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Article

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Borsa İstanbul Review

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Suggested Citation: Shahzad, Faisal; Baig, Mushahid Hussain; Ur Rehman, Ijaz; Saeed, Asif; Asim, Ghazanfar Ali (2022) : Does intellectual capital efficiency explain corporate social responsibility engagement-firm performance relationship? Evidence from environmental, social and governance performance of US listed firms, *Borsa İstanbul Review*, ISSN 2214-8469, Elsevier, Amsterdam, Vol. 22, Iss. 2, pp. 295-305,
<https://doi.org/10.1016/j.bir.2021.05.003>

This Version is available at:

<https://hdl.handle.net/10419/340270>

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Does intellectual capital efficiency explain corporate social responsibility engagement-firm performance relationship? Evidence from environmental, social and governance performance of US listed firms

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Received 22 August 2020; revised 17 May 2021; accepted 17 May 2021

Available online 26 May 2021

Abstract

This paper examines the effect of corporate social responsibility on firm performance by accounting for the role of Intellectual capital efficiency as a mechanism underlying Corporate Social Responsibility (CSR)—firm performance association. In this study, we consider 2132 US companies and develop a structural model for CSR, Intellectual Capital (IC), and firm performance while contemplating endogeneity issues in analyses over the period of 2009–2018. The value-added intellectual capital co-efficient is employed as a proxy measure for IC performance, taking into consideration corporate performance and governance measures. The findings suggest that CSR has a significant effect on firm performance. In particular, the findings reveal that CSR has a link with IC, indirectly affecting a firm performance, and the association between CSR and firm performance is partially mediated by Intellectual capital efficiency.

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JEL classification: A25; M14; O34

Keywords: Firm performance; Corporate social responsibility; Intellectual capital efficiency

1. Introduction

Increased globalization and the emergence of knowledge-based economies revolutionized the meaning of Corporate Social Responsibility (CSR) via altering the basic philosophy of society and businesses. CSR practices drive contemporary businesses to contemplate social along with the economic aspects. Thus, a modern enterprise deems both economic and social aspects imperative during decision-making (Sarkar, 2005). Enterprises participate in CSR activities to overcome

agency problems thus generating relational assets and moral capital consequently boosting a firm's performance. When firms engage in CSR activities, several benefits are achieved which include reduced employees' turnover rates, increased employees' commitment, increased satisfaction level of customers and enhanced customer loyalty consequently, all of which improve a firm's reputation (Rehman, Baloch, & Sethi, 2015).

This new route for an enterprise is guided by CSR-forced modern corporate entities to implement practices that are in line with stakeholders' perceptions and expectations. Consequently, the nexus between enterprises and society transformed the roles and responsibilities of businesses in society. The inclusion of societal aspects in enterprise decision-making is not without challenges and is imperiled by a trade-off between the cost and benefits for a business. On the contrary, Porter and Kramer (2006) view CSR facets as a competitive

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Peer review under responsibility of Borsa İstanbul Anonim Şirketi.

advantage rather than a cost or constraint if they are incorporated into the strategic framework of an enterprise.

In the late 20th century, the global economies transitioned from the old industrial age towards the knowledge age, repositioning the strategies for businesses to achieve their strategic goals and objectives (Chaharbahhi & Cripps, 2006). This revolution encouraged business entities to focus more on intangible assets rather than tangible ones to achieve a competitive advantage. Subsequently, firms with suitable intellectual capital tend to have an improved chance of survival in the global economic arena (Bontis, 2003). Thus, in contemporary businesses, knowledge-based assets are pivotal for the firm's internal capabilities if utilized effectively.

There are three major components of IC which include Human capital (HC), Structural capital (SC), and Relational capital (RC) (Sveiby, 1997). Human capital (HC) comprises expertise, skills, experience, and training received by employees while carrying out their jobs. Structural capital (SC) includes organizational resources such as management measures, approaches, plans and databases. This type of IC enables employees to enhance their on-the-job performances which in turn enhance firm performance. Relational capital (RC) refers to a firm's intellectual assets helping firms to build, manage and retain external relationships – relationships with customers, suppliers, marketing channels and stakeholders.

Previous literature seems increasingly focused on exploring and explaining the association between a firm's performance with CSR.¹ These studies largely ignored intellectual property as an important positive contributor to a firm performance. From a bird's eye view, globally, firm performances are influenced by two parallel phenomena, i.e., the shift towards a knowledge-based economy, and the incorporation of CSR facets to manage those intangible assets. Similarly, Sumita (2005) describes intellectual capital and Corporate Social Responsibility as two opposing sides of a coin where both describe the association between society, companies and their performance. Studies rooted in the resource-based perspective argue that CSR can be a pivotal resource for sustained competitive advantage if it interacts with intangible assets of the firm (Jain, Vyas, & Roy, 2017) thus, suggesting mediation between CSR and a firm's intellectual resources. Similarly, Edvinsson (2002) suggested that dependence on value creation (as a source of competitive advantage) shifted from the physical to intangible, and is rooted in the firm's activities and specialized knowledge. These intangible resources (valuable, rare and hard-to-imitate) are indeed the real form of intellectual capital (Stewart, 1997).

Thus, in contemporary corporate settings, a firm's competitive capabilities depend on the effective deployment of intellectual resources and organizational processes linking CSR to intangible resources. In a similar regard, Welford (2007) raised two imperative questions, i.e., what type of rare and

valuable intangible assets can be acquired via CSR, and secondly, how can a stakeholder's management influence the ability of a firm to enhance and protect these rare resources in the form of IC? Contemplating these questions, Tetrault Sirsly & Lamertz (2008) argued that investment in CSR creates both internal and external benefits, i.e., improvement in the company's reputation and stakeholder's relationship (external benefits) and the deployment of rare resources and capabilities rooted in IC (internal benefits). Thus, a socially responsible firm is more capable of drawing and utilizing new resources via the materialization of its relational networks consequently, strengthening the intellectual capital of a firm.

Now, however, studies have started giving increasing importance to intellectual capital (IC) because it helps firms achieve a competitive advantage. A critical review of the literature shows that previous studies largely ignored the mediation role of IC while encapsulating the association of CSR and firm performance. This specific notion is imperative because there is a direct causality between CSR and IC. This provides a potential gap in the research. Henceforth, this study aims to fill this literature gap by empirically investigating the nexus of firm performance and CSR via the mediation of IC in a firm. Our results suggest that CSR has a significant effect on firm performance. In particular, the findings reveal that CSR engagement has a link with IC, and CSR indirectly affects a firm performance. The association between CSR and the firm's performance is fully mediated by Intellectual capital efficiency.

The remaining paper is organized in the following way. Section 2 contains a discussion on the theoretical framework developed based on formulated hypotheses. The research methodology employed in the paper and the econometric model are discussed in Section 3. Results followed by discussion are reported in Section 4 and the conclusion is given in Section 5.

2. Theoretical framework

2.1. CSR and firm performance

Previous studies have tried to find a direct nexus among CSR and firm performance. A fair share of literature highlights a positive association between CSR and firm performance² while others reported no correlation or negative association between CSR and a firm's performance.³ Similarly, the literature deems the company's success is rooted in its ability to create enough wealth and satisfaction for its primary stakeholders (Clarkson, 1995). The firm's primary stakeholders include all of its customers, communities, suppliers, employees and the natural environment. Further, the firm's operational and financial performance is linked to the seamless

¹ See for instance (Javeed & Lefen, 2019; Walker et al., 2019; Sial, Tehmina & Nguyen, 2018; Feng, Wang, & Kreuze, 2017; Martinez-Conesa, Soto-Acosta, & Palacios-Manzano, 2017; Agan et al., 2014; Sweeney, 2009).

² See for instance (Javeed & Lefen, 2019; Rahman et al., 2017; Galbreath & Shum, 2012; Abu Bakar & Ameer, 2011; Van Beurden & Gössling, 2008; Orlitzky et al., 2003).

³ See for instance (Aupperle et al., 1985; Crisóstomo, de Souza Freire, & de Vasconcellos, 2011; Malcolm et al., 2007).

operations of these entities (Mishra & Suar, 2010; Godfrey, 2005), i.e., meeting stakeholders needs through active involvement in CSR activities which helps firms to improve their financial performance (Jones, 1995; Naseem et al., 2020).

CSR facilitates firms in the reduction in conflict of interest among managers and other stakeholders (Sial et al., 2018), i.e., to overcome agency problems. CSR activities generate relational assets and moral capital which boosts a firm's performance (Wang et al., 2008). CSR activities reveal a reduction in the employee turnover rate and increased employees' commitment (Santos, 2011), increased satisfaction level of customers (Saeidi et al., 2015), enhanced customer loyalty (Weber, 2008) as well as helping firms to improve their overall reputation (Chatzoglou et al., 2017; Tencati et al., 2004). The above-mentioned factors facilitate firms towards lowering the transaction cost and improved firm performance (Manchiraju & Rajgopal, 2017; Sprinkle & Maines, 2010). Those firms that generate more revenues are keen to depict environmental and social disclosure in their report (Ho & Taylor, 2007). Moreover, according to social impact theory, CSR positively impacts financial performance (FP) and improves the social relationship of the firm (Cornell & Shapiro, 1987). Return on equity (ROE) is supposed to be very important for CSR and FP and the studies verify that ROE is largely used as a performance measure (Moskowitz, 1972). Thus, in hindsight according to the above discourse, we hypothesized the following.

H1. *Corporate social responsibility (CSR) and firm performance are positively linked with each other.*

2.2. Corporate social responsibility, intellectual capital, and firm performance

In modern times we have seen a shift from the industrial age to the information age. In the industrial age, companies achieved economic growth via tangible assets like machinery, plants, equipment and buildings. On contrary, in the information age, intellectual assets which include processes, people and capabilities, play a vital role in economic growth (Guthrie, Cuganesan, & Ward, 2007; Petty & Guthrie, 2000). Intellectual capital encompasses the capabilities and skills of employees in generating wealth for firms; such skill-based resources are unique and imperative for an organization (Sardo & Serrasqueiro, 2017; Huang, 2007; Peteraf & Barney, 2003). There are three major components of IC which comprise Human capital (HC), Structural capital (SC), and Customer capital (PC) (Sveiby, 1997). A study by Bontis (2001) considers Relational capital (RC) as a substitute for customer capital. The same Relational capital has been employed in many further research studies (Joshi et al., 2013; Nadeem et al., 2017).

Similarly, CSR also plays a vital role in improving the economic performance of the firm (Tsoutsoura, 2004). More precisely, CSR includes the practice and set of policies that are rooted within the business operations, decision-making processes, and supply chain of a firm and it includes issues

associated with environmental concerns, business ethics, governance, and human rights in the workplace, and the market place and community investment. Companies' internal and external stakeholders are motivated to donate more resources towards CSR activities (Razafindrambinina & Kariodimedjo, 2011; Tsoutsoura, 2004). IC and CSR are two opposite sides of the coin with both explaining the association between society and companies (Sumita, 2005). Human capital (HC) is a component of IC which contains employees' skills, knowledge, and capabilities pertaining to employees of the organization and their wellbeing. This is also considered a social and economic responsibility of the businesses (Voegtlin & Greenwood, 2016).

In a similar vein, CSR activities include employees' welfare and business ethics in different ways which bolsters employees' performances thus assisting human resource management. These activities also help firms attract more qualified and highly skilled employees (Gangi et al., 2019; Gully et al., 2013). Similarly, CSR initiatives help firms in developing their HC by improving the loyalty and commitment of employees thus achieving competitive advantages relative to their competitors (Branco-Castelo & Rodriguez-Lima, 2006). The HC component of IC is strongly linked to Structural capital (SC). Intellectual capital means a stronger organizational culture that supports a high level of innovation in products and processes and also motivates employees to show more productive behavior (Barrena-Martinez et al., 2018). Thus, CSR provides a base for sustainable corporate culture, and CSR activities cause an increase in employee commitment which further leads towards higher innovation, creativity and performance (Kim et al., 2010). Internal CSR helps organizations to build a trustworthy environment and contribute positively and effectively towards organizational knowledge that is implanted in employees and managerial skills (Brammer, Millington, & Rayton, 2007). Thus, this creates a promising work environment and motivates employees leading to higher employee performance (Davis et al., 2000).

Furthermore, CSR helps firms to improve Relational capital (RC) (Gangi et al., 2019), i.e., improving image and reputation among its stakeholders (Aras, Aybars, & Kutlu, 2011). Firms that involve CSR gain a positive reputation (Melo & Garrido-Morgado, 2012), and such firms acquire several business benefits, for instance, lower labor costs (McWilliams & Siegel, 2011) customer loyalty (Aramburu & Pascador, 2017; Kim, 2017; Gatzert, 2015), attracting investors and facing lower funding costs (El Ghoul, 2011). Thus, this suggests a positive association between CSR and Relational capital (RC).

The IC of a firm may be defined as the sum of all the unique resources, capable of generating wealth for the firm so that they achieve a competitive advantage over their competitors, such as skills and competencies possessed by its employees (Choo Huang, 2007; Peteraf & Barney, 2003). Past literature largely ignored intellectual property as an imperative positive contributor to the financial performance of a firm. This was due to conventional accounting standards (Financial Reporting Standard 138) hampering the exposure of intangible assets on financial statements (Gigante, 2013; Joshi et al., 2013; Wang

& Chang, 2005). However, practitioners and academics have started giving attention to IC in the recent past. IC comprises of intangible assets that lead the firm towards wealth creation (Sardo & Serrasqueiro, 2017; Burgman et al., 2005; Edvinsson & Malone, 1997).

Extant literature on IC and firm performance has yielded varying outcomes. Few empirical studies⁴ have confirmed a significant association between firm performance and intellectual capital. On the contrary, some studies⁵ have found no significant relationship between these variables. Sveiby (1997) gave the taxonomy of IC, suggesting its three types, namely Human capital (HC), Structural capital (SC), and Customer capital (CC). Bontis (1996) substituted Customer capital with Relational capital (RC) which was employed by (Joshi et al., 2013; Nadeem et al., 2017).

Human Capital (HC) contains abilities, skills, capabilities and expertise attained by workers during their jobs. This capital shifts with the employees turnover in an organization (Spender, 1996; Roos et al., 1997; Ahangar, 2011). Optimum utilization of human resources by a firm result in value creation, thereby improving a firm's performance (Abeysekera, 2010). Organizational structures and procedures such as management processes, plans and records constitute structural capital. This type of IC enables employees to enhance their on-the-job performance which in turn ameliorates firm performance (Bollen et al., 2005; Nonaka, 1994; Roos et al., 1997). Some studies (Keong Choong, 2008; Nadeem et al., 2017) have suggested subdividing the Structural capital (SC) further into two types. The first type of SC includes trademarks, copyrights, databases and patents. Whereas the other type of SC considers all infrastructural resources, enabling firms to perform their routine tasks. Relational capital (RC) refers to a firm's intangible assets that will help firms to construct, sustain and control external relationships – relationships among customer, suppliers, stakeholders and marketing channels (Tether & Tajar, 2008; Meles et al., 2016).

Previous researches applied different theories to develop an understanding of the significance and role of Intellectual capital (IC) in improving a firm's performance. For instance, resource-based theory (RBV) (Wernerfelt, 1984), advocates the optimization of strategic resources (such as a specialized skill set, specific operating procedures, databases, etc.) to achieve comparative advantages relative to their competitors. In a similar vein, Khan et al. (2019) find that IC facilitates firms to achieve a competitive edge and thus improves their overall performance. According to organizational learning theory, organizations having a culture of continuous learning experience with both product and process innovation. Thus, this theory is concerned with the Structural capital (SC) of a firm. Nadeem et al. (2017) revealed that as a result of investment in development and more research activities, firms experience improvement in their performance. The resource dependence view is yet another view (Pfeffer & Salancik, 1978), relied upon

to explore and understand the IC – firm performance link. This theory recommends that organizations greatly rely on resources sourced from the outside environment for their operations. The utilization of these external resources ultimately determines the firm performance and behavior. Resource dependence theory, in part, may be viewed as indicating the importance of HC – an external resource – in ensuring improvement in the performance of a firm. Similarly, Smriti and Das (2018) showed that firms that employed HC optimally experienced an increase in overall productivity and firm performance. Thus, in hindsight of the above discourse, we hypothesized the following:

H2. *Intellectual Capital (IC) mediates the relationship between CSR and firm performance.*

3. Research methodology

3.1. Data collection

This study employs the unbalanced panel data of public listed firms in the USA⁶ from 2009 to 2018. The sample excludes finance companies due to their different investment patterns compared to non-finance companies. To examine whether the relationship between CSR and FP is mediated by IC, data on CSR were extracted from the Thomson Reuters ASSET4 database, mostly applied in past studies (Rehman et al., 2020; Naseem et al., 2020). We begin by analyzing the complete list of public companies yielded by the Thomson Reuters database. Subsequently, the companies for which Environmental, Social, and Governance (ESG) information was not available for at least one financial year between 2009 and 2018 were excluded from the list. This data extraction process resulted in a sample comprising 2541 USA companies for the 10-year period of 2009–2018. This resulted in a total of 25,410 firm-year observations.

Additionally, the financial sector firms were not considered as they could not be meaningfully and directly compared to the manufacturing and service sector firms. Hence the application of this filter limited the sample of 2132 firms over the period of 10 years. The ASSET4 data were matched to the Thomson Reuters DataStream to obtain data on the variables of FP and IC for the estimation of Value-Added Intellectual Capital (VAIC). Owing to missing data on several governance variables, VAIC and certain firm-specific control variables, the final sample was restricted to 6152 firm-year observations by the econometric analyses. The descriptive statistics of firm-specific characteristics are reported in Table S1.

Table S1 represents the descriptive statistics of the key variables. In the table, the return on asset (ROA) of the sample shows the companies varies from –44.58 to 20.23 with 2.17 mean value, demonstrating that after tax net profit is 2.17 times more than the total asset of the firm. The CSR performance shows the minimum value of 5.63 and a maximum value of

⁴ For instance (Clarke et al., 2011; Tan et al., 2007).

⁵ For instance (Chan, 2009; Firer & Williams, 2003).

⁶ Thomson Reuter's data stream is used to gather the data of firms for the last 10 years i.e., from 2009 to 2018.

96.247, with a mean of 50.462. This demonstrates that there is a moderate level of CSR performance in US firms. Similarly, the IC of the sample companies range from 2.218 to 15.395, and the mean value of IC is 12.445, this represents that the sample companies have a maximum level of IC. The IC in the existing study is 12.445. However, the IC in Indonesia is 4.81 (Razafindrambinina & Kariodimedjo, 2011), 4.052 in Greece (Maditinos et al., 2011), 0.42 in Australia (Clarke, Seng, & Whiting, 2011), 5.795 in Iran (Alipour, 2012) and 10.63 in the UK (Wang, 2011).

The average IC score seen here suggests that IC efficiency is higher in the USA relative to the other markets. Age which is our control variable varies from 0 to 3.807 with a mean value of 2.626. This proposes that the sample firms are older firms while the board size varies from 1 to 19 with a mean of 9.52, representing board size changes to a great extent across sample companies. We also report the correlation analysis in Table S2 to diagnose a potential multicollinearity issue. The results reported in Table S3 confirm that variables survive with the existence of multicollinearity issue.

3.2. Econometric model

To analyze the mediating role of IC on the relationship between CSR and firm performance. We employed the method used by Baron and Kenny (1986). By taking IC as a mediator, the following econometric model was developed:

$$FP_{i,t} = \alpha_0 + \alpha_1 CSR_{i,t} + \alpha_2 SIZE_{i,t} + \alpha_3 AGE_{i,t} + \alpha_4 LEV_{i,t} + \alpha_5 BI_{i,t} + \alpha_6 BS_{i,t} + \sum \alpha_j INDUSTRY + \sum \alpha_K YEAR + \varepsilon_{i,t} \tag{1}$$

$$IC_{i,t} = \beta_0 + \beta_1 CSR_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 AGE_{i,t} + \beta_4 LEV_{i,t} + \beta_5 BI_{i,t} + \beta_6 BS_{i,t} + \sum \beta_j INDUSTRY_{i,t} + \sum \beta_K YEAR_{i,t} + \varepsilon_{i,t} \tag{2}$$

Table 1
Variable's description.

Name of Variable	Label of Variable	Nature of variable	Description
Dependent Variables			
Firm Performance	FP	Numerical	Calculated by ROA. ROA is the ratio of net profit after tax to total assets. Where TobinQ is the ratio of firm market value plus liabilities over total assets.
Independent Variables			
Corporate Social Responsibility	CSR	Numerical	CSR is the average score of three ESG Pillars i.e. Environment, Social and Governance.
Mediating Variables			
Intellectual Capital	IC	Numerical	The study computes it through the VAIC model.
Control Variables			
Firm size	SIZE	Numerical	Natural logarithm of total assets
Leverage	LEV	Numerical	Leverage is the ratio of total debt divided by the total asset.
Board Size	BS	Numerical	Natural logarithm of the number of directors.
Board Independence	BI	Numerical	Percentage of an independent board of directors.

$$FP_{i,t} = \gamma_0 + \gamma_1 IC_{i,t} + \gamma_2 CSR_{i,t} + \gamma_3 SIZE_{i,t} + \gamma_4 AGE_{i,t} + \gamma_5 LEV_{i,t} + \gamma_6 BI_{i,t} + \gamma_7 BS_{i,t} + \sum \gamma_j INDUSTRY_{i,t} + \sum \gamma_K YEAR_{i,t} + \varepsilon_{i,t} \tag{3}$$

where α_1 in eq. (1) captures the direct impact of CSR on firm performance, β_1 in eq. (2) shows the impact of CSR on IC and γ_1 in eq. (3) indicates the effect of the intermediate variable IC on FP. The total impact on FP is the sum of the direct effect of CSR and the indirect mediator effect of IC which is, $\alpha_1 = \gamma_1 + \beta_1 \gamma_2$. The year and industry effects are restricted by the function of particular dummies. The variables' construction is given in Table 1.

3.3. Measurement of main variables

3.3.1. Firm performance

Following the previous literature, the first accounting-based measure of firm performance was the Return on Assets (ROA) (Shahzad et al. 2019). However, as a robust check, we also used a market-based measure of a firm's performance namely, Tobin's Q.

3.3.2. Independent variable: corporate social responsibility

To gauge CSR, a comprehensive CSR index was constructed based on Environmental, Social, and Governance (ESG) pillars. The data related to ESG was gathered from the Thomson Reuters-ASSET 4data stream. ASSET4 outlines each of the sample firms, including several indicators of environmental, social, and governance aspects of a firm's decisions. Each CSR pillar is rated using relevant information provided by the ASSET4 element of Thomson Reuters. Drawing on previous studies, we allocate equal weights to each of the three pillars (Attig et al., 2016; Cheng et al., 2012; Naqvi et al. 2021; Samet & Jarboui, 2017). The CSR score range is between 0 and 100. The higher the value, the higher the CSR performance in the firm.

Table 2
CSR (Corporate Social Responsibility), IC (Intellectual capital) and ROA (Firm Performance).

	ROA (1)	IC (2)	ROA (3)
CSR	0.029*** (5.920)	0.003*** (7.000)	0.010** (2.380)
IC			6.557*** (53.350)
Size	-0.218** (-2.380)	0.875*** (111.270)	-5.953*** (-45.320)
Age	0.809*** (6.390)	0.069*** (6.290)	0.360*** (3.430)
Leverage	-6.433*** (-15.74)	-0.056 (-1.600)	-6.063*** (-17.960)
Board Independence	-0.986 (-1.520)	-0.030 (-0.530)	-0.792 (-1.480)
Board Size	0.429 (1.060)	0.107*** (3.070)	-0.272 (-0.810)
Constant	12.152*** (5.190)	-0.525*** (-2.610)	15.592*** (8.060)
Industry Dummies	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes
Observations	6152	6152	6152
R ²	0.140	0.834	0.413
Sobel Test			6.944***

Note: Definitions of variables were given in Table 1. Values in the parentheses show t-values which are rounded off to three decimal points. *, **, ***represents significance at 10%, 5% and 1% levels.

3.3.3. Measurement of intellectual capital

3.3.3.1. VAIC model. VAIC, introduced by Pulic (2000,2004), is used to measure IC. The model employs firms’ financial data to compute the efficiency of their IC and asset values. Previous research studies used VAIC as a proxy for IC (Dzenopoljac, Janosevic & Bontis, 2016; Joshi et al., 2013; Kamath, 2008; Purohit &Tondon, 2015). The detailed computation of VAIC model is provided in Supplementary document.

3.3.4. Control variables

In the extant literature, studies⁷ have investigated the impact of intellectual capital on firm performance focusing on several variables including firm size, leverage, board size, firm age and board independence. The study computed firm size by taking the natural log of total assets, revealing the capability of an organization to attain maximum resources and gaining the best opportunities (Galbreath, 2018; Hsu, Lai, & Yen, 2018). It is expected that the size of a firm positively affects its performance. The total number of years of a firm's operations is used as a measure of its age, and this study (Loderer & Waelchli, 2010) expects firm age to have a negative impact on firm performance. The third control variable, leverage, is computed as the ratio of total debt to total assets (Hsu et al., 2018; Shahzad et al., 2019) and is also expected to negatively affect a company performance. Leverage reflects the

⁷ For instance: (Shiu, 2006; Fan et al., 2011; Dzenopoljac, Janosevic & Bontis, 2016; Hsu et al., 2018).

proportion of debt in a firm's capital structure. With an increase in the debt quantity, interest expense also increases thereby reducing company income level and thus firm performance. Board size, which is the fourth control variable, causes improvement in firm performance and is computed as sum of the board of directors serving a given company at the end of the year (Hsu et al., 2018).

4. Results and discussion

4.1. Regression analysis

Employing the procedure outlined by Baron and Kenny (1986), this paper tests the mediating role of IC between CSR and FP. Baron and Kenny (1986) delineate three conditions that must be met to indicate the presence of mediation. First, CSR is significantly linked with FP. Second, CSR must also have a significant effect on the mediating IC variable. Third, when a complete regression model, including both CSR and IC was tested, the direct association among CSR and firm performance developed into significant (partial mediation) or non-significant (full mediation).

Following the study of Baron and Kenny (1986), the study tested the direct effect of CSR on a firm's performance and the mediating role of IC. Controlling certain variables, the results of regression (Table 2, Column 1), show that the CSR relationship was positively associated with a firm's performance ($\beta = 0.029$, $p < 0.01$). Additionally, examining the link between CSR and IC, the results (Table 2, Column 2) show that the relationship between CSR and IC is positive and significant ($\beta = 0.003***$, $p < 0.01$). The last study tests the Regression model including both the independent variable (CSR) and mediating variable (IC) as criterion variables and the dependent variable firm's performance (FP) as the outcome variable. The results obtained (Table 2, Column 3), showed that CSR ($\beta = 0.010**$, $p < 0.05$) was positively linked to a firm's performance. Moreover, the association of IC with a firm's performance was also positive and significant ($\beta = 6.557$, $p < 0.01$). Overall, our results suggest the existence of partial mediation as both the direct and indirect impact of CSR on a firm's performance as being significant.

The hypotheses are supported by the findings. The empirical evidence in Table 2, C3 supports hypothesis 1 which states that CSR is positively associated with a firm's performance. Hypothesis 2 posits that IC mediates the relationship between CSR and a firm's performance. Our results confirm hypothesis 2 (Table 2, Column 3). The result of Sobel test (6.944***) also represents the presence of mediation (Table 2).

4.2. Robustness check

4.2.1. Alternative measure of firm performance

An alternative market-based measure of a firm's performance, Tobin's Q is employed to assess the robustness of our results. The results reported in Column 1 of Table S3 show a negative and significant impact of CSR on firm performance as gauged by Tobin's Q (-0.008 , $p < 0.01$).

This finding is contrary to the previous one reported in (Table 2, Column 1). These findings suggest that the impact of CSR on a firm's performance turns out to be different for different measures of a firm's performance such as accounting-based and market-based. The CSR measure is sensitive towards accounting and market-based measures. The analysis suggestion that CSR responds positively to accounting based measure of Firm performance and negatively to Market-based measure However, further results in Table S3 Column 3 confirm the existence of partial mediation of IC. Further, the result of Sobel test also validates the existence of partial mediation of IC.

4.2.2. Endogeneity issue

The Hausman test was applied using an instrumental variable method; a single equation F test to determine the presence of endogeneity. The test statistic turned out to be significant between CSR and firm performance (F = 2, p < 0.05) there by providing evidence of a two-way linked endogeneity between the stated variables signaling the presence of endogeneity. To handle the endogeneity problem, this study utilizes an instrumental variable technique. Following Samet and Jarboui (2017), the initial value of CSR (LCSR) was used as an

instrument variable. To begin, CSR was regressed on the instrument and all control variables. Next, equations (1)–(3) were re-estimated employing the predicted value of CSR(PCSR) instead of CSR. The results of the first stage regression were reported in Table 3 and Table S4 of Column 1. We employed the F-test statistic to indicate the relevance of the IV in the first stage. The F-statistics in Tables 3 and S4 were higher than the critical value of 16.38, as mentioned by Stock and Yogo (2005), and the p value of the F stat was also less than 0.001. Hence, the high, positive F-statistic confirm that our instrument variable (LCSR) was significant, thus supporting the relevance of this instrument variable. In Table 3 and Table S4, the results were reported considering the issue of endogeneity. The results in Table 3 and Table S4 are like those reported in Table 2 and Table S3, thereby confirming the partially mediating role of intellectual capital. The coefficients of the control variables included in all the regression models (Table 2 to Table 3, and Table S3 to Table S4) generally bear the expected signs in line with the literature and in most of the cases they were also significant across all specifications.

The coefficients of firm size and leverage were negative and significant. This indicates that big companies and highly

Table 3
CSR, IC, and ROA (addressing the endogeneity).

	CSR (1) 1st stage	ROA (2) 2nd stage	IC (3) 2nd stage	ROA (4) 2 nd stage
PCSR		0.030*** (5.37)	0.003*** (6.59)	0.008* (1.82)
LCSR	0.900*** (166.77)			
IC	0.003 (0.002)			6.584*** (50.85)
Size	0.634*** (3.53)	-0.0379*** (-3.80)	0.858*** (95.91)	-6.033*** (-43.93)
Age	-0.257* (-1.70)	0.795*** (5.59)	0.068*** (5.41)	0.340** (2.96)
Leverage	-0.499 (-1.09)	-6.835*** (-15.77)	-0.090** (-2.33)	-6.239*** (-17.82)
Board Independence	2.026* (2.67)	-1.300* (-1.81)	-0.059 (-0.92)	-0.910 (-1.57)
Board Size	1.017** (2.19)	0.771* (1.76)	0.115** (2.92)	0.0139 (0.04)
Constant	-2.465 (-1.09)	4.751** (2.24)	-1.349*** (-7.10)	13.639*** (7.92)
Industry Dummy	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes
No. of Observations	4891	4891	4891	4891
R ²	0.928	0.153	0.819	0.448
Sobel Test				0.021***
F Stat	27757.6***			
Indirect Effect				0.021***
Direct Effect				0.008*
Total Effect				0.030***
Proportion of Total Effect that is mediated				0.724
Ration of indirect to direct effect				2.633
Ratio of total to direct effect				3.633

Note: Definitions of variables were given in Table 1. Values in the parentheses show t-values which are rounded off to three decimal points. *, **, ***represents significance at 10%, 5% and 1%, respectively.

leveraged firms experienced lowered firm performance which is in line with Shahzad et al. (2019). Additionally, the coefficient of firm age was positive and significant suggesting that mature firms performed better than new firms which was in line with Ilaboya and Ohiokha (2016) and Hui et al. (2013). On the other hand, the coefficients of board size and board independence were insignificant, advocating that in isolation, board size and board independence were helpful in a firm's performance and these findings were also in line with some prior studies such as Kumar and Singh (2013) and Rashid (2018).

5. Conclusion and implications

We examined the role of IC efficiency in explaining the impact of CSR engagement on a firm's performance using the firm level data over the period of 2009–2018. The value-added IC coefficient was employed as a proxy measure for IC performance, taking into consideration corporate performance and governance measures in the empirical models. Our results suggest that CSR has a significant effect on a firm's performance. In particular, the findings reveal that CSR engagement has a link with IC, CSR indirectly affects firm performance, and the association between CSR and a firm's performance is fully mediated by Intellectual capital efficiency. Our findings advocate that CSR and IC are not the only resources that can improve a firm's performance and relational capital also helps firms to enhance their overall performance (Gangi et al., 2019). It was observed that firms taking CSR initiatives tend to improve their reputation among their stakeholders (Aras, Aybars&Kutlu, 2011). Moreover, IC's impact on FP depends on the information according to which different IC components including SC, HC and RC facilitate organizations in creating worth that is an important resource in obtaining an edge over their competitors, and also improves a firm's performance (Meles et al., 2016; Nadeem et al., 2017; Sardo & Serrasqueiro, 2017).

In addition, the findings advocate that CSR can facilitate improvement in IC. Thus, this compliments resource-based view theory (RBV) (Tejedo-Romero, Rodrigues, & Craig, 2017) contributing to the contradictory studies concerning CSR (Clarkson et al., 2019; Lenssen et al., 2008). This depicts the pivotal role of CSR in improving the performance of firms by catering to the wide-ranging needs of a firm's stakeholders. Furthermore, the results also show that a firm's CSR helps in obtaining IC. Consequently, IC contributes to improvement in FP. This conclusion is rooted in RBV theory as it shows the resourcefulness of high IC in enhancing FP. The hypothesis that IC mediates the CSR – FP relationship has also been substantiated. In line with the RBV of a firm, the conclusion of this research reveals that CSR helps a firm obtain valuable resources such as IC that could lead to an improvement in FP.

These CSR activities are as useful in ameliorating the managers' operational efficiency and effectiveness as they are in strengthening the relationship of trust between a firm and its stakeholders. Implementation of well-thoughtout and appropriate human resource policies potentially encourages employees to hone their skills resulting in their growth in the

firm. This could also stimulate employees to use novel ideas and innovation in their work.

Additionally, treading the track of social responsibility enables a firm to generate and attract new capabilities and resources through its network. Hence, CSR causes a firm's intangibles, including intellectual capital, to increase. Devising and implementing employee-friendly HR policies in a firm would lead to the retention of employees, particularly those who have helped the firm succeed in the long-term. Firms can also maintain motivation and focus for their employees by introducing a properly designed reward and compensation system and participatory leadership.

As well as this, the since reinitiation of community projects and involvement in charities by firms places a company's image in good light in the society. This could affect a firm positively in the shorter term, but even greater benefits would accrue in the longer term. The firm can position itself as a responsible corporate citizen in the view of its varied stakeholders if it invests in green technology projects. The returns from such investments would most likely have a favorable impact on the future performance of a firm.

Conflict of interest

There is a no conflict of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.bir.2021.05.003>.

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