The linkages among intellectual capital, corporate governance and corporate social responsibility

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Received 10 April 2014
Revised 26 March 2015
Accepted 1 April 2015

An earlier version of the study was presented in ICICKM 2013 – 10th International Conference on Intellectual Capital, Knowledge Management and Organizational Learning (ISI Indexed Conference). Thanks for conference participant for their helpful critiques.

Abstract

Purpose – *The purpose of present study is to explore the linkages among Intellectual Capital (IC), Corporate Governance (CG) and Corporate Social Responsibility (CSR) through direct and indirect empirical inquiry.*

Design/methodology/approach – *The main setting is designed for exploring the relationship among IC, CG and CSR. Therefore, these three constructs are examined directly in which their statistical relation is evaluated among themselves and indirectly in which their possible effects are examined onto firms' unsystematic factors such as cash flow, short-term solvency, long-term solvency, profitability and asset utilization.*

Findings – *Empirical investigation is conducted on manufacturing firms listed in Istanbul Stock Exchange from 2007 to 2011. Empirical results do support a positive relationship among these important constructs.*

Research limitations/implications – *The empirical research is carried out in manufacturing firms only.*

Originality/value – *IC, CG and CSR are three demanding research areas to study. This is the first attempt here to examine their possible linkages based on so-called direct and indirect empirical inquiries. The primary reason behind this attempt is that these concepts are assumed to be important for all stakeholders.*

Keywords *Corporate governance, Intellectual capital, Corporate social responsibility*

Paper type *Research paper*

1. Introduction

The present study examines the interrelated linkages among three concepts: Corporate Governance (CG), Intellectual Capital (IC) and Corporate Social Responsibility (CSR). There is an ongoing debate about each of these concepts for exploring their impact on value, measurability and relevancy. In addition, there is a considerable research interest to document the determinants of value addition process for an organization. Therefore, CG, IC and/or CSR became challenging phenomena to study their linkages with value. In the same manner, their linkages with relevancy in the organization have been a difficult task to accomplish due to their unobservable characteristics in terms of measurability. In the past two decades, there have been many attempts to decompose the dynamics of each of these concepts for developing indices or scales that reflect their level for each organization. Because their importance for all stakeholders became increasingly necessary for preventing an organization from any types of chaotic environment, there is a need to comprehend their interrelated dynamics. We aim to analyze this challenging research interest at the micro level within manufacturing listed firms.

The research setting is designed for exploring the relationship among IC, CG and CSR. These three constructs are examined directly in which their statistical relation is evaluated among themselves and indirectly in which their possible effects are examined onto firms' unsystematic factors such as cash flow, short-term solvency, long-term solvency,

profitability and asset utilization. Empirical investigation is conducted on manufacturing listed firms in Istanbul Stock Exchange (ISE) within the period from 2007 to 2011 based on annual data. Variables are designed in both continuous and categorical structure in research setting. We applied three methods to investigate the linkages among proposed constructs. Pearson's (linear) correlation, independent sample *t*-test and ANOVA are proposed to test these linkages because of their purpose of use in research model. In this manner, two approaches are structured into two paths:

1. looking at the linkages among these three constructs (IC, CG and CSR) directly; and
2. looking at the linkages between each of these three concepts (IC, CG and CSR) and firms' unsystematic factors.

The primary contribution of present study is to examine the interrelated linkages among IC, CG and CSR for the first time. Prior researchers have investigated the possible linkages between two of these three constructs (Ho and Williams, 2003; Esa and Ghazali, 2012; Jamali *et al.*, 2010; Li *et al.*, 2012) and some other type of firm facets such as performance (McGuire *et al.*, 1988; Pava and Krausz, 1996; Igalens and Gond, 2005; Longo *et al.*, 2005; Sandhu and Kapoor, 2005; Kapoor and Sandhu, 2010; Aaron, 2011; Lioui and Sharma, 2012; Huang and Lien, 2012; Lu *et al.*, 2013; Belu and Manescu, 2013), profitability (Aupperle *et al.*, 1985; Scott, 2007; Lin *et al.*, 2009), efficiency (Becchetti *et al.*, 2008), and value (Husted and Allen, 2007; Crisostomo *et al.*, 2011; Ammann *et al.*, 2011). Therefore, the purpose of the paper is to examine direct linkages among IC, CG and CSR and indirect linkages between these three concepts and firm facets including short-term solvency, long-term solvency, profitability, asset utilization and cash flow. In terms of empirical investigation conducted within the scope of the present study, it is the first time to depict the impact of IC, CG and CSR on aforementioned firm facets at the same time. In addition, proxy variable of CSR, an index calculated through a sort of content analysis, was calculated based on an in-depth analysis which may produce better indicator than a survey result. In developed countries, researchers use CSR Index such as DOMINI in the USA (McGuire *et al.*, 1988; Becchetti *et al.*, 2008), whereas it is rather difficult to measure CSR in countries where such indices are not available (Kapoor and Sandhu, 2010; Belu and Manescu, 2013; Esa and Ghazali, 2012).

Empirical results clearly support positive linkages among IC, CG, CSR and firm facets. However, results should be interpreted with caution for the fact that the analysis was carried out for the five-year research setting. Theoretical advancement has not reached a general consensus on causality among IC, CG, CSR and firm facets (Orliztky *et al.*, 2003; Ho and Williams, 2003). That is why empirical studies produce mixed results.

The structure of present study is as follows: Section 2 gives a relatively short literature review for IC, CG and CSR; Section 3 explains raw data, variable structure and methods applied for exploring the linkages among these constructs; Section 4 reports the findings of estimated research model developed for the study; and Section 5 gives a short summary.

2. Literature review

IC is a relatively new academic endeavor that is coming originally from practice and consultancy and is far away from having a consensus on a common definition. Svieby (1997) proposed a simple definition for IC as a difference of market value and book value. In the past two decades, IC has been conceptualized (Ross *et al.*, 1997; Petrash, 1996; Lowendahl, 1997; Sullivan, 1998; Edvinsson and Malone, 1997; Brooking, 1996) within different perspectives.

Empirical studies on IC have previously focused on the assessment of the degree or the ranking value of intellectual assets in a given firm(s). However, well-known methods such as Tobin's Q, Market-to-book ratio and accounting-based measures (Lee and Guthrie, 2010; Maditinos *et al.*, 2011) have provided much knowledge to better understand and

interpret the importance of assessment of IC. There are some studies (Leibowitz and Suen, 2000; Marr and Chatzkel, 2004; Chen *et al.*, 2004) that attempt to propose the metrics for measuring IC, whereas there is no attempt to find the link among IC, CG and CSR.

The term *governance* should be clearly defined to understand its role within structure of research model. Governance is defined as "the structure and function of a corporation in relation to its stakeholders generally, and its shareholders specifically" (Banks, 2004, p. 3). The importance of corporate governance around the world rises significantly due to its possible impact on all stakeholders. Banks (2004) underlines two facts:

1. the impact of corporate governance on stakeholders; and
2. the risk that may take place if corporate governance is not effectively designed.

There are many examples that show how corporate governance affects the firms' operations around the world. Some of these are Enron, Tyco, Andersen and WorldCom from USA; Swissair from Switzerland; Kirch Media from Germany; Daiwa Bank and Sumitomo Corporation from Japan and many others (see Banks, 2004 for an extensive list).

Governance assumes various forms in modern corporate systems. These elements of governance are centered on both internal and external mechanisms. Internal governance is based on specific mechanisms and actions taken by individual firms to enforce control and accountability. Supplementing internal governance processes are external forces that establish overarching frameworks which define, or operate with, internal mechanisms.

Most theories on the relationship between corporate social/environmental performances (CSP) and corporate financial performance (CFP) assume that the current evidence is too fractured or too variable to draw any generalizable conclusions (Orliztky *et al.*, 2003). Orliztky *et al.* (2003) conducted a meta-analysis of 52 studies (which represent the population of the prior quantitative inquiry), yielding a total sample size number of 33,878 observations. The meta-analytic findings suggest that corporate virtue in the form of social responsibility and, to a lesser extent, environmental responsibility is likely to pay off, although the operationalizations of CSP and CFP also moderate the positive association.

There is an increasing trend for measuring the level and impact of CSR in the world. One of these is to develop stock market indices to observe their return and performance structure. The Domini 400 Social Index (DS400) (2008), as an example of this kind, is a float-adjusted, market capitalization-weighted, common stock index of US equities. Launched by KLD in May 1990, the DS400 is the first benchmark index constructed using environmental, social and governance factors. It is a widely recognized benchmark for measuring the impact of social and environmental screening on investment portfolios. DS400 holds at approximately 250 S&P 500 companies, 100 additional large and mid-cap companies chosen for sector diversification and 50 smaller companies with exemplary social and environmental records. Companies that engaged beyond specific levels of involvement in certain industries are not eligible for the index. These include: tobacco, alcohol, gambling, firearms, military weapons and nuclear power (FactSet Research Systems and Standard and Poor's, 2009, p. 2).

IC, CG and CSR are three demanding research areas to study, whereas this is the first attempt here to examine their possible linkages based on the so-called direct and indirect empirical inquiries. The primary reason behind this attempt is that these concepts are assumed to be important for all stakeholders. Previous research (depicted in Table I) have reported mix results for the linkages among IC, CG and CSR based on unsystematic review of literature, whereas there is no single study found that shows empirical linkages among CG, CSR and IC. The primary contribution of the paper is to fill this gap in the literature. In addition, there are some conceptual papers that discuss possible relations between CG and IC (Safieddine *et al.*, 2009) and between CG and CSR (Spitzeck, 2009; Sivakumar, 2009; Petersen and Vredenburg, 2009; Peters *et al.*, 2011).

Table I Selected empirical researches on CSR, CG and IC

Author	*Theme of empirical research*	*Main finding*
McGuire *et al.* (1988)	CSR-performance	Positive relationship
Pava and Krausz (1996)	CSR-performance	Positive relationship
Igalens and Gond (2005)	CSR-performance	Positive relationship
Longo *et al.* (2005)	CSR-performance	Positive relationship
Sandhu and Kapoor (2005)	CSR-performance	Neutral relationship
Lin *et al.* (2009)	CSR-profitability	Neutral relationship in short run; positive relationship in long run
Becchetti *et al.* (2008)	CSR-performance	Negative relationship with performance; positive relationship with efficiency
Kapoor and Sandhu (2010)	CSR-performance	Positive relationship
Aaron (2011)	CSR-performance	Positive relationship with unobserved variables
Lioui and Sharma (2012)	CSR-performance	Positive relationship
Huang and Lien (2012)	CSR-performance	Positive relationship
Lu *et al.* (2013)	CSR-performance	Positive relationship
Belu and Manescu (2013)	CSR-performance	Neutral relationship
Aupperle *et al.* (1985)	CSR-Profitability	Negative relationship
Scott (2007)	CSR-profitability	Positive relationship
Husted and Allen (2007)	CSR-firm value	Positive relationship
Crisostomo *et al.* (2011)	CSR-firm value	Negative relationship
Ho and Williams (2003)	CG-IC	Neutral relationship
Li *et al.* (2012)	CG-IC	Neutral relationship
Ammann *et al.* (2011)	CG-firm value	Positive relationship
Esa and Ghazali (2012)	CG-CSR	Positive relationship
Jamali *et al.* (2010)	CG-CSR	Basic governance differences observed within different sectors

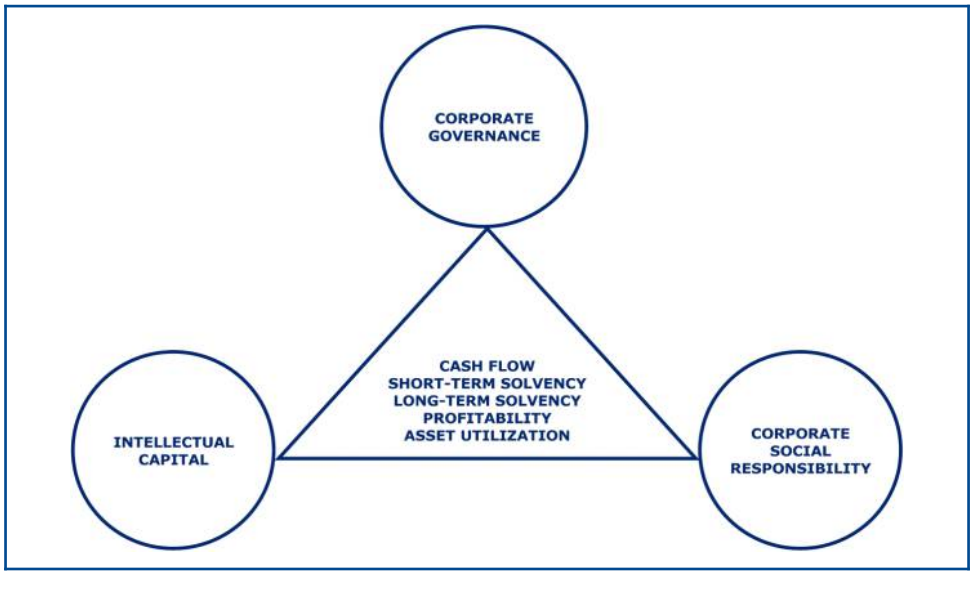
Notes: CSR = corporate social responsibility; CG = corporate governance; IC = intellectual capital

3. Data and methodology

3.1 Research model

The research model developed for the present paper is depicted in Figure 1. The main setting is designed for exploring the relationship among IC, CG and CSR. Therefore, these three constructs are examined directly in which their statistical relation is evaluated among themselves and indirectly in which their possible effects are examined onto firms' unsystematic factors such as cash flow, short-term solvency, long-term solvency, profitability and asset utilization.

Figure 1 Research model



3.2 Variable set and data structure

In the context of research model, several variables have been used in different forms including continuous and dummy as depicted in Table II. The first column indicates the name of constructs; the second column shows the proxy variable that best represent each construct; the third column indicates type of the variable; and fourth column gives the formula of each variable.

There are three main constructs as depicted in research model: IC, CG and CSR. CG metric is structured according to its availability and suitability to the aim of the study. Firms that are actively traded in ISE are graded by independent CG rating firms licensed by Turkish Capital Market Board. These rating are considered by ISE to determine CG Index (XKURY) which has developed since 2007 for the purpose of measuring the price and return performance of companies with a corporate governance rating of minimum 7-10. There are four dimensions of corporate governance principles including shareholders (25 per cent), public disclosure (35 per cent), stakeholders (15 per cent) and board of directors and executives (25 per cent). Each of these dimensions has several sub-elements. However, as depicted, these four main dimensions have different weights in calculating the rate. Because there are only a few manufacturing firms in the CG Index, CG indicator was considered as a dummy variable, taking the value of 1 if the firm is included in the index and 0 otherwise.

There are no indicators that can be used to measure the CSR of the firms in Turkey. However, Corporate Social Responsibility Association of Turkey is developing a scale for rating the firms. This initiation has not been activated and widespread in Turkey. That is why there are no available data for the firms analyzed in the study. To eliminate this problem, the mentioned scale is conducted through a sort of content analysis. The scale consists of five constructs including corporate strategy, management and processes (10 per cent), economic (30 per cent), social (30 per cent), environmental (25 per cent) and CSR report (5 per cent). The content analysis is conducted based on the scale and the availability of information about the firms. The information was collected by searching the annual reports and Web sites of the firms and then decided whether a firm has a project within the scope of CSR. The rate is calculated based on the scale weights. If the firm has a project, it takes the value of 1 and 0 otherwise. As a result, the final rate is determined by simply calculating

Table II Variable set

Construct	*Proxy variable*	*Type of variable*	*Formula*
Corporate Governance (CG)	Corporate Governance Rating	Dummy form: 1 if firm is rated; 0 otherwise	Independent rating agencies methodology
Intellectual Capital (IC)	MV to BV	Continuous form: ratio Dummy form: 2 if the ratio is higher than 1; 1 otherwise	MV/BV
	Tobin Q	Continuous form: ratio Dummy form: 2 if the ratio is higher than 1; 1 otherwise	(BV of Debt + MV of common stock)/total assets
Corporate Social Responsibility (CSR)	CSR Rating	Continuous form: rating Dummy form: 1 if the ratio is higher than 66.6%; 2 if the ratio is between 33.3% and 66.6%; and 3 if the ratio is lower than 33.3%	Authors' calculation via content analysis conducted on firms' publicly available information including annual reports, footnotes of financial statements and websites based on a scale developed for measuring CSR
Cash flow	Cash flow from operations to total liabilities	Continuous form: ratio	Cash flow from operations/total liabilities
Short-term solvency	Current asset to current liabilities	Continuous form: ratio	Current asset/current liabilities
Long-term solvency	Total liabilities to total assets	Continuous form: ratio	Total liabilities/total assets
Profitability	Net income to total assets	Continuous form: ratio	Net Income/total assets
Asset utilization	Sales to total assets	Continuous form: ratio	Sales/total assets

sum-product of each sub-construct which produces a continuous variable. This continuous variable is used in direct examination of the possible linkages with CG and IC. In addition, we structure a categorical variable based on this rate such as very intensive (a rate higher than 66.6 per cent), moderate (a rate between 33.3 per cent and 66.6 per cent) and low intensive (a rate lower than 33.3 per cent) to evaluate its impact on firms' unsystematic factor in the form of indirect inquiry.

IC, on the other hand, is calculated by two variables: market-to-book value and Tobin Q. Both variables are assumed to be an indicator for excess value of the firms that is not reported within financial statements. If the values of these two variables are higher than 1, then there is a positive sign for IC. We used this variable in both continuous and dummy forms to examine its linkages with CG and CSR.

Firms' unsystematic factors are determined as cash flow short-term solvency, long-term solvency, profitability and asset utilization. We choose one variable that is frequently used per each construct in continuous form. The primary reason here is that whether IC, CG and CSR have differentiating effect on firms' unsystematic factors.

Table III demonstrates descriptive statistics about CG with respect to firms' unsystematic factors within the analysis period. The analysis period takes place between 2007 and 2011 in the form of annual data. We used CG as a dummy variable in the analyses. In this structure, firms that are rated by independent rating agencies take the value of 1 and 0 otherwise. Despite the fact that we could use CG rates as a continuous variable, the limited number of rated firms restrict us from making any statistical examination with the rates. Therefore, we categorize firms into rated and non-rated groups and explore whether any statistical difference exist with respect to IC, CSR and firms' unsystematic factors. According to statistics given, the numbers of rated firms are 17, 15, 11, 8 and 4 in 2011, 2010, 2009, 2008 and 2007, respectively. As observed, there is an increasing tendency of being rated by independent rating agencies in Turkey. One of the most important figures is that the existence of mean differences among firms' unsystematic risk based on the categorization of rated and non-rated firms. The formal statistical examination will take place in forthcoming sections.

The proxy variable of CSR is the index value of CSR scale which is used in both continuous and categorical variables. While we were using the index rate as a continuous variable within the framework of indirect tests, we structured the index into three categorical dummy variables as very intensive, moderate and non-intensive for the purpose of representing the intensity of firms in CSR. Table IV demonstrates descriptive statistics about CSR with respect to firms' unsystematic factors within the analysis period. The most important inference coming out the statistics depicted is that there is an increasing tendency for the firms to be more intensive in CSR. The numbers of very intensive firms in CSR are 55, 45,

Table III CG statistics

		2011		*2010*		*2009*		*2008*		*2007*	
Variables	*CG*	N	*Mean*	N	*Mean*	N	*Mean*	N	*Mean*	N	*Mean*
CF	Rated	17	0.0335	15	0.1933	11	0.1436	8	0.0175	4	0.0350
	Non-rated	134	0.2731	135	0.1403	133	0.3458	135	0.2964	137	0.3550
SS	Rated	17	2.1094	15	1.9302	11	1.3482	8	1.3150	4	1.5675
	Non-rated	139	2.2818	136	2.1570	134	2.3537	135	2.2870	137	2.3653
LS	Rated	17	0.5259	15	0.4934	11	0.5764	8	0.6575	4	0.6000
	Non-rated	139	0.6321	136	0.5395	134	0.5110	135	0.5390	137	0.4820
PR	Rated	17	0.0559	15	0.0590	11	0.0473	8	0.0125	4	0.0625
	Non-rated	139	0.0038	136	0.0210	134	0.0295	135	−0.0021	137	0.0450
AU	Rated	17	1.1365	15	1.0023	11	1.0891	8	1.1688	4	1.3075
	Non-rated	139	0.9448	136	0.9134	134	0.8430	135	1.0092	137	1.0758

Notes: CG = corporate governance; *N* = number of firms; CF = cash flow from operations/total liabilities; SS = current assets/current liabilities; LS = total liabilities/total assets; PR = net income/total assets; AU = sales/total assets

Table IV CSR statistics

Variables	CSR	2011 N	2011 Mean	2010 N	2010 Mean	2009 N	2009 Mean	2008 N	2008 Mean	2007 N	2007 Mean
CF	Very Intensive	55	0.5707	45	0.2387	47	0.4211	41	0.7051	38	0.7818
	Moderate	27	0.1696	32	0.2006	25	0.3096	27	0.2963	24	0.2571
	Non-intensive	69	0.0174	73	0.0641	72	0.2783	75	0.0433	79	0.1633
SS	Very Intensive	56	2.3143	45	2.1370	47	2.5923	41	2.5602	38	3.1532
	Moderate	28	1.8361	32	2.4500	26	2.4588	27	2.6770	24	2.2262
	Non-intensive	72	2.3892	74	1.9965	72	2.0063	75	1.8935	79	1.9881
LS	Very Intensive	56	0.4279	45	0.4002	47	0.4043	41	0.4237	38	0.3350
	Moderate	28	0.9732	32	0.4155	26	0.4277	27	0.3570	24	0.4258
	Non-intensive	72	0.6332	74	0.6685	72	0.6207	75	0.6803	79	0.5757
PR	Very Intensive	56	0.0718	45	0.0579	47	0.0617	41	0.0351	38	0.1318
	Moderate	28	−0.1329	32	0.0238	26	0.0035	27	0.0507	24	0.0554
	Non-intensive	72	0.0164	74	0.0050	72	0.0206	75	−0.0400	79	0.0010
AU	Very Intensive	56	1.1425	45	0.9999	47	1.0394	41	1.1495	38	1.0568
	Moderate	28	0.8950	32	0.9846	26	0.6742	27	0.9426	24	1.0592
	Non-intensive	72	0.8557	74	0.8481	72	0.8133	75	0.9735	79	1.1018

Notes: CSR = corporate social responsibility; *N* = number of firms; CF = cash flow from operations/total liabilities; SS = current assets/current liabilities; LS = total liabilities/total assets; PR = net income/total assets; AU = sales/total assets

47, 41 and 38 in 2011, 2010, 2009, 2008 and 2007, respectively. In the same manner, the numbers of non-intensive firms have decreased from 79 in 2007 to 69 in 2011. The statistical examination will take place in exploring the statistically significant differences based on the categorization CSR with respect to IC, CG and firms' unsystematic factors.

Tobin Q as a proxy variable of IC has been used in both continuous and categorical variables within the framework of direct and indirect tests. We structured categorical variable into two groups:

1. firms that have Tobin Q ratio lower than 1; and
2. firms that have Tobin Q higher than 1.

The logic behind this categorization is that a higher value of Tobin Q may reflect positive signals in terms of intellectual capital. Table V demonstrates descriptive statistics about Tobin Q with respect to firms' unsystematic factors within the analysis period. It is observed that there are more firms taking a higher value of Tobin Q over the threshold value than those of having lower value except for 2008 in which 89 and 45 firms take a lower and a higher value, respectively. It is aimed to test whether there are statistically significant differences based on the categorization of IC with respect to CG, CSR and firms' unsystematic factors.

Table V Tobin Q statistics

Variables	Tobin Q	2011 N	2011 Mean	2010 N	2010 Mean	2009 N	2009 Mean	2008 N	2008 Mean	2007 N	2007 Mean
CF	Above 1	99	0.26	102	0.19	70	0.44	45	0.06	94	0.38
	Below 1	47	0.19	40	0.07	66	0.22	89	0.41	38	0.23
SS	Above 1	99	1.96	102	2.15	70	2.16	45	2.14	94	2.35
	Below 1	47	2.89	40	2.09	66	2.46	89	2.29	38	2.23
LS	Above 1	99	0.75	102	0.59	70	0.65	45	0.79	94	0.53
	Below 1	47	0.37	40	0.39	66	0.38	89	0.43	38	0.37
PR	Above 1	99	−0.02	102	0.03	70	0.04	45	−0.03	94	0.05
	Below 1	47	0.07	40	0.02	66	0.03	89	0.01	38	0.05
AU	Above 1	99	1.09	102	1.00	70	0.94	45	1.12	94	1.11
	Below 1	47	0.76	40	0.74	66	0.79	89	0.97	38	1.03

Notes: *N* = number of firms; CF = cash flow from operations/total liabilities; SS = current assets/current liabilities; LS = total liabilities/total assets; PR = net income/total assets; AU = sales/total assets

Market-to-book ratio (MV/BV) as a proxy variable of IC has been used in both continuous and categorical variables within the framework of direct and indirect tests. We structured categorical variable into two groups:

1. firms that have MV/BV ratio lower than 1; and
2. firms that have MV/BV higher than 1.

The logic behind this categorization is that a higher value of MV/BV may indicate positive signals in terms of IC. Table VI demonstrates descriptive statistics about MV/BV with respect to firms' unsystematic factors within the analysis period. It is observed that there are more firms taking a higher value of MV/BV over the threshold value than those of having lower value except for 2008 in which 93 and 42 firms take a lower and a higher value, respectively. It is aimed to test whether there are statistically significant differences based on the categorization of IC with respect to CG, CSR and firms' unsystematic factors.

3.3 Methodology

In the present study, we applied three methods to investigate the linkages among proposed constructs. Pearson's (linear) correlation, independent sample *t*-test and ANOVA are proposed to test these linkages due to their purpose of use in research model. We used each of these techniques by having their assumptions in mind. Therefore, we simply explained these three techniques in a way to describe them with their main features.

The linear correlation coefficient (*r*) measures the strength of the linear relationship between the paired values of two variables in a sample. This analysis is conducted for exploring the direct linkages between IC and CSR due to the fact that these two variables are continuous. Independent sample *t*-test is another statistical technique to test the mean difference between two constructs. This is a parametric statistical test that requires continuous, normally distributed and equal group variances. In case of two group comparisons, independent sample *t*-tests are applied, whereas if there are more than two group comparisons, then ANOVA is an appropriate statistical technique to conduct. Independent sample *t*-tests are applied for exploring the direct linkages among IC, CG and CSR for the fact that CG has initially a categorical variable and IC and CSR have continuous variables. In addition, independent sample *t*-tests are applied in exploring indirect linkages among the constructs where applicable. In case of examining the mean differences among more than two groups, we determine to use ANOVA for its applicability. In case of exploring indirect linkages between CSR and firms' unsystematic factors, this technique is applied, as there are three categories within CSR.

Table VI Market to BV statistics

		2011		*2010*		*2009*		*2008*		*2007*	
Variables	*MV/BV*	N	*Mean*	N	*Mean*	N	*Mean*	N	*Mean*	N	*Mean*
CF	Above 1	101	0.29	104	0.20	75	0.46	42	0.04	95	0.46
	Below 1	55	0.17	40	0.03	62	0.21	93	0.41	38	0.11
SS	Above 1	101	2.13	104	2.31	75	2.38	42	2.36	95	2.55
	Below 1	55	2.51	40	1.97	62	2.38	93	2.32	38	2.20
LS	Above 1	101	0.51	104	0.46	75	0.46	42	0.57	95	0.42
	Below 1	55	0.83	40	0.41	62	0.39	93	0.43	38	0.39
PR	Above 1	101	0.05	104	0.04	75	0.04	42	0.01	95	0.08
	Below 1	55	−0.06	40	0.01	62	0.03	93	0.01	38	0.04
AU	Above 1	101	1.08	104	0.99	75	0.92	42	1.10	95	1.11
	Below 1	55	0.75	40	0.76	62	0.80	93	0.98	38	1.02

Notes: MV/BV = market value/BV; *N* = number of firms; CF = cash flow from operations/total liabilities; SS = current assets/current liabilities; LS = total liabilities/total assets; PR = net income/total assets; AU = sales/total assets

4. Empirical findings

Empirical findings are documented based on two approaches. The first approach is about looking at the linkages among the three constructs (IC, CG and CSR) directly. In this case, we reported the results coming from correlation and independent sample *t*-tests. The second approach is about the linkages between each of these three concepts (IC, CG and CSR) and firms' unsystematic factors. The question here is that whether firms' unsystematic factors do show statistically significant differences based on categorization of IC, CG and CSR.

4.1 Direct linkages among CG, IC and CSR

This section gives the findings coming from exploring direct linkages among IC, CG and CSR. Figure 3 depicts the structure of the proxy variables for each construct and the proposed statistical tests used. CG is represented by one dummy variable: if a firm is rated by independent rating agency, then it takes the value of 1 and 0 otherwise. As a result, this structure classifies CG into two categories. On the other hand, IC and CSR have continuous variables which allow us to apply independent sample *t*-test to figure out a possible relationship. We used two proxy variables for IC as market-to-book ratio and Tobin Q ratio. In addition, we used CSR rates as a proxy variable representing CSR which is also continuous. In case of looking at the relationship between IC and CSR, we interpret correlation between these two continuous variables (Figure 2).

The first examination for direct test takes place between IC and CSR. Table VII demonstrates summary statistics and Pearson's correlation among CSR Index, MV/BV and Tobin Q ratio. We used five-year annual data for the analysis. Therefore, *N* represents observations within this period. Correlations among CSR Index and two proxy variables for IC show that there is statistically significant positive relation between CSR Index and Tobin Q, whereas there is no statistically significant relation between CSR Index and MV/BV. Despite the fact that there is no purpose to test relation between MV/BV and Tobin Q, a

Figure 2 Direct tests of research model

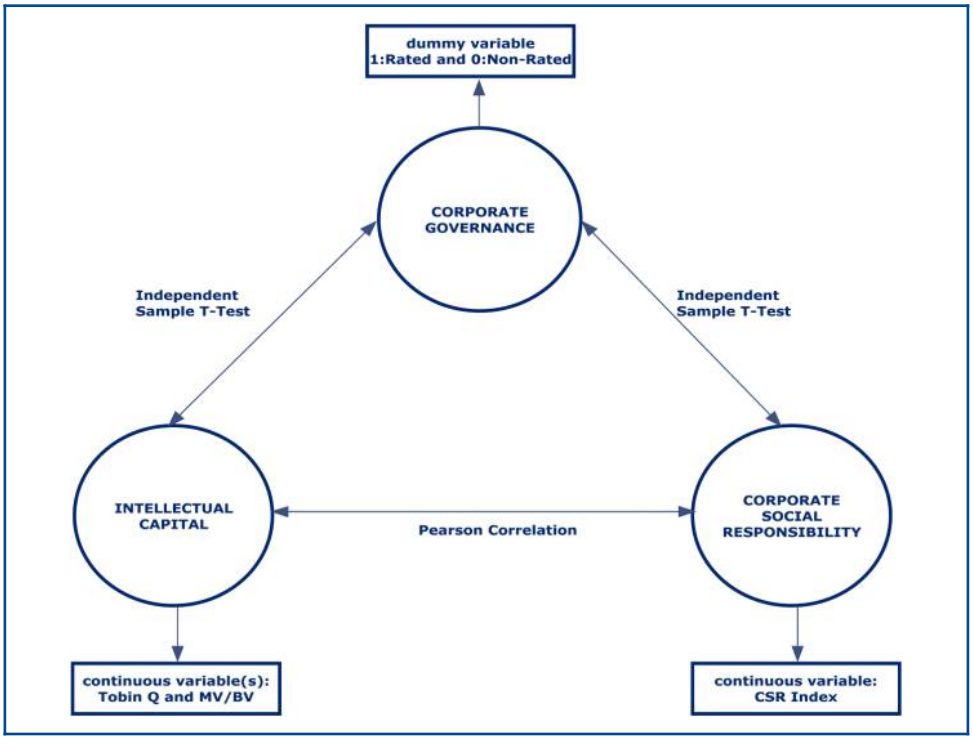


Table VII Summary statistics and correlations

Variables	N	*Mean*	*SD*	*Pearson's correlation* *CSR index*	*MV/BV*
CSR Index	647	0.4548	0.38111		
MV/BV	647	1.6611	1.73651	0.010	
TOBIN Q	647	1.2770	0.96484	0.100*	0.809**

Notes: *Correlation is significant at the 0.05 level (two-tailed); **correlation is significant at the 0.01 level (two-tailed)

statistically significant positive relation is observed between two proxy variables of CSR as expected, as they were chosen for the same purpose.

The second examination of direct test takes place among CG, IC and CSR. Table VIII gives summary statistics and *t*-test results for the constructs. In this case, the number of firms that are rated by independent rating agencies is 55 within the sample analysis period. The second category of CG in which firms are not rated includes 592 firms (observations). As depicted, the mean value of the rated firms for CSR is higher than that of non-rated firms which is also confirmed by independent sample *t*-test. However, independent sample *t*-test does not reject the hypotheses that mean value of both categories are the same for CG.

In this examination, the unequal size of categories may create a disadvantage for the test. The main reason is that there might be many firms in the second category (non-rated category) which shows high financial performance. To eliminate this problem, we have constructed a diagnosis testing strategy by choosing a sub-sample from non-rated categories. In this sub-category, we selected a sample of distressed firms based on several criteria:

- included into Watchlist Companies Market;
- had total debt greater than total asset;
- prepared financial statement based on Turkish Bankruptcy Code of 324;
- announced loss for three consecutive year; and
- had execution for debt.

Table IX demonstrates the results of this step. As depicted, the mean difference of CSR is statistically significant, as it the same in the full sample. However, we proved that the mean difference of MV/BV is also statistically significant at the 5 per cent level in this sub-sample examination. On the other hand, Tobin Q, another proxy for IC, is not proved that the mean difference is statistically significant among categories of CG.

Results of direct tests among IC, CG and CSR show that there are statistically significant differences among these constructs. At the first step, we show that there is a positive relationship observed between CSR and IC by using their continuous proxy variables. At

Table VIII Independent sample *t*-tests for CG (full sample)

Variables	*Corporate governance*	N	*Mean*	*SD*	t-*test significance (two-tailed)*
CSR Index	Rated	55	0.7418	0.29686	0.000
	Non-rated	592	0.4281	0.37727	
MV/BV	Rated	55	1.5722	0.87821	0.692
	Non-rated	592	1.6694	1.79578	
TOBIN Q	Rated	55	1.2322	0.37639	0.719
	Non-rated	592	1.2812	1.00220	

Note: *t*-test significance level takes Levene's test for Equality of Variances into account

Table IX Independent sample *t*-tests for CG (subsample)

Variables	*Corporate governance*	N	*Mean*	*SD*	t-*test significance (two-tailed)*
CSR Index	Rated	53	0.7491	0.29750	0.000
	Distressed	80	0.2744	0.33366	
MV/BV	Rated	53	1.5909	0.88760	0.021
	Distressed	80	2.3519	2.70258	
TOBIN Q	Rated	53	1.2411	0.38002	0.593
	Distressed	80	1.2026	0.42068	

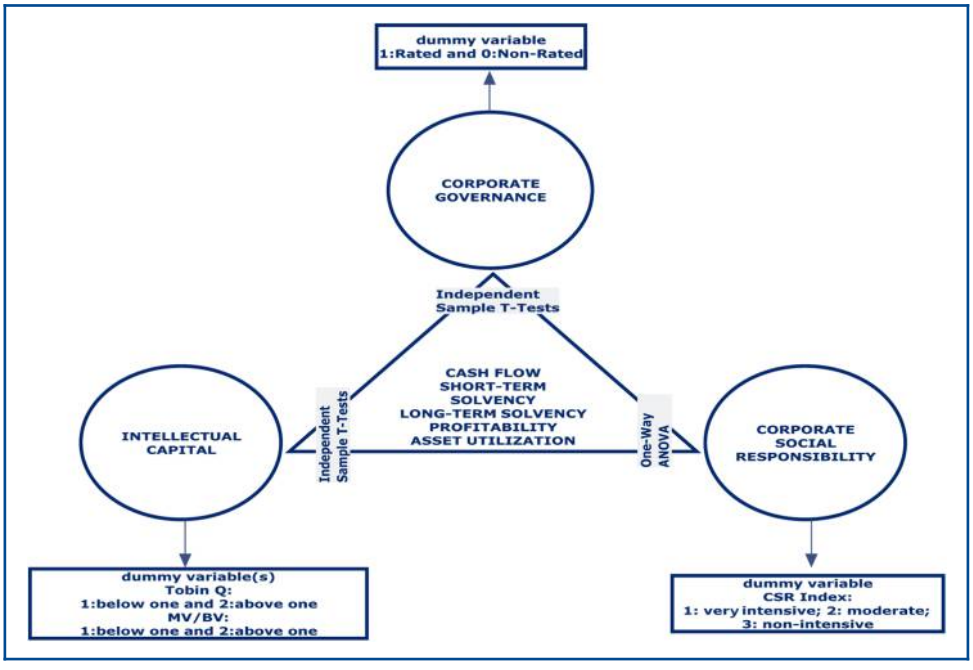
Note: *t*-test significance level takes Levene's test for equality of variances into account

the second stage, we applied independent sample *t*-test among CG, IC and CSR. Because CG has a categorical variable, we tested whether there is statistically significant difference between these categories. As a result of conducting the test, we proved that there is a statistically significant mean difference between IC, CG and CSR by using two different samples.

4.2 Indirect linkages among CG, IC and CSR

This section gives the findings coming from exploring indirect linkages among IC, CG and CSR. Figure 3 depicts the structure of the proxy variables for each construct and the proposed statistical tests used. In conducting indirect tests, we change the structure of IC and CSR from continuous variables to categorical variables as it is the case for CG. The reason is simply to test the mean difference of firms' unsystematic factors based on categorization of IC, CG and CSR. Categories of CG remain the same as those of rated and non-rated firms. In case of categorizing IC, we use threshold value of 1 for both proxies of MV/BV and Tobin Q ratios. Conceptually, the threshold value of 1 is interpreted as a limit for a firm to show positive expectation for unexplained components of intellectual value. Therefore, we categorize MV/BV and Tobin Q into two categories: the first category takes a value below 1 and the second category takes a value above 1. In case of categorizing CRS, we developed three categories:

Figure 3 Indirect tests for research model



1. so-called non-intensive firm in CSR, takes a value less than 33.3 per cent;
2. so-called moderate firm in CSR, takes a value between 33.3 and 66.6 per cent; and
3. so-called very intensive firm in CSR, takes a value higher than 66.6 per cent (Figure 3).

The primary logic behind indirect testing methodology is to decide whether there is a statistical significant difference in firms' unsystematic factors based on the categorization of IC, CG and CSR. Firms' unsystematic factors are chosen as cash flow (CF), short-term solvency (SS), long-term solvency (LS), profitability (PR) and asset unitization (AU). We chose one proxy variable per each firm's unsystematic factors. These proxies are selected based on a review of frequently used financial ratios derived from the literature.

The first indirect test is conducted between CG and firms' unsystematic factors. Because there are two categories of CG, independent sample *t*-test is applied to explore the linkages between CG and firms' unsystematic factors. Table X demonstrates summary statistics and *t*-test results for the full sample. The hypotheses that there are statistical significant mean differences between rated and non-rated firms cannot be rejected for CF, SS and LS, whereas the hypotheses are rejected for PR and AU. Even though these results are quite significant for firms' unsystematic factors, we conduct a diagnosis analysis developed in previous section in which a distressed sample is derived from non-rated firms for comparing with rated firms.

Table XI shows the results of independent sample *t*-test conducted on a sub-sample. In this case, we compare rated firms with distressed firms to see the mean differences. The results

Table X Independent sample *t*-tests for CG (full sample-indirect test)

Variables	*CG*	N	*Mean*	*SD*	t-*test significance (two-tailed)*
CF	Rated	55	0.0969	0.21380	0.001
	Nonrated	592	0.3011	1.33815	
SS	Rated	55	1.7533	1.45029	0.004
	Nonrated	592	2.3952	2.42401	
LS	Rated	55	0.5516	0.17061	0.004
	Nonrated	592	0.4346	0.21553	
PR	Rated	55	0.0492	0.06007	0.442
	Nonrated	592	0.0421	0.10155	
AU	Rated	55	1.1075	0.74162	0.193
	Nonrated	592	0.9723	0.56576	

Notes: *t*-test significance level takes Levene's test for equality of variances into account; *N* = number of firms; CF = cash flow from operations/total liabilities; SS = current assets/current liabilities; LS = total liabilities/total assets; PR = net income/total assets; AU = sales/total assets

Table XI Independent sample *t*-tests for CG (subsample-indirect test)

Variables	*CG*	N	*Mean*	*SD*	t-*test significance (two-tailed)*
CF	Rated	53	0.0968	0.21784	0.004
	Distressed	80	−0.0385	0.32125	
SS	Rated	53	1.7836	1.46913	0.344
	Distressed	80	1.4771	2.25337	
LS	Rated	53	0.5508	0.17333	0.000
	Distressed	80	0.5842	0.22036	
PR	Rated	53	0.0536	0.05624	0.000
	Distressed	80	−0.0466	0.13261	
AU	Rated	53	1.1493	0.72263	0.014
	Distressed	80	0.8592	0.54262	

Notes: *t*-test significance level takes Levene's test for equality of variances into account; *N* = number of firms; CF = cash flow from operations/total liabilities; SS = current assets/current liabilities; LS = total liabilities/total assets; PR = net income/total assets; AU = sales/total assets

as depicted are more supportive than full sample comparison. The mean differences for CF, LS, PR and AU cannot be rejected, whereas there is no enough evidence to reject the mean difference for SS based on the categorization of rated and distressed firms. Despite the fact that there is high value of SS for rated firms than that of distressed firms as expected, it is not confirmed by *t*-test. The main reason can be hidden in the manipulation of the proxy for SS. The argument here is that the construct of SS is measured by a proxy of current ratio which is a well-known indicator of short-term solvency. Firms are thought to be eager to manipulate this ratio to persuade creditors, whereas there is no statistical test to prove this argument within the context of present paper.

The second indirect test is conducted between IC (Tobin Q and MV/BV) and firms' unsystematic factors. Because categorization of Tobin Q (denoted as DTOBINQ in Table XII) includes two groups as firms below and above the value of 1, independent sample *t*-tests are applied. Table XII depicts the results of the methods. As depicted, numbers of firms below 1 and above 1 are 278 and 369, respectively. The hypotheses that there are statistically significant mean differences between these two groups cannot be rejected for LS, PR and AU, whereas the hypotheses are rejected for CF and SS. The inference can be derived from these findings is about which of these factors lead a differential in such categorization of Tobin Q. LS, PR and AU seem to be important factors to differentiate firms based on Tobin Q, whereas cash flow and short-term solvency do not imply a statistically significant contribution to this differential within a five-year period of analysis. In addition, cash flow of firms that have a value of Tobin Q above 1 is still higher than that of firms having a value lower than 1. However, a contradicting finding exists for short-term solvency (current ratio) as it was the case in direct test. It seems that firms that have a lower Tobin Q ratio produce higher current ratio than those of having higher Tobin Q ratio.

MV/BV, as a second proxy of IC, is categorized into two categories, the same as Tobin Q. Because the categorization of MV/BV (denoted as DMVBV in Table XIII) includes two groups as firms below and above the value of 1, independent sample *t*-tests are applied. Table XIII depicts the results of the methods. As depicted, numbers of firms below 1 and above 1 are 260 and 387, respectively. The hypotheses that there are statistical significant mean differences between these two groups cannot be rejected for LS, PR and AU, whereas the hypotheses are rejected for CF and SS. The inference that can be derived from these findings is about which of these factors leads a differential in such a categorization of MV/BV. LS, PR and AU seem to be important factors to differentiate firms based on MV/BV, whereas cash flow and short-term solvency do not imply a statistical significant contribution to this differential within five-year period of analysis. In addition, the cash flow

Table XII Independent sample *t*-tests for Tobin Q (indirect test)

Variables	*DTOBINQ*	N	*Mean*	*SD*	t-*test significance (two-tailed)*
CF	Above 1	278	0.2537	0.96750	0.585
	Below 1	369	0.3064	1.47728	
SS	Above 1	278	2.4003	2.13912	0.578
	Below 1	369	2.2958	2.52040	
LS	Above 1	278	0.3948	0.18588	0.000
	Below 1	369	0.4820	0.22686	
PR	Above 1	278	0.0327	0.08792	0.021
	Below 1	369	0.0503	0.10558	
AU	Above 1	278	0.8644	0.55451	0.000
	Below 1	369	1.0738	0.58899	

Notes: *t*-test significance level takes Levene's test for equality of variances into account; DTOBINQ = Tobin Q in dummy form; *N* = number of firms; CF = cash flow from operations/total liabilities; SS = current assets/current liabilities; LS = total liabilities/total assets; PR = net income/total assets; AU = sales/total assets

Table XIII Independent sample *t*-tests for market to BV (indirect test)

Variables	*DMVBV*	N	*Mean*	*SD*	t-*test significance (two-tailed)*
CF	Below 1	260	0.2360	0.96260	0.402
	Above 1	387	0.3159	1.45916	
SS	Below 1	260	2.3987	2.19418	0.609
	Above 1	387	2.3017	2.47187	
LS	Below 1	260	0.4005	0.18645	0.000
	Above 1	387	0.4742	0.22686	
PR	Below 1	260	0.0295	0.08843	0.005
	Above 1	387	0.0516	0.10420	
AU	Below 1	260	0.8819	0.56784	0.000
	Above 1	387	1.0523	0.58424	

Notes: *t*-test significance level takes Levene's test for equality of variances into account; DMVBV = MV/BV in dummy form; *N* = number of firms; CF = cash flow from operations/total liabilities; SS = current assets/current liabilities; LS = total liabilities/total assets; PR = net income/total assets; AU = sales/total assets

of firms that have a value of MV/BV above 1 is still higher than that of firms having a value of below 1. The same contradicting finding exists for short-term solvency (current ratio), as it was the case in direct test. It seems that firms that have a lower MV/BV ratio produce higher current ratio than those of having higher MV/BV ratio.

The third indirect test takes place between CSR and firms' unsystematic factors. Because CSR is categorized into three categories (very intensive, moderate and non-intensive firms in CSR), ANOVA is more appropriate method to test equality of these three sample means by analyzing their sample variances. Table XIV documents summary statistics and ANOVA results. As depicted, numbers of very intensive, moderate and non-intensive firms in CSR are 212, 121 and 314, respectively. The hypotheses that there are statistically significant mean differences among these three groups cannot be rejected for CF, LS, PR and AU, whereas the hypothesis is rejected for SS. There is sufficient evidence to support the claim

Table XIV ANOVA for CSR (indirect test)

Variables	*CSR*	N	*Mean*	*SD*	*ANOVA (significance)*
CF	Very intensive	212	0.5209	1.63217	0.003
	Moderate	121	0.2511	0.57019	
	Non-intensive	314	0.1362	1.18946	
	Total	647	0.2838	1.28267	
SS	Very intensive	212	2.4272	2.29925	0.559
	Moderate	121	2.4557	1.68486	
	Non-intensive	314	2.2379	2.61740	
	Total	647	2.3407	2.36294	
LS	Very intensive	212	0.4137	0.21014	0.001
	Moderate	121	0.4151	0.18355	
	Non-intensive	314	0.4768	0.22411	
	Total	647	0.4446	0.21447	
PR	Very intensive	212	0.0715	0.10174	0.000
	Moderate	121	0.0384	0.07316	
	Non-intensive	314	0.0250	0.10093	
	Total	647	0.0427	0.09869	
AU	Very intensive	212	1.1031	0.67096	0.001
	Moderate	121	0.9299	0.52815	
	Non-intensive	314	0.9241	0.52671	
	Total	647	0.9838	0.58329	

Notes: *t*-test significance level takes Levene's test for equality of variances into account; *N* = number of firms; CF = cash flow from operations/total liabilities; SS = current assets/current liabilities; LS = total liabilities/total assets; PR = net income/total assets; AU = sales/total assets

that the three group means are not all the same except for the construct of SS. The mean values of these three groups for the construct of SS are quite close to each other, whereas the value for very intensive firms in CSR is still higher than those of non-intensive firms in CSR. This does not change the reality that short-term solvency does not contribute the statistically significant differential among categorization of CSR.

As a result of indirect tests, it was aimed to test the possible effect of categorizations of IC, CG and CSR on the firms' unsystematic factors. We found a strong effect of these three constructs on firms' unsystematic factors.

5. Concluding remarks

The present study was aimed to explore the linkages among IC, CG and CSR through direct and indirect statistical examination. Results of direct tests among IC, CG and CSR show that there are statistical significant differences among these constructs. First, we showed that there is positive relationship observed between CSR and IC by using their continuous proxy variables. Second, we applied independent sample *t*-test among CG, IC and CSR. Because CG has a categorical variable, we tested whether there is statistically significant difference between these categories. In conducting the test, we documented that there is statistically significance mean difference between IC, CG and CSR by using two different samples. As a result of indirect tests, it was aimed to test the possible effects of categorizations of IC, CG and CSR on the firms' unsystematic factors. The results indicate that there is a strong effect of these three constructs on firms' unsystematic factors. However, we cannot tell the sensitivity of these effects among the constructs which needs additional multivariate statistical examination. We left this issue for future implications. Despite the mixed results observed in literature, the present study provides evidence favoring the positive linkages among CG, IC and CSR.

In line with theoretical and empirical advancements on IC, CG and CSR, it is observed that time dimension has not been taken into account as a mediating variable. In case of present study, a five-year research window is set as it is a regular approach in literature. However, firms have a different stage of development such as early stage, growing stage, maturity stage etc. Therefore, it is wise to expect that the development of each of these concepts and the linkages among these concepts and firms facets should be different. In the short-run, at the early stage, firms may not have enough resources to invest in CSR, to apply high standard of CG and invent IC. As a result, testing positive linkages among these concepts and firms facets in the short-run may produce negative associations. Similarly, in the long-run, firms may invest in CSR, conduct high standard of CG and develop IC. In this case, a positive association can be easily settled. Based on this argument, further research may open a new discussion to test linkages among these concepts and firms facets in the short- and long-run separately.

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