Board Intellectual Capital, Board Effectiveness and Corporate Performance: Goodness of the Data

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Abstract

Many factors influence corporate performance and among them, intellectual capital (IC) and corporate governance are the most important determinants. Based on the literature, the direct effect of IC and corporate governance mechanisms on corporate performance have been measured in the past several years. Nevertheless, to empirically test indirect effect of board IC and board effectiveness on corporate performance remains scant. In addition, most of the research in these areas have been conducted in developed countries. It is found that not much research has been carried out in the emerging markets of Middle-East like Iran. The purpose of this paper is to present goodness of data processes in relation to study board IC, board effectiveness and corporate performance of listed companies in Iran. The goodness of data involves screening and purifying of raw data in accordance with the assumptions of multivariate analysis. Data screening is the process of checking data for errors and correcting them before performing data analysis. The study employed census method where all listed companies in Tehran Stock Exchange (TSE) were investigated. Data were obtained through the questionnaire survey on 292 board members in TSE. Raw data were keyed into Statistical Package for Social Science (SPSS) version 22. A descriptive statistic, treatment of missing data, univariate assessment and removing of outliers, normality and multicollinearity tests were conducted. The results from data cleaning revealed a significance and the suitability of the data for multivariate analysis.

Keywords: Intellectual capital; Board effectiveness; corporate performance; Data screening

1. Introduction

Corporate performance consists of a set of management and analytic processes, supported by technology, that enable businesses to define strategic goals and then measure and manage performance against those goals. It involves consolidation of data from various sources, querying, and analysis of the data, and putting the results into practice (Hagos and Pal, 2010). Complex environment competitive business world and customer expectations increase made it clear to know about weaknesses and strengths of organizations and improvement of productivity (Adjaoud et al., 2007; Usoff et al., 2002). Recognition of IC as a significant resource for creating value now dominates corporate's patterns of strategy formulation (Kaen, 2003). It is catalyst to achieve business goals and improve corporate performance (Earnest and Sofian, 2013). In addition, the board of directors with a better decision-making process could ultimately improve corporate performance (Maditinos et al., 2011). Generally, the performance of a company reflects the quality of its directors and their effectiveness. The board of director's skills, attitudes, and behaviors are the matter to improve board effectiveness in the pursuit of company success (Shen, 2005; Roberts et al., 2005). Despite the rapidly growing literature on IC and board governance, however, the gaps are still existing in the literature to examine the effect of board IC and their effectiveness on corporate performance. Further, examine the mediating role board effectiveness between the relationship of board IC and corporate performance.

This study employed a quantitative measure using questionnaire survey as the research instrument for collecting data. Before starting any data analysis in a research, it is necessary to run a preliminary exploration of data set to prove if the data were suitable for further analysis (Pallant, 2001). Data should be purified to provide meaningful and reliable results when analyzed (Hair et al., 2010). Indeed, it cannot be expected to get good models from scanty data. Even if they seem completely logical, preprocessing the data must take place before initiating training. Data screening is the main factor to be given due consideration to achieving consistency and accuracy in an analysis (Tabachnick and Fidell, 2007). The aim of this paper is to describe data cleaning process applied in determining the effect of board IC and board effectiveness on corporate performance. The second section discusses the literature review, the third section is the methodology, the fourth section presents the process of data collection, the fifth section demonstrated the response rate, and the sixth section focused on data screening and purification issues including treatment of missing data, removing outliers, normality test and multicollinearity test, and finally the conclusion.

2. Literature Review

There is a consensus among scholars that IC is vital to organizations to build competitive advantage (Kong and Prior, 2008; Schiuma et al., 2008), carries unconditional economic value in business (Tayles et al., 2007; Abdullah et al., 2015) and boost corporate performance (Earnest and Sofian, 2013, Pardis et al., 2016). Besides IC, corporate governance is also identified as an important factor that positively influences on corporate performance. A good corporate governance system would increase financing, reduce costs of capital, manage stakeholder interest, and foster dynamic economic growth. In fact, the board of directors as the heart of corporate governance (Gillan, 2006; Lawal, 2012), are responsible for corporate decisions and play a key role in creating value for both shareholders and other stakeholders (Tricker and Tricker, 2015). By this, directors want to ensure the implementation of company's manager strategic decisions, seek adequate and accurate information on their status and look to the future to provide promotion and improve corporate performance. Figure 1 shows the research theoretical framework of this study which is based on Payne et al. (2009), Ogbechie (2012), Zattoni et al. (2015), and Jamshidy et al. (2014) research models.

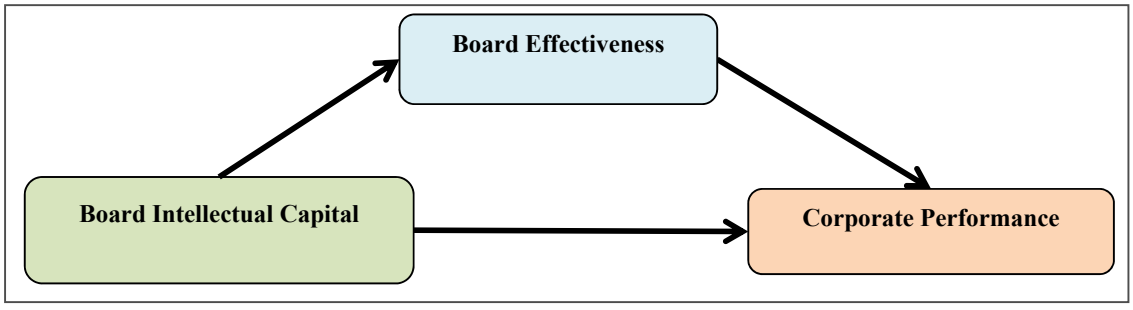

Figure 1, Theoretical Framework of the Study

The board of directors as company's ultimate decision control (Roberts et al., 2005), with high-quality members, promote their effectiveness and supports organizations to get better performance class and acquire competitive advantage (Nicholson and Kiel, 2004; Nadler et al., 2006). Therefore, a well-constructed board has a broad range of relative competencies, where power and ability to perform assigned tasks depend on the board member's intellectual capacity. The original intention of this study is to examine the effect of board IC and board effectiveness on corporate performance. Further, examine the mediating role of board effectiveness between the relationship of board IC and corporate performance.

3. Methodology

This study employed survey questionnaire method as the data collection mechanism (Sekaran and Bougie, 2016; Mark et al. 2009). Past studies have considered the method as the main data collection instrument (Payne et al., 2009; Machold and Farquhar, 2013; Zona and Zattoni, 2007; Minichilli et al. 2009; Minichilli et al., 2012; Zattoni et al., 2015). The aim of survey questionnaire in this study is to get perceptions on the effect of the board IC and board effectiveness on corporate performance in listed companies in TSE. Hence, to achieve the objectives of the study closed questions was used. The population was derived from listed companies in TSE. Since the target population was small, this study employed census method where all the companies in the target population have been investigated. Therefore, a complete questionnaire which included 65 items along with a cover letter explaining the general purpose of the survey and ensuring the anonymity of the response, was posted to the board members of all the 292 listed companies in TSE. Board of directors is deemed suitable respondent as they are directly or indirectly involved with company resources, financial and non-financial reports and are concerned with board activities. After data retrieval, they were keyed into SPSS version 22.0 and Smart-PLS statistical software for further analysis.

4. Data Collection Process

The full-scale data were collected from board members that represent the respective listed companies in TSE during July to November 2016. In the questionnaire survey, non-response bias has been considered as a major limitation of the survey. One way to reduce response bias is to obtain a high percentage of returns. To increase the response rate, several attempts were made by reminding the respondents through telephone calls and self-visits. Table 1 shows the summary of data collected survey responses.

Table 1: Summary of Questionnaire Survey

Description	Number	Percentage
Total Number of Questionnaires Distributed	292	100%
Questionnaires Not Returned	126	43%
Questionnaires Received:	166	57%
Less: Incomplete Questionnaires	14	5%
Usable Questionnaires	**152**	**52%**

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Out of the 292 questionnaires distributed by post 166 (57%) were returned and 126 (43%) were not. However, 14 (5%) discarded because of incomplete sections, resulting in a sample of 152 usable completed questionnaires. Babbie (1990) suggested the response rate of 50% is adequate, 60% is good and 75% is very good. On the other hand, Sekaran and Bougie, (2016) and Hair et al. (2010) state that 30% response rate is acceptable for social sciences. In line with the perspective of Babbie (1990) and Sekaran and Bougie, (2016), the response rate of 52% is considered adequate for further analysis.

5. Rate of Response

Table 2, represents the frequencies and percentages of the demographical variables. These data show gender, age, educational background, work experience, and job position of respondents in the company board.

Table 2: Profile of Respondents

Group	Frequency	Percentage
Gender		
Male	152	100
Female	0	0
Age		
25 to 30 years old	0	0
31 to 40 years old	0	0
41 to 50 years old	138	90.8
51 to 60 years old	13	8.6
Above 60 years old	1	0.7
Educational Background		
Diploma	2	1.3
Bachelor Degree	72	47.4
Master Degree	62	40.8
PhD	16	10.5
Work Experience		
10 to 15 years	82	53.9
16 to 20 years	54	35.5
20 years and above	16	10.5
Job Position		
Executive Directors	32	21.1
None Executive Directors	120	78.9

All 152 questionnaires were received from male respondents. Therefore, the sample of this study was all male. In specifying the age of the respondents, the larger percentage (90.8%) of the respondents are between 41 to 50 years old, 8.6% are between 51 to 60 years old and only 0.7% of them are more than 60 years old. To introduce the background of respondents, it is important to know about the level of education of the respondents. Table 4.7, shows that most of board members (47.4%) have a bachelor's degree, and 40.8% of the respondents have a master's degree while 10.5% the respondents have PhD and 1.3% have a diploma. This indicates that the participants in this survey are mostly educated, therefore their participation has enriched the quality of the survey findings in explaining the situation of company's board of directors in listed companies in TSE. The respondents were also asked to determine their working experience. As the result, the largest percentage (53.9%) of them have 10 to 15 years of experience, followed by those that are between the range 16 to 20 years (35.5%) and 10.5% have 20 years of experience and above. In specifying the position of the respondents, 78.9% were None-Executive Directors while the remaining, 21.1% were Executive Directors.

6. Data Screening and Purification Processes

Data collection with questionnaire is typically loaded with some primary issues that must be addressed. However, screening and cleaning data include treatment of missing data, assessment of outliers and to confirm that the distribution of variables is normal (Meyers et al., 2006).

6.1 Treatment of Missing Data

Missing data, primarily result from errors in data collection which can be caused by many things. For instance, respondents may fail or refuse to answer one or more items purposefully or mistakenly (Enders,

2010). This can reduce the statistical power of a study and can produce biased estimates, leading to invalid conclusions (Kang, 2013). Most statistical procedures automatically drop cases with missing data. This means that in the end, the researcher may not have enough data to perform the analysis. There are some techniques to impute missing data include hot or cold deck attribution, case substitution, mean substitution and relapse ascription. In this study, mean substitution technique was applied to replace missing data (Huisman, 2000; Howell, 2007). The justifications behind this methodology were that it is the most widely employed/acknowledged strategy for missing completely at random. There are three missing data mechanisms include missing not at random, missing at random, and missing completely at random (Rubin, 1976; Hair et al., 2012; Soley-Bori 2013). In this study, to ensure the data were free from missing values, researcher utilized SPSS software and, hence preliminary descriptive statistic was run with the aim to discover whether missing data exist. The statistically insignificant outcome indicated that types of missing values were completely at random. In random types, Cohen et al. (2013) suggested that the missing values less than 10% is not large, therefore, can usually be ignored. However, if they are greater than 20% to 30% levels, they need to be considered. Likewise, Cohen et al. (1983) proposed that 5% or even 10% missing data on the scale is not adequate.

6.2 Removing Outliers

There are two types of outliers including univariate outliers an instance of a great worth on single item, and multivariate outlier's instances of an irregular grouping of abnormal values in two or more variables (Kline, 2011). Hence, the only univariate outlier was detected and remedied. For univariate detection, apart from testing box-plots and histograms, each variable was tested for the standardized z-score (Tabachnick and Fidell, 2012). There are some general guidelines which recommend inside univariate outliers a case is abnormal when the standard score for small sample size (Eighty or Less) is ±2.5 or greater. In fact, for a large sample size (greater than 80 observations) standard score can be deliberately more than 4 (Selst and Jolicoeur, 1994; Cousineau and Chartier, 2010). As mentioned in the earlier section, the sample of this study was152 (greater than 80), therefore a case would be an outlier when its standard score is ±4.0 or beyond. By using SPSS software function of descriptive statistics, the data estimations of every assessment were changed to standardized score known as z-scores (Tabachnick and Fidell, 2012). The outcomes revealed the standardized z-scores of the cases for the research variables ranged from -3.936 to 2.308, which indicates that none of the items exceeded the threshold of ±4. Thus, among 152 cases, there is no any univariate outlier.

6.3 Data Normality Test

In this study, a statistical method of Skewness and Kurtosis to assess the normal distribution of data was applied. A data would be normally distributed if the values of skewness and kurtosis are equal to zero (Tabachnick and Fidell; 2001). Skewness is positive when most of the values are below the mean, negative points, showing just the opposite. Positive kurtosis suggests high peak and the negative, the opposite (Kline, 2011). Curran et al. (1996) suggested using the cutoff point less than 7 as an acceptable value for the kurtosis and skewness should be within the -2 to +2 range when the data are normally distributed (Everett, 2013). Kline (2011) pointed out that skewness values should be lower than 3 and kurtosis values should be lower than 10 for each item. The absolute value of Skewness greater than 3 and Kurtosis value greater than 10 may indicate a problem, and values higher than these are problematic. In this study, skewness and kurtosis were employed to assess normality of the data. The skewness and kurtosis values for all 65 items were computed using SPSS software. It can be concluded that the data set of all items were well-modelled by a normal distribution. However, the Smart-PLS a robust statistical technique will be used for further statistical analysis, which is not require meeting all the assumptions about the normality of the data distributions (Hair et al., 2013; Henseler et al., 2009). This statistical

software transforms non-normal data in accordance with the central limit theorem (Hair et al., 2012).

6.4 Multicollinearity Test

There are two forms of multicollinearity test which include determine the bivariate and multivariate relationship matrix and computing the variance inflation factors and tolerance impact (Tabachnick and Fidell, 2012). The tolerance effect specifies the inconsistency identified by endogenous construct, while variance inflation factors are the inverse of tolerance effect. If the value of tolerance is less than 0.1 and, simultaneously, the value of variance inflation factors 10 and above, then the multicollinearity is problematic (Cooper and Schindler, 2003; Hair et al. 2010). Hair et al. (2010) remarked that multicollinearity exists if the correlation between independent variables is 0.9 and greater. Meanwhile, Pallant (2010) stated that the correlation value above 0.7 as a threshold for multicollinearity among independent variables. In this study, multicollinearity was tested first by examining correlation matrix and secondly by tolerance and variance inflation factors level for the independent variables. Pearson's correlation has been utilized to calculate bivariate correlation matrix. The correlation analysis in Table 3 shows the significant correlation among the independent variable in the main model. The result demonstrates that all the correlation values between the variables were within 0.9 (Hair et al., 2010; Pallant, 2010). It is, therefore, concluded that there is no problem of high correlation among the variables.

Table 3: Pearson's Correlation for Observing Multicollinearity

Description	BHC	BSPC	BP	BTP
Board Human Capital (BHC)	1			
Board Spiritual Capital (BSPC)	0.634**	1		
Board Process (BP)	0.597**	0.676**	1	
Board Task Performance (BTP)	0.610**	0.704**	0.617**	1

**Statistically significant at 10 percent significance level.

Secondly, multicollinearity was tested through examination of tolerance and variance inflation factors using regression results provided by the SPSS collinearity diagnostics result. As recommended by Hair Jr et al. (2010), tolerance and variance inflation factors are the most important and reliable test of multicollinearity. Table 4, shows that the tolerance ranges between 0.385 and 0.515 substantially greater than 0.1 and variance inflation factors ranges from 1.943 and 2.599. Therefore, it is accepted as being less than 10. The result also revealed that multicollinearity does not exist in this study since tolerance values are above 0.10 and variance inflation factors values is below 10.

Table 4: Calculation of Tolerance Effect and Variance Inflation Factors

Description	Collinearity Statistics	
	Tolerance	VIF
Human Capital	0.515	1.194
Spiritual Capital	0.385	2.599
Board Process	0.475	2.102
Board Task Performance	0.441	2.267
a. Dependent Variable: Corporate Performance		
VIF: variance inflation factors		

7. Conclusion

This paper presents the board IC, board effectiveness and corporate performance goodness of data which involved different processes to achieve the purpose of the study, the processes includes data collection process, the presentation of the response rate of the respondents which is quite impressing as an adequate response rate of 52% has been achieved. The issue relating missing data, assessment of outliers, normality and multicollinearity tests have also been discussed in the paper. The result of the analysis revealed the significance and the suitability of the data for multivariate analysis.

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