al., 2010, Bear et al., 2010; and Díaz-Fernández et al., 2015, Schwab et al., 2016, Ming and Em, 2016). In this research, the same approach has been adopted. The agency theory points out that as a result of opportunistic behaviors, each individual intends to maximize their interests (Fooladi & Shukor, 2012). This conflict of interest comes from the fact that shareholders hire managers for investment activities, which often result in an information asymmetry, as managers enjoy an information advantage over non-corporate shareholders (Zubaidah et al., 2009). The agency theory is connected to two key issues: (1) the effect of board composition on organizational performance and (2) the impact of the board structure (such as the CEO's dichotomy) on organizational performance (Walt & Ingley, 2003). From the perspective of agency theory, the importance of corporate governance is related to mitigating the agency problem between executives and shareholders. In other words, corporate governance is a mechanism for aligning the goals of management and shareholders (Fooladi & Shukor, 2012). The board of directors is almost the most important internal governance mechanism for controlling and monitoring managers, to hamper any opportunistic behaviors (Rose, 2007). In most studies, the supervisory and controlling role of the board of directors has been stressed, but another key role of the board is providing resources for the company (Miller & del Carmen Triana, 2009).

Despite all of the aforementioned issues regarding how board diversity can improve corporate performance, some findings suggest that these two are not directly interrelated. For example, Dimovski & Brooks (2006) did not find any direct link between gender diversity of the board members and corporate performance. This has led many researchers to examine the role of mediators that may affect the relationship between board diversity and corporate performance (Miller & del Carmen Triana, 2010). According to Miller & del Carmen Triana (2009), racial diversity can influence corporate performance via the two variables of reputation and innovation. Of course, that distinction between mediator and moderator variables, should be taken into account. The former refers to a variable through which the independent variable affects the dependent variable, but the latter represents a variable which affects the

relationship between independent and dependent variables. For example, Carter et al. (2010) showed that the performance of US companies was not significantly related to the gender and ethnicity of the board of directors. The study of Bohdanowicz (2011) exhibited that the gender diversity of board members did not have a significant effect on the financial performance of Polish companies. It should be noted that in this research, the two indicators of return on assets (ROA) and equity returns were used to assess financial performance. Vintila & Gherghina (2012) indicated that the dichotomy of the CEO's role, his/her residence, and entrepreneurial position did not have a major effect on corporate performance. Nevertheless, the CEO's age had a negative effect on the price-to-profit ratio. Additionally, the CEO's tenure period was found to be positively correlated with the return of equity and the price-profit ratio. McGuinness et al. (2017) reported that with greater gender balance among the members of the management team, the social performance of the respective companies was improved. This positive effect was especially reinforced when a female CEO was involved. Wu and Li (2017) confirmed the positive effect of selecting female executives on the performance of Chinese companies, especially in creative industries.

H_5: There is a relationship between the board of directors' characteristics and corporate performance.

3. RESEARCH METHOD

This was an applied research that adopted a descriptive-correlational design to pursue its goals. The data were all quantitative in nature and the statistical population consisted of all companies listed on the Tehran Stock Exchange during the period of 2011-2017. In this research, a systematic deletion method was used to determine the sample size based on the following criteria:

1. The firm was listed on the Tehran Stock Exchange before 2011.
2. The fiscal year of the firm ends in March.
3. All required information has been provided by the firm to determine research variables.
4. During the research period, there has not been any change in the fiscal year.
5. All investment firms, banks and insurance companies were excluded.

According to the above criteria, 100 companies were included in the final sample, the names of which are given in the attachment.

3.1. The Model and Definition of the Research Variables

The study variables comprised four groups of dependent, independent, moderator and control variables.

Corporate performance: In this research, consistent with the study of Díaz-Fernández et al. (2015), return on assets (ROA) was used to measure

the performance of sample companies. This variable is defined as the ratio of net profit to total assets. Some researchers, such as Carter et al. (2010) and Julie Saerma and Surrey (2012) have employed this variable in their studies.

The two variables of the "characteristics of the board of directors" and the "intellectual capital of the board of directors" functioned both as independent and moderator variables. The following variables were used to measure the intellectual capital of the board of directors in accordance with Díaz-Fernández et al. (2015):

1. Educational background diversity (Edubackdiv): To assess the diversity in the educational background of board members, the following equation was used:

$$Edubackdiv = 1 - \sum_i P_i^2$$

Where P_i is the ratio of board members who are in the i*th* group. To measure such a variable, the main measure is education in a field of study related to the main activity of the company of interest. Given that, "the Iranian guideline for the classification of educational levels and academic degrees" is used. The variable of Edubackdiv is always between 0 and 1 and values higher than this domain are indicative of higher educational background diversity.

2. Education Level Diversity (Edulevdiv): To assess the diversity in the level of education of board members, the following equation was used:

$$Edulevdiv = 1 - \sum_i Q_i^2$$

Where Q_i is the ratio of board members who hold an academic degree including "diploma and lower", "associate degree", "bachelor's degree", "master's degree", and "doctorate or higher". The Edulevdiv variable was always between zero and one, with larger values indicating greater variation in the level of education.

In this research, the gender of board members was used as the only demographic characteristic of members of the board of directors, by virtue of avoidance of suffering from multicollinearity issues. The conventional wisdom argues that having two or more characteristics from a single source of data may provide such an issue. In this case, using the previous equation, gender diversity (Gendiv) in the board of directors of the sample firms was calculated.

To eliminate the effect of other variables that may affect the relationship between independent, dependent and moderating variables, the following variables were controlled:

☐ Firm size (Sizefirm): The natural logarithm of total sales

☐ Firm age (Agefirm): The difference between year of establishment and the present year

☐ Board size: Number of board members

To test the research hypotheses, a regression model was used as follows:

H$_1$ model:

$$ROA = a_0 + b_1Edubackdiv + b_2Sizefirm$$
$$+ b_3Agefirm + b_4Sizeboard + e$$

The regression coefficient in this model is b$_1$. If the coefficient is significant, the main hypothesis (H$_1$) regarding a significant relationship between educational background diversity and corporate performance is confirmed.

H$_2$ model

$$ROA = a_0 + b_1Edulevdiv + b_2Sizefirm$$
$$+ b_3Agefirm + b_4Sizeboard + e$$

The regression coefficient used in this model is b$_1$. If this coefficient is significant, the main hypothesis (H2) regarding the significance of the relationship between the level of education and corporate performance is confirmed.

H$_3$ model

$$ROA = a_0 + b_1Edubackdiv + b_2Gendiv$$
$$+ b_3Edubackdiv \times Gendiv$$
$$+ b_4Sizefirm + b_5Agefirm$$
$$+ b_6Sizeboard + e$$

The regression coefficient in this model is b$_3$. If the coefficient is significant, the main hypothesis (H3) regarding the impact of gender diversity on the relationship between educational background diversity and corporate performance is confirmed.

H$_4$ model

$$ROA = a_0 + b_1Edulevdiv + b_2Gendiv$$
$$+ b_3Edulevdiv \times Gendiv$$
$$+ b_4Sizefirm + b_5Agefirm$$
$$+ b_6Sizeboard + e$$

The regression coefficient in this model is b$_3$. If this coefficient is significant, the main hypothesis (H4) regarding the effect of gender diversity on the relationship between the level of education and corporate performance is approved.

H$_5$ model

$$ROA = a_0 + b_1Gendiv$$
$$+ b_2Sizefirm + b_3Agefirm$$
$$+ b_4Sizeboard + e$$

The regression coefficient in this model is b$_1$. If this coefficient is significant, the main hypothesis (H5) concerning the significance of the relationship between gender diversity and corporate performance is verified.

3.2. Hypothesis Testing

Given the analysis of companies listed on the Tehran Stock Exchange (as sample firms) over a 7-year period, panel data were used. Considering the time correlation of the panel data,

special methods were employed for modeling. The three commonly used models are: equal effects, fixed effects, and random effects. To decide which of these methods to adopt, Hausman and Limmer tests were utilized. Additionally, to assess the assumptions of the regression model, the Shapiro-Wilk test and correlation coefficient were used to examine the normality of the dependent variables and linearity of explanatory variables, respectively. For data analysis and testing of the research hypotheses, the powerful R-software was used.

4. RESEARCH FINDINGS

4.1. Descriptive Statistics

Table 1 shows the results of all descriptive statics of the variables. According to the reported results during the terms of the research, the sales growth of the sample companies was 0.112 on average with a standard deviation of 0.15. The amount of return on the investment of the companies under investigation therefore did not improve greatly. Among the board members of the

Table 1. Descriptive statistic of variables

Variable	Symbol	Min	Median	Mean	Max	SD
Return on investment	ROA	-0.451	0.110	0.112	0.622	0.150
Educational background diversity	Edubackdiv	0.000	0.480	0.480	0.800	0.174
Educational level diversity	Edulevdiv	0.000	0.480	0.460	0.720	0.158
Gender diversity	Genderdiv	0.000	0.000	0.035	0.480	0.105
Firm size	Sizefirm	9.620	13.580	13.750	19.720	1.708
Firm age	Agefirm	8.000	38.000	36.200	69.000	13.947
Board size	Sizeboard	3.000	5.000	5.080	8.000	0.437

sample companies, educational background (Edubackdiv) and education level (Edulevdiv) were not that divergent, such that the highest educational level diversity reported among the sample year-companies was 0.720 and the highest education background diversity was equal to 0.800. This occurs while the average amount of educational background/level diversity among the board members of companies under the study were 0.480 and 0.460, respectively. Moreover, the results of gender diversity, had an average amount of 0.035 and standard deviation of 0.105, revealing that the sample under study does not have that much gender diversity. According to the results of the firm size and firm

age, it is understood that the smallest firm is 9.620 and the largest is 19.720 with a standard deviation of 1.708, while the oldest company in the sample is 69 years old. Regarding board size numbers, the smallest board among the companies under study has only 3 members, while the largest, belonging to the Shiraz Petrochemical Company had 8 members during 2014-2016. On average, the number of board members of the sample companies was 5. 080 people with a standard deviation of 0.437 people.

The results of testing of the first hypothesis using the fixed effects method are reported in Table 2.

Table 2: Results of testing the first hypothesis

$ROA = a_0 + b_1 Edubackdiv + b_2 Sizefirm + b_3 Agefirm + b_4 Sizeboard + e$				
Explanatory variable	**Symbol**	**Regression coefficient**	**t statistics**	**Sig.**
Educational background diversity	Edubackdiv	0.068	0.330	0.740
Firm size	Sizefirm	0.692	11.250	0.000
Firm age	Agefirm	-0.108	-6.830	0.000
Board size	Sizeboard	0.143	1.110	0.270
Determination coefficient (R^2)		0.208		
F statistics		32.600		
Level of significance F		0.000		
Durbin–Watson statistic		1.641		

Based on the results of Table 2, the estimated regression coefficient of educational background diversity was 0.068. Given the sign of the obtained coefficient of regression, it can be concluded that educational background diversity has a positive effect on ROA (t = 0.330, Sig.> 0.05). Among the control variables in the model, the two variables of firm size and firm age were significantly related to ROA (Sig. <0.05). However, the relationship between board size and ROA was not significant (t = 1.110, Sig.> 0.05). According to the statistics, the model implies that explanatory variables in the model explained about 21% of variance in the dependent variable (R2 = 20.8%) and the estimated model was generally significant (F = 32.600, Sig. <0.05). On the other hand, the Durbin–Watson statistic did not show any serial correlation between the estimated model remainders (1.5 <DW <2.5).

The results of the testing of the second hypothesis using fixed effects method are reported in Table 3.

According to the results of Table 3, the estimated regression coefficient of the diversity of educational level was -22.33. Given the sign of the obtained coefficient of regression, it can be concluded that diversity in educational level has a negative impact on ROA (t = -1.091, Sig.>0.05).

Table 3: Results of testing the second hypothesis

$ROA = a_0 + b_1 Edulevdiv + b_2 Sizefirm + b_3 Agefirm + b_4 Sizeboard + e$				
Explanatory variable	**Symbol**	**Regression coefficient**	**t statistics**	**Sig.**
Educational background diversity	Edubackdiv	-0.223	-1.091	0.276
Firm size	Sizefirm	0.692	11.31	0.000
Firm age	Agefirm	-0.108	-6.884	0.000
Board size	Sizeboard	0.137	1.069	0.286
Determination coefficient (R^2)		0.210		
F statistics		32.941		
Level of significance F		0.000		
Durbin–Watson statistic (DW)		1.640		

Among the control variables in the model, the two variables of firm size and firm age were significantly correlated with ROA (Sig. <0.05).

However, the relationship between board size and ROA was not significant (t = 1.069, Sig.> 0.05). Based on the statistics, the model implies that the explanatory variables were able to explain 21% of variance in the dependent variable of the model ($R^2 = 21\%$) and the estimated model was generally significant (F = 32.941, Sig. <0.05). On the other hand, the Durbin-Watson statistics did not reveal any serial correlation between the estimated model remainders (1.5 <DW <2.5).

The results of testing on the third hypothesis using the fixed effects method are reported in Table 4.

Table 4: Results of testing the third hypothesis

$ROA = a_0 + b_1 Edubackdiv + b_2 Gendiv + b_3 Edubackdiv \times Gendiv + b_4 Sizefirm + b_5 Agefirm + b_6 Sizeboard + e$				
Explanatory variable	**Symbol**	**Regression coefficient**	**t statistics**	Sig.
Educational background diversity	Edubackdiv	-0.046	-0.219	0.826
Firm size	Sizefirm	-1.394	-0.957	0.339
Firm age	Agefirm	3.989	1.570	0.117
Board size	Sizeboard	0.699	11.304	0.000
Determination coefficient (R^2)	0.218			
F statistics	22.923			
Level of significance F	0.000			
Durbin–Watson statistic (DW)	1.625			

According to the results of Table 4, the estimated regression coefficient for gender diversity was 3.989. Given the sign of the obtained regression coefficient, it can be concluded that gender diversity has a positive effect on the relationship between the diversity of educational level and ROA (t = 1.570, Sig.> 0.05). Among the control variables in the model, the two variables of firm size and firm age were significantly related to ROA (Sig. <0.05). However, the relationship between board size and ROA was not significant (t = 1.157, Sig.> 0.05). Based on the model statistics, it is concluded that the explanatory variables of the model explain about 22% of the variance in the dependent variable (R^2 = 21.8%) and the estimated model was generally significant (F = 22.923, Sig. <0.05). Durbin-Watson statistics, on the other hand, suggested that there was no serial correlation between the estimated model remainders (1.5 <DW <2.5).

The results of testing on the fourth hypothesis using the fixed effects are reported in Table 5.

Table 5: Results of testing the fourth hypothesis

$ROA = a_0 + b_1 Edulevdiv + b_2 Gendiv + b_3 Edulevdiv \times Gendiv + b_4 Sizefirm + b_5 Agefirm + b_6 Sizeboard + e$				
Explanatory variable	Symbol	Regression coefficient	t statistics	Sig.
Educational background diversity	Edubackdiv	-0.161	-0.746	0.456
Firm size	Sizefirm	1.340	1.641	0.101
Firm age	Agefirm	-1.204	-0.774	0.439
Board size	Sizeboard	0.704	11.484	0.000
Determination coefficient (R^2)		0.217		
F statistics		22.766		
Level of significance F		0.000		
Durbin–Watson statistic (DW)		1.633		

Based on the results as shown in Table 5, the estimated regression coefficient of gender diversity was -1.240. Considering the sign of the obtained regression coefficient, it is concluded that gender diversity had a reverse effect on the relationship between the level of education and ROA (t = -7.774, Sig.> 0.05). Among the control variables in the model, the two variables of firm size and firm age were significantly correlated with ROA (Sig. <0.05). However, the relationship between board size and ROA was not significant (t = 1.084, Sig.> 0.05). According to the

statistics, the model suggests that the explanatory variables of the model accounted for approximately 22% of the variance in the dependent variable ($R2 = 21.7\%$) and the model was generally significant (F = 22.766, Sig. <0.05). On the other hand, the Durbin-Watson statistics did not reveal any serial correlation between the estimated model remainders (1.5 <DW <2.5).

The results of testing on the fifth hypothesis using the fixed effects method are reported in Table 6.

Table 6: Results of testing the fifth hypothesis

$ROA = a_0 + b_1 Gendiv + b_2 Sizefirm + b_3 Agefirm + b_4 Sizeboard + e$				
Explanatory variable	Symbol	Regression coefficient	t statistics	Sig.
Educational background diversity	Edubackdiv	0.802	1.921	0.055
Firm size	Sizefirm	0.706	11.524	0.000
Firm age	Agefirm	-0.111	-7.061	0.000
Board size	Sizeboard	0.145	1.139	0.255
Determination coefficient (R^2)		0.214		
F statistics		33.729		
Level of significance F		0.000		
Durbin–Watson statistic (DW)		1.629		

According to the results shown in Table 6, the estimated regression coefficient of gender diversity was 0.802. Given the sign of the obtained regression coefficient, it is concluded that gender diversity directly affects corporate performance (t = 1.921, Sig. <0.1). Among the control variables, the two variables of firm size and firm age were significantly correlated with ROA (Sig. <0.05). However, the relationship between board size and firm growth was not significant (t = 1.139, Sig.> 0.05). According to the statistics, the model suggests that the explanatory variables of the model accounted for approximately 21% of the variance in the dependent variable (R2 = 21.4%) and the estimated model was generally significant (F= 33.729, Sig. < 0.05). Durbin-Watson statistics, on the other hand, did not show any serial correlation between the estimated remainders (1.5 <DW <2.5).

5. CONCLUSION AND REMARKS

The results of the data analysis show that on account of the sign of the regression coefficients, it can be concluded that the educational background diversity has a positive impact on ROA; that is, adding to the diversity in the educational backgrounds among the members of the board, leads to an increase in ROA. Nonetheless, with regard to the significance level, the effect of the variable of educational background diversity on ROA was not significant.

The findings of the present study are consistent with the results reported by Díaz-Fernández et al. (2015) in the Spanish capital market. Accordingly, they found that the educational level diversity of board members did not have a significant effect on the ROA of Spanish companies. However, the diversity of educational background was positively and significantly correlated with an increase on ROA. Also, Francis et al. (2015) revealed that executives with academic education could improve a company's performance. These results are not consistent with the findings of the first research hypothesis. This inconsistency can be due to different demographic characteristics of the statistical sample in these two studies. Accordingly, it can be argued that members of the board of directors create intellectual capital through their competency, attitude and intellectual alertness and their knowledge asset comprises of skills, expertise, problem-solving ability and leadership style, all of which can have a bearing on corporate performance. According to the results, there was no significant statistical relationship between corporate performance and the diversity of the educational background of board members. Therefore, the first research hypothesis is rejected.

According to the analysis of the second research hypothesis, based on the sign of the estimated coefficient of regression, it can be concluded that education level diversity is reversely related to ROA. That is, higher diversity in the education level of board members reduces ROA.

However, given the significance level, the effect of education level diversity on ROA is not significant. The findings are consistent with the results of Al-Musali & Ku Ismail (2012), who concluded that the diversity of education level did not have a significant sway on the intellectual capital function, of banks active in the Gulf Cooperation Council. According to their results, there was a positive relationship between the technological innovation of companies and the level of educational diversity. Accordingly, it can be argued that the level of education helps board members to gain the perspective required to improve performance. Teams whose members have a high level of education tend to outstrip teams with lower levels of education. According to the results, there is no statistically significant correlation between corporate performance and educational level diversity. Therefore, the second hypothesis is rejected.

With regard to the analysis of the third research hypothesis, based on the sign of the obtained regression coefficient, it can be concluded that gender diversity has a positive effect on the relationship between educational background diversity and ROA. In other words, by promoting gender diversity, the effect of educational background diversity on ROA is heightened. However, considering the significance level, the effect of gender diversity on the relationship between the diversity of educational background and ROA was not significant. In the review of the literature, we did not find any study that explores the effect of characteristics of the board of directors on the relationship of gender diversity and educational background diversity with corporate performance. Based on the results, it can be contended that intellectual capital, through building value for key stakeholders of the organization, will significantly improve the corporate performance. Therefore, it can be concluded that one of the key measures to improve corporate performance is taking account of the intellectual capital available in the organization. According to the results, gender diversity does not have a significant effect on the relationship between the educational background of board members and corporate performance. Therefore, the third hypothesis is rejected.

According to the analysis of the fourth research hypothesis, given the sign of the obtained coefficient of regression, it can be concluded that gender diversity has an adverse effect on the relationship between the level of education and ROA. That is, with an increase in the gender diversity, the effect of the education level diversity on ROA deteriorates. However, based on the significance level, the effect of gender diversity on the relationship between education level and ROA was not significant. The review of literature suggested that there was a paucity of studies that explore the effect of characteristics of the board of directors on the relationship of gender diversity and educational level diversity with corporate performance.

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Based on the results, it can be proposed that the investment of the board of directors on the skills of employees and their level of individual knowledge, together with factors of training, motivation, and organizational interaction, leads to the promotion of intellectual capital, which in turn improves financial performance (market value). Therefore, in companies with powerful corporate governance, investing in human resources is prioritized over structural and physical capital to improve corporate performance.

According to the results, gender diversity did not have a significant bearing on the relationship between the level of education and corporate performance. Therefore, the fourth hypothesis is rejected. According to the results of analyzing the fifth research hypothesis, given the sign of the obtained coefficient of regression, it can be proposed that gender diversity has a direct impact on corporate performance. In other words, greater gender diversity was associated with increased ROA. The results of testing of this hypothesis are in agreement with the findings reported by Julizaerma and Sori (2012), Wellalage & Locke (2013) and Martín-Ugedo and Minguez-Vera (2014) in the capital market of Malaysia, Sri Lanka and Spain, respectively. Nevertheless, the study of Carter et al. (2010) suggested that the performance of U.S. companies was not significantly related to the gender of the board of directors. Such disparities can be explained in terms of the different lines of work in which these companies were involved. Therefore, it can be proposed that companies whose board of directors have excellent characteristics provide a context in which human resources will improve the corporate performance. That is, the diversity of characteristics and skills contributes to the development of human resources and eventually the corporate function. Close monitoring of the performance, along with the separation of management and ownership roles of economic enterprises ultimately leads to safeguarding the rights of investors and stakeholders, as issues such as impartiality, transparency, accountability and liability are strategic corporate principles in valuable cooperation and development. According to the results, there was a significant relationship between the characteristics of the board of directors and corporate performance. Therefore, the fifth hypothesis is confirmed.

Finally, it can be argued that intellectual capital in today's knowledge-based economy plays a crucial role in corporate performance. Meanwhile, the dimensions of intellectual capital, such as human capital, as the basis of intellectual capital, are linked to factors such as knowledge, skill, ability, and attitude of employees, and this has driven organizations to greatly invest in promoting the knowledge and skills of employees to generate income and improve efficiency and productivity.

A structural capital that includes all of the non-human knowledge resources in the organization encompasses databases, organizational charts, process execution instructions, strategies, executive programs, and anything that is of utmost value to the organization. It should be noted that customer capital indicates the importance of the dimensions of intellectual capital in organizations, as it represents contributions to organizations to regulate their strategies, assess the implementation of strategies and help in decision making, expansion and diversification of an organization's activities. Customer capital is of vital importance and it is the main determinant of intellectual capital and consequently organizational performance. On the other hand, the characteristics of the board of directors also affect the function of intellectual capital. In companies with excellent corporate governance, which mostly employ educated and efficient component members, intellectual capital plays an ameliorating role in their performance. In these companies, the first step to increase profitability is to review the corporate governance through analyzing the components of the board of directors' members, in possessing the required educational background and level as well as different genders. Then, according to the potential weaknesses in the board they should arrange new members, which may in turn, improve the firm's operation. On the whole, it can be concluded that corporate governance represents the top priority of organizations, followed by the factor of intellectual capital, which will ultimately promote corporate performance. Companies competing in other industries may apply our findings in order to form a more efficient and successful board of directors, which in turn may lead to the improved performance of their operations. For instance, they may set several limitations including educational level and background as well as gender specification.

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