The intellectual CVC: The Role of Intellectual Capital on CSR strategies and financial performance of corporate investors

Simon Friedrich Georg Rausch

Dissertation written under the supervision of PhD Fatima Shuwaikh

Dissertation submitted in partial fulfillment of requirements for the MSc in Finance at Católica Lisbon School of Business and Economics, at Universidade Católica Portuguesa, 12th of September 2024

Abstract

CSR strategies advance corporate knowledge structures, creating valuable knowledge called intellectual capital. As CVCs pursue strategic and financial objectives synchronously, this notion is important in creating competitive advantage. Pondering on the impact of intellectual capital on the corporate social responsibility and financial performance relationship, I hypothesize that environmentally and socially responsible corporate investors inherit higher intellectual capital and perform better financially. I further expect intellectual capital to fully or partially mediate the CSR strategies and financial performance relationship.

Evidence is presented from a panel dataset with 1,570 firm-year observations of 79 listed U.S. corporate investors spanning the periods between 2003 and 2022. Results of this study support the impact of CSR on financial performance. Overall higher intellectual capital leads to better financial performance. The CSR-FP relationship of corporate investors is partially mediated through intellectual capital coefficients like structural and relational capital.

This study raises attention to CVCs' efforts in expanding and managing intellectual capital while undertaking CSR strategies and maximizing financial returns. The delicate findings reveal uncovered layers that assume great importance for researchers and managers of corporate investors. Limitations suggest further research.

Title: The Intellectual CVC: The Role of Intellectual Capital on CSR Strategies and Financial Performance of Corporate Investors

Keywords: Corporate Venture Capital, CSR Performance, Financial Performance, Intellectual Capital, Value Added Intellectual Coefficient

Author: Simon Friedrich Georg Rausch

Abstrato

As estratégias de RSE avançam as estruturas de conhecimento corporativo, criando um conhecimento valioso chamado capital intelectual.
À medida que os CVCs perseguem objetivos estratégicos e financeiros de forma simultânea, esta noção é importante para criar uma vantagem competitiva.
Refletindo sobre o impacto do capital intelectual na relação entre a responsabilidade social corporativa e o desempenho financeiro, proponho a hipótese que investidores corporativos ambiental e socialmente responsáveis possuem maior capital intelectual e apresentam melhor desempenho financeiro.
Além disso, espero que o capital intelectual medie, total ou parcialmente, a relação entre as estratégias de RSE e o desempenho financeiro. Os dados são apresentados a partir de um painel com 1.570 observações ano-empresa de 79 investidores corporativos listados nos EUA, abrangendo o período entre 2003 e 2022. Além disso, um capital intelectual globalmente mais elevado leva a um melhor desempenho financeiro. A relação entre RSE e desempenho financeiro dos investidores corporativos é parcialmente mediada por coeficientes de capital intelectual, como o capital estrutural e o capital relacional.
Este estudo chama a atenção para os esforços dos CVCs em expandir e gerir o capital intelectual enquanto implementam estratégias de RSE e maximizam os retornos financeiros. As descobertas delicadas revelam camadas não exploradas que assumem grande importância para pesquisadores e gestores de investidores corporativos. Limitações sugerem a necessidade de pesquisas adicionais.

Título: O CVC Intelectual: O Papel do Capital Inteectual nas Estratégias de RSE e no Desempenho Financeiro dos Investidores Corporativos

Palavras-chave: Capital des Risco, Desempenho em RSE, Desempenho Financeiro, Capital Intelectual, Coeficiente de Valor Acrescentado do Capital Intelectual

Author: Simon Friedrich Georg Rausch

Acknowledgements

First and foremost, I'd like to express my gratitude to my supervisor PhD F. Shuwaikh for her continuous support, guidance, and encouragement throughout my thesis process. I am truly grateful for her mentorship and sticking to me over the years.

A special thank you to my internal, little thesis committee comprised of the closest group of friends for their unwavering weekly support. I thank them for their expertise, time, and quality comments on this thesis.

Particularly, I would like to thank my family, friends, and my girlfriend for their continuous and unrivaled support during my years of study. I have been fortunate to experience advice and guidance whether it be in proximity or from afar.

Lastly, I want to thank Professor J. Faias, all the professors, Católica staff, and fellow students who made my years at Católica an unforgettable, insightful, and cherishable experience. I am very grateful to experience this MSc. in Finance with all the people making it truly special.

Concludingly, this thesis is a culmination of my past experiences and combined efforts of peoples around me, to whom I am deeply grateful.

Thank you.

Table of Contents

List of Figures

List of Tables

List of Abbreviations

AI	Artificial Intelligence
CEE	Capital Employed Efficiency
CSR	Corporate Social Responsibility
CVC	Corporate Venture Capital(ist)
ESG	Environmental, Social, Governance
FE	Fixed-Effects
FP	Financial performance
HCE	Human Capital Efficiency
IC	Intellectual Capital
IVC	Independent venture capitalist
KBV	Knowledge-based view
KM	Knowledge management
LEV	Leverage
LIQ	Liquidity
NAICS	North American Industry Classification System
NRBV	Natural resource-based view
OLS	Ordinary Least Square
PE	Private Equity
RBV	Resource-based view
RD	Research & Development
ROA	Return on Assets
ROE	Return on Equity
SCE	Structural Capital Efficiency
SD	Standard Deviation
SEM	Structural Equation Modeling
SIC	Sustainable intellectual capital
SIZE	Firm size
TQ	Tobin's Q
VA	Value Added
VAIC	Value-added intellectual coefficient

VC	Venture Capital(ist)
VRIN	Valuable, rare, inimitable, non-substitutable

1. Introduction

In today's knowledge economy, sustainable financial success is predetermined by knowledge-intensive firms to constantly seek routes to new knowledge and innovation (Trauth, 2012). Strategic knowledge that creates value is coined as intellectual capital (Cabrita et al., 2011). As strategic asset to firms, the management of intellectual capital is vital in order to compete (Cabrita et al., 2011). Corporate investors qualify as knowledge-intensive firm that undertake CVC investments as mechanism to acquire knowledge and innovation for their internal development (Benson & Ziedonis, 2009; M. Maula et al., 2013). Corporate Venture Capital (CVC) is the financing of entrepreneurial, early-stage startups pursued through minority investments in equity (Dushnitsky & Lenox, 2006). In the year of 2021, CVC investments peaked with an average deal value of 45.5 million USD in the U.S., marking the rise of this funding type. Although average deal values declined to 38.2 million USD in 2023 (NCVA, 2023), CVC investors, however, claimed a 64% share in U.S. VC deal value in the first half of 2023 (TDK Ventures & 6Pages, Inc., 2023). CVCs involvement in novel technologies lead to exploration of knowledge (Mohamed et al., 2010). For example, the recent forefront technology Artificial Intelligence (AI) received global funding of almost 50 billion USD in the last year. The largest part of funding went in the startups of OpenAI, Anthropic, and Inflection AI, collecting a total funding amount of 18 billion USD in 2023 (Crunchbase, 2024). All of which were backed by established, non-financial companies that attained equity shares through CVC units (Silicon Valley Bank, 2024). Technologies, like AI, are servants in fostering sustainable intellectual capital in CVCs operating model (Rossi et al., 2016, 2019). In order to create intellectual capital the ambidextrous CVC must consider all possible combinations of natural resources for creating valuable and profitable knowledge that serves the CVC (Hart, 1995). For this consideration, corporate social responsibility (CSR) initiatives are measured as the combination of natural resources through CSR performance (Battisti et al., 2022). CSR strategies relating to environmental and social aspects proved to lead to higher intellectual capital and a competitive advantage (Nikolaou, 2019). Thus, CSR may advance the intellectual capital by serving internal strategic goals of the CVC and aims to create financial value. Yet, research has not established how the intellectual capital of corporate investors influences the relationship of CSR and financial performance.

In academia, CVC research emphasized on three main themes. First, on the inter-organizational knowledge transfer with the startup venture (Dushnitsky & Shaver, 2009; Emmanuelle & Shuwaikh, 2020; S. M. Lee et al., 2015a). Second, many studies focus mostly on financial performance when comparing to independent venture capitalist (IVC), while especially strategic considerations are of greater importance for CVCs (Röhm, 2018). Lastly, in a research string focusing on intra-organizational performance metrics, mostly innovation capacity and its performance of CVCs are of wider interest (Benkraiem et al., 2021, 2023; Chemmanur et al., 2014; Shuwaikh & Dubocage, 2022).

While the literature body on innovation and its performance in CVC is growing, the adjacent string of knowledge management (KM) in regard to measuring the investor's knowledge equity is still underserved (Lorenzo & Vrande, 2018). This finding goes hand in hand with current SVB data on strategic CVC units helping their companies more than ever with managing resources, thus adding strategic value (Silicon Valley Bank, 2023). Furthermore, research on corporate social responsibility performance of CVCs is relatively nascent but proved strategic alignment of the corporate investors in attaining sustainable competitive advantage (Alakent et al., 2020a; Antarciuc et al., 2018; Battisti et al., 2022; Benkraiem et al., 2023). Ultimately, the research on the corporate investor level lacks insights into the strategic mechanisms of intangibles, such as intellectual capital in explaining the delicate relationship of non-financial and financial performances. To bridge the gap in research, the study of my thesis is the first to understand intellectual capital as strategic asset and its potential for corporate investors' CSR and financial strategies.

This thesis is organized as follows. In the next chapter, theoretical introductions on corporate venture capital, intellectual capital, corporate social responsibility, and financial performance are compiled in the literature review. In the third chapter, the methodology in selection, all relevant data, and the econometrical analysis are presented. This is followed by the presentation of the results in chapter four. Chapter five concludes the study by discussing all relevant findings for academia and practice as well as presenting limitations. Lastly, conclusions are drawn and an outlook into further streams of research is given.

2. Literature Review

In the following, various streams of literature are introduced in order to set theoretical foundations for the study. Stakeholder theory and RBV (resource-based view) theory provide differing perceptions into the evolution of organization theory and its pursuit of value creation (Wernerfelt, 1984). The extensions of RBV theory, NRBV (natural resource-based view) and KBV (knowledge-based view) theory, point to the company's strategic practices and assets of corporate social responsibility (CSR) and intellectual capital (IC)(Grant, 1996; Haque & Islam, 2015; Hart, 1995). Before introducing the hypotheses of this study, the research subject of CVC and recent literature is presented.

2.1 Stakeholder, RBV and NRBV theory

The development of the stakeholder concept in organization and management theory led to the common understanding that executives should adhere to the corporations' actors having a stake in their business (Freeman & Reed, 1983). That is, the company's management must serve its stakeholder's interests by creating value for the stakeholders. Ever since, stakeholder theory encompasses different fields of research (i.e., strategic management, finance, accounting, law, marketing, health care, public policy, and environment). Freeman was the first in pointing to a new perspective on corporate governance and corporate responsibility to its environment in advanced studies, especially in the realm of stakeholder theory (Harrison & Freeman, 1999; Hörisch et al., 2014). In modern literature, CSR became of focal interest for researchers (e.g., Jamali, 2007; Omran & Ramdhony, 2015; Tanggamani et al., 2017), as strategic implications and interest for managers around the globe rose due the climate crisis but also the stakeholder's rising interest in firm's non-financial performance (Albareda et al., 2008; Haque & Islam, 2015).

In stakeholder theory, CSR disclosures represent an additional point of information and data to the already existing financial disclosures (Saad & Belkacem, 2021). The linkage of non-financial (i.e., CSR) and financial disclosures (i.e., financial statements) gained importance in the reporting to stakeholders, and since has been found to create value (J. B. Barney, Ketchen, Wright, McWilliams, et al., 2011). Furtherly, considering CSR matters as a firm's own differentiation strategy has been hypothesized to pay dividends in the long term (McWilliams & Siegel, 2001). In the light of organizational innovations, CSR strategies proved to impact organizational learning for companies by strategic adaptations like dealing with external pressure, establishing of internal learning process, and internalizing sustainable norms (Dashwood, 2012). The value-creating

stakeholder practice CSR is further linked to spurring innovation through more sustainable business (Bocquet et al., 2015; L. Lee & Chen, 2018; Pan et al., 2020; Xiao, 2020). Thus, CSR proved itself as a competitive strategy, serving internal and external stakeholders by closely monitoring and interrelating with a firm's environmental business context.

In another research stream, strategic management focuses constantly on examining firms regarding input and output factors. The resource-based view theory, employed through Wernerfelt (1984), introduced the notion that firms are bound by their organizational resources. These resources serve as input factors for a firm's competitiveness. This theory was furtherly advanced by Barney (1991) adding that firm resources should adhere to being valuable, very rare, costly to imitate and non-substitutable - the VRIN concept - in order to attain a sustained competitive advantage.

Building on the limitations of the RBV theory, Hart (1995) contends that internal as well as external factors contribute to a firm's competitiveness. The omission of an organization's interplay with the natural environment in Wernerfelt's RBV theory (1984) led to the formulation of the NRBV of the firm. The NRBV theory views an organization as an actor seeking a sustained competitive advantage in close relationship to its environment (Hart, 1995, 2005). Moreover, the NRBV posed a vital addition to research as it allowed "for a more systematic examination of the relationship between environmental and financial performance by specifying the link between resources and capabilities and strategic outcomes" (J. B. Barney, Ketchen, Wright, Hart, et al., 2011, p. 1467). NRBV theory in conjunction with stakeholder theory outline the foundations of this study: the interplay of CSR, intellectual capital, and financial performance of corporate investors.

2.2 Intellectual Capital and Corporate Venture Capital

In an extension to the existing RBV theory, the knowledge-based view of the firm entails that an organization's knowledge is of the highest value and the main strategic resource of a firm in the attainment of sustained competitive advantage (Grant, 1996). Thus, naturally, organizations thrive to develop new knowledge bases. Their competitive future is a direct function of their capability to innovate and create knowledge (Spender, 1996). In contrast to the explicit knowledge type, which can be reported (Grant, 1996), in modern knowledge economies the tacit knowledge type is valuable, rare, costly to imitate and non-substitutable, constituting a vital asset in a companies' competitiveness strategy. Especially, tacit knowledge poses the potential to create intellectual capital, as outlined by Smedlund (2008).

In adhering to knowledge strategies in light of the KBV theory of the firm, companies are pressured to either internally create knowledge or to externally source knowledge (Gutmann et al., 2023). In strategic management theory, corporate strategies like CSR are associated with the capability to attain knowledge internally. External knowledge creation, for example, is perused through engagement in merger & acquisition strategies, or the creation of a company's venture unit assimilates new company knowledge (Dushnitsky & Shaver, 2009). One way of executing the external knowledge creation strategy of attaining access to knowledge, is carried out by corporate venture capital[1] (CVC) investments in startups on behalf of the company's venture unit. Performing CVC investments, either through a venture unit or as a strategic unit close to management, can be understood as innovation- and knowledge-sourcing activity by companies (Drover et al., 2017).

As knowledge-attaining and innovation-generating organizations, a corporate venture capitalist embodies a company type that poses as an ideal study object in analyzing the topics of corporate social responsibility, intellectual capital, and financial performance. Since the growing CVC literature on knowledge management testifies sourcing intellectual assets became pertinent to CVCs (Belderbos et al., 2018; Rossi et al., 2016, 2020; Vrande et al., 2011). The CVC's ambidextrous nature of pursing financial and strategic goals at the same time allow for a unique study outline. This archetype combines exploiting own knowledge sources for the aim of further exploration of value-generating systems (Rossi et al., 2019, 2020).

Besides known CVC knowledge-sourcing strategies like geographical diversity or forming technology alliances (Belderbos et al., 2018), CVCs enable storing, sharing and integration of knowledge for portfolio companies as well as the parent company (Yang et al., 2013). This ability serves the inward look into a corporate investor's[2] knowledge equity, namely its intellectual capital.

In most of recent CVC literature, knowledge sourcing activity is a function of a CVC's technology performance or innovation performance and measured by patent output, citation count, R&D intensity, or absorptive capacity (e.g., Benkraiem et al., 2023; Escribano et al., 2009; Sancho-Zamora et al., 2021; Shuwaikh & Dubocage, 2022). These output driven metrices give insight into

[1] CVC is a form of externalizing research & development expenses for non-financial companies. This is done by acquiring innovative startups through equity financing. The entrepreneurial firms pose a strategic and financial advantage to the acquiring company.

[2] For the purpose of this thesis, I will use corporate investor and CVC synonymously. Correctly distinguished, I refer to the company undertaking investment through a CVC unit.

the CVC's efficiencies to convert knowledge from external sources, i.e., the start-ups into VRIN output exclusive to the corporate investor. However, KM with attention to the corporate investor's knowledge equity and measuring is still spurious(Lorenzo & Vrande, 2018). Measured knowledge creating value is referred to as intellectual capital serving company needs (Cabrita et al., 2011).

The concept of intellectual capital in strategic management is an inimitable asset referred to as knowledge equity, encompassing all possible knowledge bases across an organization (Kianto et al., 2014). Establishing an IC thus is a strategy in attaining a competitive advantage and consequently creating tangible value for the firm (J. Barney, 1991). In IC literature, IC encompasses human capital, structural capital, and relational capital(Bontis, 2001). Within the context of CVC, the human capital component refers to skills and knowledge of the corporate investor's workforce. All used organizational processes and systems that facilitate knowledge sharing can be related to the structural capital component. Lastly, relational capital depicts the general networks and relationships of the corporate investor with external stakeholders (Bontis, 2001). Although recent CVC literature does not explicitly touch on the concept of IC, general positive assumptions regarding IC can be inferred: For example, Maula et al. (2009, p. 275) indicate that corporate investor "provide access to valuable strategic resources" that benefits the CVC's ventures. CVCs are ambidextrous in building new knowledge and leveraging existing IC, indicative of their strong relational network and support system (Hill & Birkinshaw, 2014). After all, resourceful companies were associated with CVC activity and authors hinted at huge IC bases at the corporate investor level (Basu et al., 2011; Dushnitsky, 2008; Dushnitsky & Lenox, 2005). In a recent study by Bendig et al. (2024), human capital was found to have a positive implications for CVC's innovation performance, furtherly amplifying the rise in importance of the IC for CVCs. A corporate investor's ability to undertake CSR was linked to increasing the internal knowledge processes of CVC (Hegeman & Sørheim, 2021). As CVC literature interacts with knowledge management studies, it rather focuses on the inter-organizational transfer (S. M. Lee et al., 2015b) or knowledge outputs (i.e. innovation performance) (Belderbos et al., 2018; Benkraiem et al., 2023), but less so on the dynamic, organization-spanning knowledge equity concept of intellectual capital. In the following, adjacent fields of research are reviewed to demonstrate a relevant examination of intellectual capital of corporate investors, that undertake ambidextrous strategies like CSR and its impact on financial performance.

2.3 CSR performance, financial performance and the connection with intellectual capital

2.3.1 CSR performance and financial performance

As introduced in section 2.1, NRBV and stakeholder theory support the notion that CSR strategies are distinguished instruments in achieving sustainable firm value growth. Thus, in recent years, CSR literature grew interest in analyzing the relationship of CSR on financial performance in the context of corporate investors. Yet, research has not been able to determine a distinguished conjunction of CSR and financial performance, despite numerous attempts. The relatively nascent research body on CVC's corporate responsibility performances rose to attention in recent years (Alakent et al., 2020b; Battisti et al., 2022; Benkraiem et al., 2021, 2023). On the level of the corpore investor, CVC investments through CVC units and their subsequent CSR has proved its significance. (Battisti et al., 2022). In particular, Battisti et al. (2022) shun light on the relationship of CSR disclosures on financial performance in CVCs. They first hypothesized and proved that CVCs would function in combining strategic CSR goals with pursing financial objectives as an ambidextrous strategy is in the focal nature of the CVC units (Hellmann, 2002; Jeon & Maula, 2022). Other strings of CVC literature focus on different metrices of CSR performance, using greenhouse gas emissions or female independent directors as a proxy for environmental or social performance (Benkraiem et al., 2021, 2023). Yet, studies on reporting matrices, like ESG scores, are still underserved in the context of CVC research. ESG scores are typical metrices when reporting CSR performance employing a stakeholder view on the firm, as studies from other fields of research underline. Comparing studies, that specifically use ESG Scores to measure CSR performance, a contrasting picture of the influences on financial performance must be drawn (Halid et al., 2023).

Research on ESG disclosures has confirmed, that the ESG Scores of US S&P 500 companies had positive effects on financial performance like Tobin's Q. However, ESG Score was negatively associated with performance figures like return on assets or return on equity (Alareeni & Hamdan, 2020). This was furtherly confirmed in a study in emerging markets, where ESG Score and all pillar scores (E Score, S Score and G Score) were negative associated with return on assets evidencing financial slack theory (Duque-Grisales & Aguilera-Caracuel, 2021). The disclosure for social performance (S Score) was also found to have a positive effect on the financial performance (Baird et al., 2012), indicating socially responsible behavior has favorable effects on financial performance. Contrastingly, social and governance performance has been observed in having no

effect on the firm value as well as ROA and ROE, respectively, in a South African sample (Chininga et al., 2024). In light of the above discussion on CSR disclosures and financial performance, therefore the following is hypothesized. I posit that CVC investors that actively pursue CSR strategies, it is reflected in the CSR performance, namely the ESG scores of the corporate investor. This strategic setout facilitates the corporate investor in creating measurable value for the firm in the short- and long term. Corporate investors of higher ESG scores increase returns to equity and assets by exploring and exploiting environmental and social performance strategies.

Hypothesis 1 *Corporate Venture Capital Investors' corporate sustainability performance positively influences its financial performance.*

2.3.2 CSR performance and Intellectual Capital

In the concept of NRBV, Hart (1995) posits that gaining an understanding on the environmental and social resources assists in the creation of intangible assets, such as IC. IC and its constituents (Human Capital, Structural Capital, and Relational Capital) pose as unique resources which fit the rationale of Hart (1995) in generating a sustained competitive advantage. The linkage of CSR performances and IC aim at creating a corporates' sustainable intellectual capital (SIC). As coined by Nikolaou (2019), sustainable efforts lead to a shared knowledge base benefitting all stakeholders alike, proving that organization engaging in social and environmental strategies reach higher competitive advantage. As CSR strategies are generally policies enhancing the corporate's environmental and social responsibilities, they are integrated ideally in all of the companies structures and relationships (Tsoutsoura, 2004), furtherly enhancing the structural and relational capital the corporate investor (Beretta et al., 2018). CSR create ethical capital that is fostering governance structures and relational capital for their several stakeholders of the company (i.e., workforce, suppliers and customer) (Xuetong et al., 2023). When inspecting the relational capital component, environmental efforts may increase the existing relationships with stakeholders, protection and awareness efforts are generally positively associated (Nikolaou, 2019; Surroca et al., 2010). CSR initiatives to the human capital component are manifold: CSR can have positive effects on attracting better employees, training them in environmental and social matters and lastly, improving the working conditions inhouse through high environmental and social standards

(Nirino et al., 2020; Surroca et al., 2010; Vázquez-Carrasco & López-Pérez, 2012). These environmental and social standards are said furtherly enhance operational processes, leading to better structural capital (Y.-S. Chen, 2008). Studies relating the CSR performance scores (ESG scores) to the accounting model of VAIC[3] (Pulic, 2000), found that ESG disclosures influence the intellectual capital efficiency of firms (Gangi et al., 2019). Furtherly, green intellectual capital was affected by CSR disclosure in a Taiwanese sample (Chang & Chen, 2012), pointing to the importance of environmental consciousness for IC creation. Furtherly, CSR expenditures have a positive and significant effect on the value-added intellectual coefficient (VAIC) as examined by Ali et al (2024). This study suggested this for all components of intellectual capital efficiency, except for structural capital (Ali et al., 2024).

However, in contrasting literature, a study incorporating manufacturing companies, CSR could not establish any significant relationships with coefficients of the VAIC model (Aras et al., 2011). Other mixed results found by Reboredo et al. (2021), suggest that environmental information is not related with intellectual capital efficiency. Additionally, governance information affected human capital efficiency and relational capital efficiency, and that social information is negatively attributed to human and relational capital efficiency (Reboredo & Sowaity, 2021). Based on this reviewed literature on the relationship of corporate responsibility and intellectual capital, I propose the following hypothesis. Corporate investors that undertake action or investments in CSR strategies create measurable IC. Thus, CSR has a positive impact on intellectual capital.

Hypothesis 2 *Corporate Venture Capital investors' corporate sustainability performance positively influences its intellectual capital.*

2.3.3 Intellectual Capital and Financial Performance

The IC of a firm is a crucial, strategic resource in the concept of KBV, an extension of the RBV theory (Craighead et al., 2009). Craighead (2009) stresses that IC and knowledge development capacity potentially impact organizational outputs. Several previous studies found that IC impacts financial performance .In an investigation of Chen et al. (2005) where able to gain empirical

[3] The Value-Added Intellecutal Coefficient model by Pulic (2000, 2004) is a common IC measurement in intellectual capital and finance literature.

evidence on the relationship of IC and financial performance. This study on Taiwanese listed companies supports the positive effect of intellectual capital, through VAIC, on firm value. In operations research, Menor et al. (2007) underscore that operational IC is a rare and valuable resources, whereas Onofrei et al. (2019) argue that knowledge is the most critical resource for gaining competitive advantage. Recent IC literature has shown that the investment in an intangible asset, such as IC (Khan et al., 2019), leads to higher firm performance. For example, a multi-industry study evidenced the importance of IC for productivity and firm performance (Kengatharan, 2019). Moreover, IC has proved to partially mediate governance to firm performance in an Egyptian sample (Shahwan & Fathalla, 2020). Another study confirms the positive relationship of intellectual capital and market value. Particularly, the relationship of margin ratio and return on assets was positively related (Nimtrakoon, 2015). In research on the banking sector, human capital was found to directly and indirectly influence business performance while relational capital was found to negatively moderate structural capital on firm performance (Mention & Bontis, 2013). In a panel data analysis on mutual funds, all IC components (VAIC, HCE, SCE and CEE) were found to impact financial performance. In particular, the relationship of Capital Employed (CEE) proved to give significant return on asset and return on equity (Ahmad et al., 2016).

In CVC literature, CVCs have been linked with having specific knowledge management strategies and endeavor to accumulate intellectual capital (Kianto et al., 2014). With regards to the components of IC, CVC have been found to stronger execute on building public credibility and reputation, as this contributes to relational capital (i.e., stronger customer, partner, supplier relationships) (M. Maula & Murray, 2001). From the above-mentioned research I derive at the following hypothesis. Corporate investor's that seek to increase their intellectual capital, experience positive effects on their financial performance. Thus, Intellectual capital efficiency is directly and significantly linked to financial performance.

Hypothesis 3 *Corporate Venture Capital investors' intellectual capital positively influences its financial performance.*

As, the previous three sub-section indicated, this thesis is based on intertwined literature. Surroca (2010) was first in hypothesizing that intangibles form the indirect relationship corporate social responsibility and financial performance through mediation and evidenced this in a multi-country study across 599 companies. Also, the link of intellectual capital, corporate social responsibility and financial performance of 345 listed European firms has been partially proved by conducting mediation analysis on the implementation of CSR strategies and their advantageous effect on financial performance (Nirino et al., 2020). In line with previously reviewed literature on the concepts of CSR performance, IC and financial performance, I postulate the following fourth hypothesis. Corporate investor's that engage in CSR strategies, perform better financially, and increase their intellectual capital. Additionally, as intellectual capital is heavily linked to improving a corporate investor's financial performance, too, I hypothesize that the relationship of CSR and financial performance is mediated through the intellectual-capital efficiency coefficients.

Hypothesis 4 *The relationship between a Corporate Venture Capital Investor's corporate sustainability and financial performance is mediated by its intellectual capital. A higher investor's intellectual capital explains the relationship of CSR and FP.*

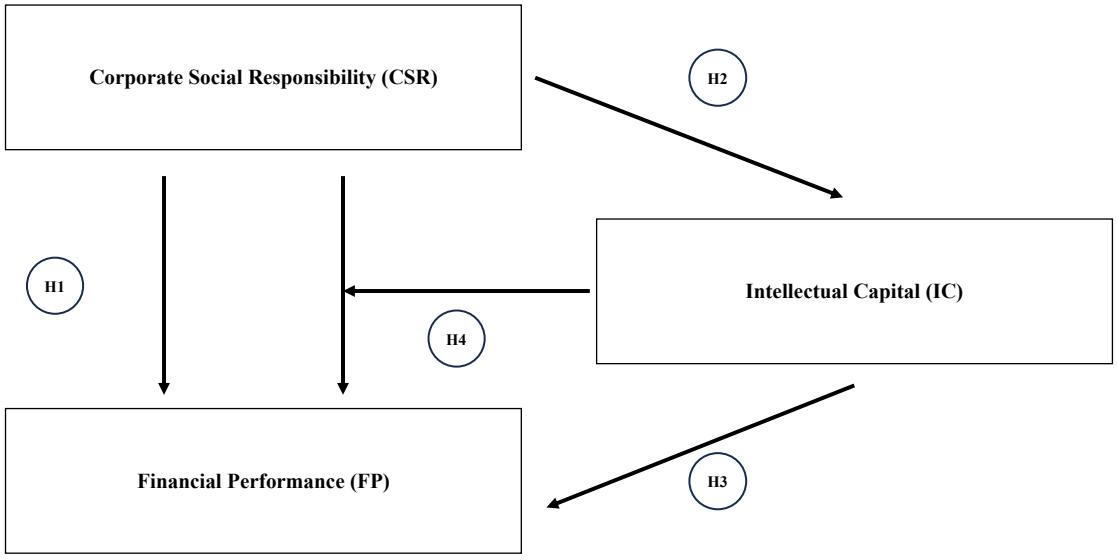

Figure 1. Research design of the hypotheses 1-4

3. Data and Methodology

3.1 Data

3.1.1 Data collection and extraction

The sample of this thesis is collected from various data sources. In a first step, investors of CVC were identified by consulting the Thomson VentureXpert database to attain information on U.S. companies undertaking at least one CVC investment between 2003-2022 (Röhm et al., 2020). For this the starting period of 2003 since ASSET4 started providing data coverage in that year for ESG scores (de Villiers et al., 2022), and the end-date of 2022 is applied to include CVC investors that haven't reported financials of 2023 at the time of this study.

As a first methodological step after selecting private equity investments as the universe of the Screener, all firm investors are filtered by the pre-selected years, the investor type "Corporate PE/Venture Capital" and the firm investor nation "United States". The analysis is focused on US American companies, where reporting of financials and impacts of pollical context on CSR reporting is coherent (Basu et al., 2011). Furthermore, in line with Röhm et al. (2020) I do not limit the investments by the origin of investees to include cross-country investments of corporate investors. After this step, the firm investors (CVC units) were hand-matched to the companies behind these investment firms by including ticker and company names (e.g., Alphabet Inc. with Google Ventures). Hand-matching was completed through consulting established platforms on private equity and venture capital deals like PitchBook, Crunchbase (Dalle et al., 2017), and the companies' websites. All CVC data is accessed through the Private Equity Screener on Thomson Reuters Datastream. Data on the corporate investors' CSR performance data was obtained from the Thomson Reuters ASSET4 ESG database in Refinitiv Eikon. ASSET4 collects various data from annual reports, filings, CSR reports, and news other sources (Thomson Reuters, 2013) and is widely acknowledged in the CSR research (Battisti et al., 2022; de Villiers et al., 2022; Nirino et al., 2020). In a third step, financial and accounting data from the corporate investorsare collected from Standard and Poor's Compustat database for the construction of the financial performance variables and IC constituents. Ultimately, the sub-samples were matched by adding the ESG and financial data to the pre-selected CVC data. Lastly, corporate investors were excluded if data on the financial performance, corporate social responsibility, or intellectual capital matrices were not accessible or missing.

3.1.2 Sample selection

After combining all data, a panel sample was created by retaining 79 individual, publicly listed US corporate investors, and a total of 1580 firm-year observations.

In this study, I ruled out financial corporate investors (SIC codes for 60-67) as suggested by previous IC-related research (Shahzad et al., 2022), still allowing my study for a cross-industry investigation as my thesis should provide insights for CVC investments for investors coming from multiple industries and evidencing the effect of CSR through IC. This led also to the reduction of industry biases in the sample.

Ultimately, a cross-sectional panel dataset was created covering the time series from the years of 2003 to 2022 with the aim of creating more accurate estimation models, the ability to control the impact of the omitted variable bias, and the minimization of other estimation biases (Hsiao & Pesaran, 2008).

3.2 Measurements

For the quantitative analysis through a fixed-effect OLS model, independent, mediator and dependent, and control variables engender the mathematical constituents for the hypotheses H1 to H4. For the financial performance, the variables Tobin's Q, ROA, and ROE are introduced. The mediator variable is the suspected intellectual capital measured through VAIC (Pulic, 2000). For the CSR performance as ESG Score, social score (S Score), environmental score (E score) and governance score (G Score) are introduced.

3.2.1 Dependent Variables

Financial performance

As the analysis of the hypotheses introduced in chapter 2 entails various steps, I subsequently induce the different independent variables for the specific hypotheses.

For the validation of my first hypothesis (H1), three differing measurements of financial performance (FP) constitute the distinct layers of assessment. The firm's financial performance is measured in Tobin's Q (TQ) Return on Equity (ROE) and Return on Assets (ROA). The three variables are calculated as follows:

$$Tobin's\ Q = \frac{Market\ Value\ Equity + \ Preferred\ Stock\ + \ Debt}{Total\ Assets}$$

For Tobin's Q, the firm equity value also denoted as the market value of equity which is calculated by multiplying a companies' share price and its number of common stock outstanding shares. Next, the liquidating value of outstanding preferred stock, and "the value of the firm's short-term liabilities net of its short-term assets, plus the book value of the firm's long-term debt" (Chung & Pruitt, 1994, p. 71), and lastly, Total Assets as the book value of total assets. This approach is employed from Chung et al. (1994), and has been replicated in adjacent CVC and IC research manifold (Benkraiem et al., 2023; Dushnitsky & Lenox, 2006; Surroca et al., 2010). According to Dushnitsky et al. (2006), Tobin's Q is posited to fit the CVC setting, as CVC financing significantly impacts Tobin's Q. Additionally, Tobin's Q accounts for future expectations thereby reduces the effect of potential reporting inaccuracies (Lindenberg & Ross, 1981), which is of particular interest for the sustainability reporting.

All accounting and financial data used to calculate Tobin's Q were derived from Compustat.

$$Return\ on\ Assets = \frac{Net\ Income}{Total\ Assets}$$

$$Return\ on\ Equity = \frac{Net\ Income}{Equity}$$

Next, two short term proxies of financial performance (FP) are introduced. Return on Assets is calculated as the net income of a company devided by the total assets of a company. Return on Equity is measured by ratio of the net income to a company's firm equity. ROA and ROE can be best interpreted as direct competitive advantage or the return on investment in the units of total assets, and equity, respectively (Benkraiem et al., 2023). All accounting and financial data for the two performance proxies are retrieved from Compustat.

3.2.2 Mediator Variable

Intellectual Capital as VAIC

I introduce an established method for the variable of IC, for measuring the impact of the strategic aspects of this intangible asset on the relationship of CSR performance and financial performance of CVCs. The assessment of IC is performed through the calculation of the Value-Added

Intellectual Capital (VAIC) coefficient according to Pulic (2000, 2004). The VAIC is an extensively discussed research topic in the research of intangibles and firm performance (Bontis et al., 2015; M.-C. Chen et al., 2005; Chowdhury et al., 2019; Nimtrakoon, 2015; Sardo & Serrasqueiro, 2017; Tseng et al., 2013). Pulic (2004) was the first to recognize IC in a tool (VAIC™), by computing IC as an asset. Since then, its computation has found wide application despite some limitations (Marzo, 2022; Ståhle et al., 2011).

The VAIC consists of three components, the Human Capital Efficiency (HCE), the Structural Capital Efficiency (SCE), and the Capital Employed Efficiency (CEE)(Andriessen, 2003; Pulic, 2000, 2004). The HCE analyzes the effectiveness of the human capital, such as the skills, knowledge, and experiences of the workforce. The SCE entails the calculation of all processes, trademarks, and systems of a company. Thirdly, the CEE computes the physical and financial capital (Andriessen, 2003; Pulic, 2000). All components contribute to a positive, high VAIC coefficient indicating the IC of a company, which can be benchmarked to a company's respective industry.

Delving deeper into the calculation of the VAIC, as proxy for IC, the following equation is introduced:

$$VAIC = Human\ Capital\ Efficiency + Structural\ Capital\ Efficiency + Capital\ Employed\ Efficiency$$

where Human Capital Efficiency (HCE) is calculated by dividing a corporate investor's Value Added (VA) by total salary and labor costs. Structural Capital Efficiency coefficient (SCE) is a corporate investor's ratio of Value Added deducted by the human capital, to its Value Added. Third, the Capital Employed Efficiency coefficient (CEE) is the ratio of a corporate investor's Value Added and net assets of the company(Nirino et al., 2020).

In order to be able to assess the aforementioned three Efficiency variables, a company Value Added must be calculated. The Value Added is "the sum of the operating profit, employees' costs, amortization and depreciation, interest expenses, taxes, and dividend payout" (Nirino et al., 2020, p. 426).

For the human capital computation, I use the approach of Andriessen in using labour expenses as the best proxy for the asset of human capital (Andriessen, 2003). According to this approach, Value Added is derived as the gross margin deducted by selling, general and admin expenses and the

addition of the human capital, denoted as labour expenses (Andriessen, 2003). All accounting data for the computation of the VAIC are from Compustat.

3.2.3 Independent Variables

CSR performance

To quantify outcomes of CSR strategies, research has widely based its studies around the ESG scores. Although ESG scores pertain to general weaknesses regarding their preciseness in analyzing, research has favored the generalizability and comparability among different studies (Halid et al., 2023). ESG scores are based on the pillar scores of the three constituent dimensions: environment (E Score), social (S Score), and governance (G Score). Thereby, a company's ESG score encompasses the various actions merging into variables that constitute the pillar scores. First, a total of 70 item indicators are considered in evaluating the environmental pillar performance. This includes items that impact the categories of emissions reduction, resource use, and innovation (Thomson Reuters, 2013). The social pillar score aggregates data from 88 variables encompassing the themes relating to personnel, community management, and product responsibility. The third component, the governance pillar score, includes a total of 68 indicators scoring in the areas of management, shareholders, and CSR strategy. Each of the pillar scores can attain a minimum score of 0 and a maximum score of 100. All three pillar scores are eventually weighted differently for the final calculation: The environment pillar score amounts to 34%, the social pillar score to 35.5%, and the governance pillar score to 30.5% of the total final ESG score (Thomson Reuters, 2013).

For the regression equations, the overall ESG score as well as the environmental and social scores are deployed as proxies for the respective scopes of sustainability performance, respectively. As the high-level score of ESG and the pillar level scores of environmental and social performances are applied in different models, a potential pairwise multicollinearity issue can be ignored. All data for the ESG, E, and S scores are computed by using Thomson Reuters Datastream.

3.2.4 Control Variables

A total of eight control variables are used in the study to assess the inferences made about the three main variables (FP, CSR, and IC) of interest. Controls possess the capability to enhance the empirical findings interpretation and pointing to certain conclusions (Nielsen & Raswant, 2018). Next, the eight control variables are introduced with the aim of addressing the regression model potential biases, for enhanced accuracy and predictive power.

The first control variable, the governance pillar score (G Score) shall control for potential endogeneity (Battisti et al., 2022). As environmental and social impacts on financial performance shall be measured, it's essential to control for the associated impact of control through governance on the financial performance (Aggarwal, 2013). Second, I use firm size (SIZE) calculated as natural logarithm of total assets in order to control for companies with huge asset bases, thus potentially being more resourceful than companies with less total assets (Battisti et al., 2022; Nirino et al., 2020). Thirdly, it's controlled for liquidity levels of a company (LIQ), pertaining to the slack theory of companies with higher levels of liquidity, as excess cash might negatively influence the relationships to financial performance. Liquidity is the ratio of current assets divided by current liabilities (Li et al., 2012; Nirino et al., 2020). Furtherly, the study controls for a corporate investor's leverage (LEV), as capital structure is associated with an impact on the financial performance as companies pay considerable attain on stakeholders like creditors (Battisti et al., 2022; Benkraiem et al., 2023; Surroca et al., 2010). I control for research & development intensity (RD) as I want to fix the effects of research and development expenses, often used as indicator for a firm's capacity to innovative, as innovation performance is, too, associated with financial performance (Benkraiem et al., 2023).

Lastly, I control for industry and year effects by including *industry dummies* and *year dummies*. The industry dummies are constructed based on two-digit NAICS codes to control for industry-specific variations. Also, year-specific dummies are created for each of the 20 years of the sample to control for time to smoothen the effect of time trends and to control for cyclical seasonality. Find an variables overview in the Appendix (Table 1. Variables Overview).

3.3 Methodology

For the analysis of a potential mediation of CVCs IC on CSR and FP I choose to employ a method of mediation research introduced by Baron and Kenny (1986), similarly to the study of Nirino (2020).

For the first hypothesis (H1), the relationship of CSR and FP is tested by using the following regression equation (1):

$$FP_{it} = \alpha + \beta_1 CSR_{t-1} + \beta_2\, GScore_{it} + \beta_3\, SIZE_{it} + \beta_4\, LIQ_{it} + \beta_5\, LEV_{it} + \beta_6 RD_{it} + \gamma_1 Industry_{it} + \gamma_2 Year_{it} + \varepsilon_{it}$$

where FP represents a corporate investors' (i) Tobin's Q, ROA, or ROE as the dependent variable for the respective years (t). Furtherly, CSR of the previous year (t-1) is denoted as ESG score, E score, or S score calculating environmental, and social performance. Additionally, the control variables governance score (G Score), firm size (SIZE), firm liquidity (LIQ), firm leverage (LEV), research & development intensity (RD), and two dummy variables for industry (Industry) and year (Year) fixed effects are included.

Hypothesis 1 is testing the causal relationship between a firm's corporate social responsibility performance and its previous year financial performance. H1 can be accepted if $\beta_1$is positive and significant as this would translate to an appreciative, causal impact of CSR on FP.

In the second hypothesis (H2), the relationship of intellectual capital on the firm's financial performance is predicted in equation (2):

$$FP_{it} = \alpha + \beta_1 IC_{it} + \beta_2\, GScore_{it} + \beta_3\, SIZE_{it} + \beta_4\, LIQ_{it} + \beta_5\, LEV_{it} + \beta_6 RD_{it} + \gamma_1 Industry_{it} + \gamma_2 Year_{it} + \varepsilon_{it}$$

where IC indicates the intellectual capital of a firm (i) at time (t) denoted as the computed VAIC. Additionally, all controls of the study are included in this regression. $\beta_1$is expected to be significant.

Thirdly, the time-lagged effect of CSR performance on the intellectual capital of the corporate investors is tested, as Hypothesis 3 stated. This is denoted as IC as the dependent variable in equation (3):

$$IC_{it} = \alpha + \beta_1 CSR_{t-1} + \beta_2\, GScore_{it} + \beta_3\, SIZE_{it} + \beta_4\, LIQ_{it} + \beta_5\, LEV_{it} + \beta_6 RD_{it} + \gamma_1 Industry_{it} + \gamma_2 Year_{it} + \varepsilon_{it}$$

where $\beta_1$must have a significant impact on the firm's intellectual capital.

In the fourth step of the Baron and Kenny (1986) model, the equation (4) for proving a mediation of corporate social responsibility performance on financial performance by means of intellectual capital as stated in hypothesis 4 is calculated as follows:

$$FP_{it} = \alpha + \beta_1 CSR_{t-1} + \beta_2 IC_{it} + \beta_3\, GScore_{it} + \beta_4\, SIZE_{it} + \beta_4\, LIQ_{it} + \beta_6\, LEV_{it} + \beta_7 RD_{it} + \gamma_1 Industry_{it} + \gamma_2 Year_{it} + \varepsilon_{it}$$

where a corporate investors' (i) year-lagged corporate social responsibility performance (t-1) and the value-added intellectual capital coefficient (t) are included to measure the joint mediation effect on financial performance (t). Eventually, the $\beta_1$of the equation (4) must be positive and significant and is compared to β_1 of equation (1) for the mediation to show effect.

4. Results

4.1 Univariate and Bivariate Analysis

4.1.1 Descriptive Analysis

For the univariate analysis, Table 2 presents the descriptive statistics of the independent, dependent, and control variables of the 79 CVC in the sample. As for the three dependent variables Tobin's Q (TQ), Return on Assets (ROA), and Return on Equity (ROE) in Panel A, the following statements can be made: TQ has a mean value of 2.32 (SD = 1.49) indicating an average firm value in the sample being 2.32 times higher than its total asset value with a standard deviation of 1.49.

For ROA, a mean value of 0.07 (SD = 0.07) was recorded in the sample. This translates to the sample firms' average profitability at 7%, as ROA is an efficiency measure showing the ratio of

generating profits with their respective asset base. Further, ROE displays an average of 0.04 (SD = 0.14), indicating that corporate investors record on average a net profit 4% on their employed equity. Also, ROE suffers from overdispersion as the standard deviation (SD = 0.14) is higher than its mean value (Mean = 0.04), since ROE is a continuous data variable this finding can be omitted. Additionally, the dependent variables show high skewness for TQ (Skew = 3.38) and a high negative or left skew for ROE (Skew = -19.14) in this sample, indicating slight asymmetries in the distribution of the respective variables. As for kurtosis, TQ (Kurt = 19.92) and ROA (Kurt = 11.53) point to high, leptokurtic tails and ROE to even extreme leptokurtosis (Kurt = 500.92), showing a proneness of the dataset to outliers when analyzing regression results. Considering Panel B, the corporate investors' CSR performance of the sample records an average ESG Score of 62.22 for the whole sample. Also, the independent variables of ESG Score and the pillar scores of E Score and S Score suggest a gradual yearly improvement of the corporate investor indicated by higher median than mean as well as extreme minima and maxima values across the sample (ESG Score: Min = 2.49, Median = 66.46, Max = 95.16; E Score: Min = 1.05, Median = 67.44, Max = 97.22; S Score: Min = 2.63, Median = 83.16, Max = 98.26). Inspecting Panel C, the mediator variables of IC were expressed through the non-transformed VAIC coefficients. The average (median) of VAIC as the aggregate sum of HCE, SCE, and CEE can be observed at 28.84 (13.21). The averages (median) for HCE, SCE, and CEE score at 27.71 (12.0), 0.60 (0.52), and 0.52 (0.54), respectively. For the analysis VAIC values are z-transform to within values as high kurtosis (skewness) for VAIC at 1076.81 (30.52), HCE 1077.11 (30.16), SCE 1102.18 (30.41), and CEE 602.62 (-17.12) indicate exceedingly high values, and strong positive skeweness (left in the case of CEE). This raises the problem of potential tail risk in the observed values. Lastly, by analyzing the control variables in Panel D, statements regarding the corporate investors firm size, liquidity, leverage, and R&D can be made. The average corporate investor has a liquidity level of 1.63 (SD = 0.91) and is moderately levered as 0.61 (SD = 1.87) mean value indicates. The corporate investor's average R&D intensity is 0.07 (SD = 0.09) while average firm size corresponds to 10.3 (SD = 1.23). Noteworthily, high kurtoses for liquidity (Kurt = 22.45) and R&D intensity (Kurt = 43.62) were measured. In summary, it can be inferred from the sample statistics that the 20-year sample of 79 corporate investors, on average, have positive financial performance, such as a 2.32x market value in comparison to intrinsic values. The non-financial performance suggests an average high scoring

on ESG scores (Mean = 62.22), as well as it pillar dimensions environmental (E Score; Mean = 61.51) and social performance (S Score; Mean = 64.87).

Table 2. Descriptive Statistics

Variables								Quantiles	
	N	Mean	Median	SD	Skewness	Kurtosis	Min	Max	0.25	0.75
Panel A										
TQ	1580	2.32	1.94	1.49	3.38	19.92	0.57	14.38	1.42	2.66
ROA	1580	0.07	0.07	0.07	-0.84	11.53	-0.44	0.51	0.04	0.11
ROE	1578	0.04	0.05	0.14	-19.14	500.92	-4.01	0.36	0.03	0.07
Panel B										
ESG Score	1578	62.22	66.46	18.74	-0.57	2.49	4.18	95.16	48.02	77.05
E Score	1446	61.51	67.44	22.99	-0.76	2.68	1.05	97.22	46.08	78.82
S Score	1578	64.87	68.03	21.34	-0.47	2.36	2.63	98.26	48.53	83.16
Panel C										
VAIC	1580	28.84	13.21	333.16	30.16	1076.81	-2053.17	12035.55	7.85	23.75
HCE	1580	27.71	12.05	333.14	30.16	1077.11	-2054.00	12034.50	6.72	22.45
SCE	1580	0.60	0.52	0.63	30.41	1102.18	-0.14	23.62	0.43	0.66
CEE	1580	0.52	0.39	3.39	-17.12	602.62	-104.44	34805.00	0.28	0.54
Panel D										
G Score	1578	62.11	64.61	20.28	-0.41	2.32	8.28	98.53	46.87	78.64
SIZE	1580	10.30	10.34	1.23	-0.17	2.62	6.67	13.22	9.43	11.19
LIQ	1580	1.63	1.39	0.91	12.50	22.45	0.20	8.08	1.08	1.93
LEV	1580	0.61	0.60	0.19	0.26	3.47	0.11	1.48	0.49	0.73
RD	1580	0.07	0.04	0.09	3.56	43.62	0.00	1.56	0.00	0.13

The table presents dependent, independent, mediator, and control variables. Values of VAIC, HCE, SCE, and CEE are shown after transformation. Values are given on observations (N), Mean, Median, Standard Deviation (SD), Skewness, Kurtosis, Min, Max and the Quantiles of 25% and 75%

4.1.2 Correlation Matrix

For the bivariate analysis, Pearson's correlation matrix is computed to conduct a pairwise analysis measuring the impacts of changes in the linear relationship of any two variables. Table 3 presents the pairwise Pearson's correlation matrix on the dependent financial performance (Panel A), the independent non-financial performance (Panel B), the mediator variable (Panel C), and the control variables (Panel D) of the study sample on the 79 corporate investors in the period from 2002 to 2023.

Assessing the financial performance variables, TQ is positively and significantly correlated with CSR at the level of overall ESG Score ($p < 0.01$) as well as the pillar scores E Score, S Score and G Score ($p < 0.01$), as well as ROE, the IC variables SCE, CEE, and control variables LIQ, LEV, and RD. ROA is positively and significantly correlated with CSR performance on the aggregate level of ESG Score as well as the pillar levels of E Score, S Score, and G Score ($p < 0.01$).

ROE is positively correlated with ROA (0.54) on a significance level ($p < 0.01$). In regard to CSR performance, ROA is lightly positively correlated with ESG Score (0.08), and S Score (0.08). It also exhibits positive correlations with the intellectual capital panel, being correlated with the value-added intellectual capital coefficient (0.07), human capital efficiency (HCE) (0.07) and structural capital (SCE) (0.07) as well as firm size (SIZE) (0.15) in the control panel.

Considering, the corporate social responsibility variables ESG Score is negatively correlated with VAIC (-0.06), HCE (-0.06) at the 5% significance level, and positively with SCE (0.12) at the 1% significance level. For the control panel, ESG Score is significantly correlated with firm size (SIZE) (0.44), financial leverage (LEV) (0.09), and R&D intensity (RD) (0.06). Noteworthy for the pillar performance scores E Score and S Score is the relatively high correlation coefficient of 0.39 and 0.43 with firm size (SIZE), respectively suggesting higher environmental and social performance in larger corporate investors. After z-transforming the intellectual capital panel, the within-unit Z-score of VAIC shows a slight, but significantly negative correlation (-0.06) ($p < 0.01$), indicating that levered corporate investors contain less intellectual capital. As expected, structural capital (SCE) is positively correlated with firm size (0.07) ($p < 0.01$), pointing to the advantageous potential of exploiting structures in larger corporate investors.

The relationships of the control variables shed light on the dependency with the firm value matrices. As expected, G Score is slightly positively correlated with TQ (0.07), ROA (0.08), and ROE (0.05) suggesting a positive effect of governance measures on firm value as well as short-term financial performance of the corporate investors in the sample. Additionally, SIZE is negatively linked to the firm value (-0.23) and the intellectual capital values of VAIC and human capital efficiency (HCE) with correlations of -0.04 and 0.04, respectively, pointing to possible lower firm value and a lower stock of intellectual capital or human capital in smaller corporate investors. Expectedly, liquidity (LIQ) is positively and significantly correlated with Tobin's Q (TQ) (0.23) and Return on Assets (ROA) (0.20) at the 1% significance level, respectively, indicating a positive effect on firm value and short-term returns through higher levels of liquidity.

The only expectedly high coefficients between ESG Score and its pillar scores E Score (0.83) and S Score (0.89) were measured above the multicollinearity threshold of $|r| > 0.8$ and in the VAIC coefficient and its sub-coefficient HCE (0.98) (Wooldridge, 2016). These findings do not further corrupt the regression analysis as ESG Score and its pillar score as well as VAIC and HCE test multiple levels of the variables relationships without being part in combined regressions. Thus, in the pairwise Pearson correlation matrix a multicollinearity issue between the relevant regression variables could not be observed.

Table 3. Pearson's Correlation Matrix

	TQ	ROA	ROE	ESG Score	E Score	S Score	G Score	VAIC	HCE	SCE	CEE	SIZE	LIQ	LEV	RD
TQ	1														
ROA	0.43***	1													
ROE	0.00	0.54***	1												
ESG Score	0.09***	0.16***	0.08***	1											
E Score	0.08***	0.12***	0.04	0.83***	1										
S Score	0.08***	0.16***	0.08***	0.89***	0.67***	1									
G Score	0.07***	0.08***	0.05**	0.68***	0.37***	0.38***	1								
VAIC	0.03	0.14***	0.07***	-0.06**	-0.07***	-0.06**	0.01	1							
HCE	0.03	0.14***	0.07***	-0.06**	-0.07***	-0.07***	0.02	0.98***	1						
SCE	0.15***	0.26***	0.07***	0.12***	0.13***	0.11***	0.03	-0.01	-0.02	1					
CEE	0.14***	0.20***	0.01	0.03	0.00	0.04	0.00	0.16***	0.10***	0.21***	1				
SIZE	-0.23***	0.02	0.15***	0.44***	0.39***	0.43**	0.22***	-0.04	-0.04	0.07***	-0.03	1			
LIQ	0.23***	0.20***	0.01	-0.04	-0.03	-0.07**	0.02	0.03	0.03	0.03	-0.08***	-0.23***	1		
LEV	-0.11***	-0.23***	-0.04	0.09***	0.06**	0.11**	0.06**	-0.06***	-0.06**	-0.02	0.19***	0.06**	-0.49***	1	
RD	0.33***	0.09***	-0.08***	0.06**	0.09***	0.07**	0.01	-0.03	-0.04	0.00	-0.04	-0.12***	0.43***	-0.31***	1

Pearson's correlation pairwise correlations among the vaariables of the analysis. Values of VAIC, HCE, SCE, and CEE are shown after z-transformation. *,**,*** indicate 10 %, 5% , and 1% significance level, respectively.

4.2 Multivariate Analysis

Before conducting the regression analysis, a Hausman test was performed to choose the model most suitable for the sample of the study. The Hausman test (Hausman, 1978) differentiates between models of fixed effects and random effects for panel data analysis. For this OLS regression, a fixed-effects model was chosen as the significant systematic difference between the fixed-effects and random-effects coefficients suggest.

4.2.1 CSR Performance and Financial Performance

The impact of CSR performance on financial performance is measured through Model 1-9 in Table 4. As results indicate, that CSR performance has a significant and positive effect on financial performance. The coefficient of ESG Score is positive and significant with Tobin's Q (TQ) at 0.66 percentage point for a significance level of 10%, relating to a change of firm value in if ESG Score change by one unit. This is in line with previous findings suggesting a positive effect of ESG Score on Tobin's Q (Alareeni & Hamdan, 2020), indicating that overall ESG performance has significant positive impact on firm value. Still, there was no statistically significant relationship of ESG Score and the short- and long-term financial performance variables of Tobin's Q, and ROA discovered. Considering the pillar score for environmental performance (E Score), a slight negative but statistically significant relationship with ROE was identified at a 5 % significance level. This suggest that environmental strategies negatively affect a firm's operational performance, which was shown and confirmed by exisiting literature on US S&P 500-listed companies (Alareeni & Hamdan, 2020).

With regard to the social performance pillar score (S Score) a positive and significant relationship was found with the corporate investor's firm value at a significance level of 10%. This finding is confirming prior research of Baird et al. (2012) and Barnett et al. (2012).

Lastly, several control values indicated meaningful relationship with the financial performance matrices. The governance pillar performance (G Score) was found to have a mixed relationship with financial performance. Except for the governance pillar performance (G Score) who was not found to have any significant relationship with financial performance. However, larger corporate investors suffer in market value (TQ) and short-term financial performance (ROA) through their size as indicated by the regressions at significant levels. Furthermore, corporate investors with higher levels of liquidity (LIQ) experience significantly positive effects on ROA. This was partly

observed for firm value and long-term financial performance. Also, financial leverage (LEV) was seen to have expected negative effect on all three financial performance values, being significant for ROA on the 1 % significance level. This indicates that higher levels of firm risk pose harmful impacts on the short- and long-term variables of Tobin's Q, ROA, and ROE. Lastly, R&D intensity was found to be negatively, but statistically significant related to financial performance. This translates to light impacts of R&D investments on the short-term financial performance (ROA), which is in line with research of Benkraiem et al. (2023) but negative impact on Tobin's Q as they likely introduce inconsistencies impacting effectiveness as evidenced by Yiu et al. (2020).

To conclude, the results indicate that higher corporate investors' CSR performance does impact the corporate investor's financial performance.

Table 4. Regression of effect of CSR on FP with OLS FE

	TQ			ROA			ROE		
	1	2	3	4	5	6	7	8	9
Variables	ESG Score	E Score	S Score	ESG Score	E Score	S Score	ESG Score	E Score	S Score
CSR	0.0066*	-0.0013	0.0058*	0.0000	-0.0001	0.0001	-0.0007	-0.0006**	-0.0002
	(2.27)	(-0.59)	(2.57)	(-0.16)	(-0.76)	(0.60)	(-1.81)	(-3.13)	(-0.60)
G Score	-0.0002	-0.0007	0.0010	0.0000	0.0000	0.0000	0.0002	0.0001	0.0001
	(-0.08)	(-0.37)	(0.57)	(0.10)	(0.38)	(-0.05)	(0.88)	(0.77)	(0.22)
SIZE	-0.2960***	-0.2550**	-0.2980***	-0.0209***	-0.0254***	-0.0212***	0.0002	-0.0126	-0.0011
	(-4.13)	(-3.01)	(-4.17)	(-4.93)	(-5.22)	(-5.02)	(0.02)	(-1.62)	(-0.11)
LIQ	0.0978*	0.0511	0.0970*	0.0080**	0.0087**	0.0080**	0.0170*	0.0084	0.0173*
	(1.99)	(0.95)	(1.97)	(2.73)	(2.82)	(2.76)	(2.47)	(1.70)	(2.52)
LEV	-0.2150	0.0628	-0.2300	-0.0840***	-0.0954***	-0.0838***	-0.0675	-0.1130***	-0.0653
	(-0.83)	(0.22)	(-0.88)	(-5.46)	(-5.95)	(-5.45)	(-1.86)	(-4.39)	(-1.80)
RD	-4.4800***	-4.7390***	-4.5510***	-0.5870***	-0.5450***	-0.5860***	-0.5100***	-0.5450***	-0.4980***
	(-4.34)	(-4.33)	(-4.41)	(-9.61)	(-8.69)	(-9.60)	(-3.54)	(-5.43)	(-3.46)
Constant	5.4970***	5.3100***	5.5130***	0.3510***	0.4060***	0.3510***	0.0946	0.2710***	0.0933
	(7.39)	(5.97)	(7.41)	(7.98)	(7.96)	(7.98)	(0.91)	(3.32)	(0.90)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.1620	0.1550	0.1630	0.1440	0.1490	0.1440	0.0446	0.0762	0.0426
R-squared adj.	0.1000	0.0869	0.1010	0.0813	0.0800	0.0815	-0.0253	0.0016	-0.0274
N	1499	1367	1499	1499	1367	1499	1498	1366	1498

Table 4 presents the fixed effect regression of CSR Scores on the FP variables. Model 1-3 use TQ, 4-6 ROA, and 7-9 ROE, respectively. Standard errors are presented in parentheses. Year and Industry dummies are included. *,**, and *** indicate significance at 10%, 5%, and 1% level, respectively.

4.2.2 Intellectual Capital and Financial Performance

Table 5 contains the results of the regression analysis for equation (2) (Chapter 3.3.1). The coefficients of intellectual capital demonstrate a positive and significant relationship on the corporate investors' financial performance. The Value-Added Intellectual Coefficient (VAIC) is positively and significantly related with the financial performance variables of ROA and ROE, on a 1% and 10% significance level, respectively. The same applies for the Human Capital Coefficient (HCE). The findings for VAIC are consistent with recent research on the IC and financial performance relationship (e.g., Akgün & Türkoğlu, 2023; Al-Musali & Ku Ismail, 2016; Xu & Wang, 2018), confirming my findings. Also, the HCE results are in line with previous research (e.g., Komnenić & Pokrajčić, 2012; Tran & Vo, 2020; Xu & Wang, 2018). Whereas the Structural Capital Coefficient (SCE) and the Capital Employed Coefficient (CEE) presented positive and statistically significant relationships with Tobin's Q and ROA at a significance level of 1%, respectively. This was also proved by various researchers (Bataineh et al., 2022; Chowdhury et al., 2019; Xu & Wang, 2018), who also found SCE and CEE to contributed positively to Tobin's Q and ROA. However, some of the control variables suggest a decrease in the effect. For high revenue (SIZE) and R&D intense (RD) corporate investors, negative and significant relationships could be observed throughout the regression. Similarly, negative relationships apply for leverage (LEV) on all financial performance variables, only being wholly statistically significant for ROA. Lastly, high liquidity levels of the corporate investors proved to positively impact financial performance and being mostly statistically significant for ROA and ROE.

The findings in Table 5 suggest that corporate investors with a higher intellectual capital base retain better short- and long-term financial performance.

Table 5. Regression of effect of IC on FP with OLS FE

	TQ				ROA				ROE			
	1	2	3	4	5	6	7	8	9	10	11	12
Variables	VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE
IC	0.0367	0.0358	0.1870***	0.2420***	0.0080***	0.0077***	0.0168***	0.0174***	0.0087*	0.0094*	0.0045	0.0052
	(1.27)	(1.24)	(6.64)	(8.74)	(4.73)	(4.57)	(10.31)	(10.79)	(2.17)	(2.33)	(1.11)	(1.31)
G Score	0.0016	0.0016	0.0022	0.0022	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.93)	(0.91)	(1.32)	(1.31)	(-0.05)	(-0.11)	(0.57)	(0.43)	(0.10)	(0.06)	(0.19)	(0.18)
SIZE	-0.2740***	-0.2720***	-0.2810***	-0.2530***	-0.02030***	-0.0199***	-0.0213***	-0.0192***	-0.0011	-0.0005	-0.0019	-0.0013
	(-3.84)	(-3.81)	(-4.01)	(-3.64)	(-4.86)	(-4.76)	(-5.26)	(-4.75)	(-0.11)	(-0.05)	(-0.19)	(-0.13)
LIQ	0.0928	0.0927	0.0737	0.110*	0.0078**	0.0077**	0.0062*	0.0092**	0.0171*	0.0171*	0.0169*	0.0177**
	(1.88)	(1.88)	(1.52)	(2.30)	(2.69)	(2.68)	(2.20)	(3.28)	(2.50)	(2.50)	(2.46)	(2.58)
LEV	-0.2180	-0.2220	-0.0315	-0.9540***	-0.0803***	-0.0810***	-0.0657***	-0.1360***	-0.0610	-0.0615	-0.0602	-0.0803*
	(-0.84)	(-0.85)	(-0.12)	(-3.58)	(-5.26)	(-5.30)	(-4.40)	(-8.74)	(-1.68)	(-1.70)	(-1.65)	(-2.11)
RD	-4.4950***	-4.4930***	-3.7880***	-3.7480***	-0.5600***	-0.5600***	-0.5120***	-0.5240***	-0.4690**	-0.4650**	-0.4770**	-0.4780***
	(-4.34)	(-4.33)	(-3.70)	(-3.71)	(-9.23)	(-9.22)	(-8.66)	(-8.91)	(-3.25)	(-3.23)	(-3.29)	(-3.31)
Constant	5.4310***	5.4160***	5.4230***	5.540***	0.3370***	0.3340***	0.3440***	0.3540***	0.0781	0.0726	0.0909	0.0936
	(7.29)	(7.26)	(7.40)	(7.65)	(7.73)	(7.64)	(8.14)	(8.39)	(0.75)	(0.70)	(0.88)	(0.90)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.1590	0.1590	0.1840	0.2020	0.1570	0.1560	0.2040	0.2100	0.0456	0.0461	0.0432	0.0435
R-squared adj.	0.0981	0.0980	0.1250	0.1440	0.0957	0.0947	0.1460	0.1520	-0.0241	-0.0236	-0.0266	-0.0263
N	1501	1501	1501	1501	1501	1501	1501	1501	1500	1500	1500	1500

Table 5 presents the fixed effect regression of IC variables on the FP variables. Model 1-4 use TQ, 4-8 ROA, and 9-12 ROE, respectively. Standard errors are presented in parentheses. Year and Industry dummies are included. *,**, and *** indicate significance at 10%, 5%, and 1% level, respectively.

4.2.3 CSR Performance and Intellectual Capital

Looking into the relationship of CSR performance and intellectual capital, Table 6 gives an overview of the findings resulting from regression analysis of equation (3) (Chapter 3.2). Hypothesis 3 expects CSR performance to impact intellectual capital components positively. According to Baron and Kenny (1986), this relationship needs to be positive and significant. Regarding ESG Score, varying findings could be observed. First, a negative, non-significant impact on VAIC and HCE, and second, positive relationships with SCE and CEE. The impact of ESG Score on the Capital Employed Coefficient (CEE) is significant at a 5% significance level. This finding reveals that ESG Scores affect how efficiently the corporate investor's create additional value from physical as well as financial resources as indicated by Bayraktaroglu et al. (2019). Furtherly, a similar varying relationship between E Score and VAIC, HCE, SCE and CEE can be obtained, in accordance to the results of the ESG Score. The relationship between E Score and CEE proved to be significant on a 10% level. Lastly, social pillar performance (S Score) recorded positive relationship with VAIC, HCE, and CEE, with SCE however it recorded a negative relationship. The relationship between S Score and CEE is statistically significant at a significance level of 5%.

The findings of the regression analysis for equation (3) found differing effects of the CSR performance variables on intellectual capital. Hypothesis 3 still holds for all the relationships of CSR performance variables with the Capital Employed Coefficient (CEE), as these are positive and statistically significant.

Table 6 Regression of effect of CSR on IC with OLS FE

	VAIC			HCE			SCE			CEE		
	1	2	3	4	5	6	7	8	9	10	11	12
Variables	ESG Score	E Score	E Score	ESG Score	E Score	E Score	ESG Score	E Score	E Score	ESG Score	E Score	E Score
CSR	-0.0022	-0.0016	0.0016	-0.0030	-0.0018	0.0005	0.0008	0.0009	-0.0027	0.0080**	0.0041*	0.0066**
	(-0.83)	(-0.81)	(0.76)	(-1.10)	(-0.90)	(0.22)	(0.30)	(0.43)	(-1.25)	(2.92)	(1.98)	(3.12)
G Score	0.0015	0.0022	0.0007	0.0026	0.0033	0.0017	-0.0034	-0.0033	-0.0029	-0.0045*	-0.0056**	-0.0030
	(0.86)	(1.28)	(0.44)	(1.47)	(1.91)	(1.06)	(-1.94)	(-1.90)	(-1.80)	(-2.52)	(-3.19)	(-1.87)
SIZE	-0.0766	-0.0429	-0.0885	-0.1290	-0.1180	-0.1390*	0.0182	0.1430	0.0300	-0.1200	-0.2170**	-0.1220
	(-1.15)	(-0.55)	(-1.33)	(-1.94)	(-1.52)	(-2.09)	(0.27)	(1.83)	(0.45)	(-1.79)	(-2.74)	(-1.82)
LIQ	0.0256	0.0701	0.0277	0.0286	0.0767	0.0306	0.1080*	0.1270*	0.1060*	-0.0637	-0.0856	-0.0649
	(0.56)	(1.43)	(0.61)	(0.63)	(1.57)	(0.67)	(2.34)	(2.58)	(2.30)	(-1.38)	(-1.71)	(-1.40)
LEV	-0.4740	-0.2300	-0.4640	-0.3980	-0.1220	-0.3870	-1.0930***	-1.0040***	-1.1000***	2.9970***	2.9340***	2.9790***
	(-1.96)	(-0.89)	(-1.92)	(-1.65)	(-0.48)	(-1.61)	(-4.50)	(-3.90)	(-4.53)	(12.26)	(11.23)	(12.20)
RD	-3.2580***	-2.6720**	-3.2010***	-3.4250***	-2.9030**	-3.3640***	-4.3500***	-3.8890***	-4.3900***	-3.4310***	-2.8330**	-3.5210***
	(-3.40)	(-2.66)	(-3.34)	(-3.58)	(-2.90)	(-3.52)	(-4.51)	(-3.86)	(-4.56)	(-3.54)	(-2.77)	(-3.63)
Constant	1.6790*	0.9240	1.6770*	2.1370**	1.5540	2.1320**	0.4090	-0.9570	0.4080	-0.2240	1197	-0.2060
	(2.43)	(1.13)	(2.43)	(3.10)	(1.91)	(3.09)	(0.59)	(-1.17)	(0.59)	(-0.32)	(1.44)	(-0.29)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.0607	0.0444	0.0606	0.0627	0.0462	0.0619	0.1260	0.1390	0.1270	0.1550	0.1580	0.1550
R-squared adj.	-0.0080	-0.0327	-0.0080	-0.0058	-0.0308	-0.0066	0.0619	0.0692	0.0629	0.0928	0.0897	0.0936
N	1499	1367	1499	1499	1367	1499	1499	1367	1499	1499	1367	1499

Table 6 presents the fixed effect regression of CSR Scores on the IC variables. Model 1-3 use VAIC, 4-6 HCE, 7-9 SCE, and 10-12 CEE respectively. Standard errors are presented in parentheses. Year and Industry dummies are included. *,**, and *** indicate significance at 10%, 5%, and 1% level, respectively.

4.2.4 CSR Performance, Intellectual Capital and Financial Performance

In the last step of the Baron and Kenny (1986) model, the potential mediation of intellectual capital of the corporate social responsibility performance and financial performance relationship is assessd. Hypothesis 4 states that coefficients must be significant and reduce the total effect of CSR performance as obtained in regression 1 (chapter 3.3.1).

As reported in Table 7, several positive and significant relationships on the direct, and total effects of CSR on financial performance while essentially controlling for the mediation of intellectual capital was obtained. A total mediation was not obtained through the models (1-36). Although there exist several positive and significant relationship when incorporating CSR performance variables and IC variables in the regression on financial performance, only two of the paths lead to a total mediation as some meditation criteria did not hold for the respective regressions (Baron & Kenny, 1986). They hold the criteria for having significant relationships in the first three regression models ($\beta_1 *$), while having a significant and positive mediator variable in the fourth regression model $\beta_1 > 0 \wedge *$), Lastly, the value for $\beta_1$in the first model needs to be higher than in the fourth model for a partial or full mediation (Nirino et al., 2020).

Reflecting on the results, the relationship of ESG Score and Tobin's Q was mediated through the Capital Employed Coefficient (CEE) Also the S Score and Tobin's Q relationship qualified to be fully mediated by the Capital Employed Coefficient (CEE). While ESG Score significance lowered in the first relationship between the first ($\beta_1 = 0.00656; p < 0.1$) and the fourth model ($\beta_1 = 0.00466$), the coefficient for S Score decreased in the second relationship with Tobin's Q from the first model ($\beta_1 = 0.00581; p < 0.1$) to the fourth model ($\beta_1 = 0.00423$). This total mediation effect implies that the ESG Score and S Score relationship with firm value (TQ), was fully explained by the mediator, eliminating the direct effect of ESG Score and S Score, respectively. This full mediation suggests that Hypothesis 4 holds, and that investments in ESG strategies, especially those in ESG and S Score positively impact a corporate investors capital employed efficiency. This, in turn, enables higher financial performance (TQ), indicating that investments in social resource strategies increase the value of relational capital and firm value of a corporate investor.

Table 7 Regression of effect of CSR on FP with OLS FE mediated IC

	TQ											
	ESG Score				E Score				S Score			
	1	2	3	4	5	6	7	8	9	10	11	12
Variables	VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE
CSR	0.0067*	0.0067*	0.0064*	0.0047	-0.0012	-0.0012	-0.0015	-0.0023	0.0058*	0.0060*	0.0063**	0.0042
	(2.30)	(2.30)	(2.25)	(1.65)	(-0.56)	(-0.55)	(-0.67)	(-1.05)	(2.54)	(2.56)	(2.83)	(1.91)
IC	0.0378	0.0374	0.1870***	0.2390***	0.0466	0.0477	0.1790***	0.2350***	0.0349	0.0350	0.1900***	0.2380***
	(1.31)	(1.29)	(6.62)	(8.59)	(1.52)	(1.55)	(5.93)	(7.97)	(1.21)	(1.21)	(6.73)	(8.56)
G Score	-0.0002	-0.0002	0.0005	0.0009	-0.0008	-0.0008	-0.0001	0.0006	0.0010	0.0009	0.0015	0.0017
	(-0.11)	(-0.13)	(0.26)	(0.50)	(-0.42)	(-0.45)	(-0.06)	(0.34)	(0.56)	(0.54)	(0.91)	(1.02)
SIZE	-0.2930***	-0.2910***	-0.2990***	-0.2670***	-0.2530**	-0.2500**	-0.2810***	-0.2040*	-0.2950***	-0.2940***	-0.3040***	-0.2690***
	(-4.09)	(-4.05)	(-4.24)	(-3.82)	(-2.99)	(-2.94)	(-3.35)	(-2.46)	(-4.12)	(-4.09)	(-4.31)	(-3.85)
LIQ	0.0968*	0.0967*	0.0777	0.1130*	0.0478	0.0474	0.0284	0.0712	0.0960	0.0959	0.0769	0.1120*
	(1.97)	(1.96)	(1.60)	(2.35)	(0.89)	(0.88)	(0.53)	(1.36)	(1.95)	(1.95)	(1.58)	(2.34)
LEV	-0.1970	-0.2000	-0.0109	-0.9300***	0.0735	0.0686	0.2420	-0.6250*	-0.2130	-0.2160	-0.0208	-0.9380***
	(-0.76)	(-0.77)	(-0.04)	(-3.48)	(0.26)	(0.25)	(0.87)	(-2.18)	(-0.82)	(-0.83)	(-0.08)	(-3.52)
RD	-4.3570***	-4.3520***	-3.6680***	-3.6610***	-4.6140***	-4.6000***	-4.0430***	-4.0740***	-4.4390***	-4.4330***	-3.7170***	-3.7140***
	(-4.20)	(-4.19)	(-3.58)	(-3.62)	(-4.20)	(-4.19)	(-3.72)	(-3.80)	(-4.29)	(-4.28)	(-3.63)	(-3.68)
Constant	5.4340***	5.4180***	5.4210***	5.5510***	5.2670***	5.2360***	5.4810***	5.0290***	5.4540***	5.4380***	5.4350***	5.5620***
	(7.29)	(7.25)	(7.39)	(7.65)	(5.92)	(5.88)	(6.24)	(5.78)	(7.32)	(7.29)	(7.42)	(7.67)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	0.1630	0.1630	0.1870	0.2040	0.1570	0.1570	0.1780	0.1960	0.1630	0.1630	0.1890	0.2040
	0.1010	0.1010	0.1270	0.1450	0.0878	0.0879	0.1110	0.1300	0.1020	0.1020	0.1290	0.1460
N	1499	1499	1499	1499	1367	1367	1367	1367	1499	1499	1499	1499

Table 7 presents the fixed effect regression of CSR Scores and IC on the FP variables. Models 1-4 use ESG Score, 5-8 E Score, and 9-12 S Score and 1-12 TQ, respectively. Standard errors are presented in parentheses. Year and Industry dummies are included. *,**, and *** indicate significance at 10%, 5%, and 1% level, respectively.

Table 7 (continued). Regression of effect of CSR on FP with OLS FE mediated IC

ROA											
ESG Score				E Score				S Score			
13	14	15	16	17	18	19	20	21	22	23	24
VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE
0.0000	0.0000	0.0000	-0.0002	-0.0001	-0.0001	-0.0001	-0.0002	0.0001	0.0001	0.0001	0.0000
(-0.06)	(-0.03)	(-0.25)	(-1.01)	(-0.66)	(-0.65)	(-0.93)	(-1.35)	(0.51)	(0.58)	(0.97)	(-0.27)
0.00797***	0.0077***	0.0168***	0.0175***	0.0080***	0.0078***	0.0188***	0.0168***	0.0080***	0.0077***	0.0169***	0.0174***
(4.71)	(4.54)	(10.30)	(10.84)	(4.61)	(4.47)	(11.26)	(10.14)	(4.71)	(4.54)	(10.33)	(10.77)
0.0000	0.0000	0.0001	0.0001	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000
(-0.01)	(-0.08)	(0.64)	(0.84)	(0.22)	(0.14)	(1.00)	(1.30)	(-0.11)	(-0.18)	(0.44)	(0.49)
-0.0203***	-0.0199***	-0.0212***	-0.0188***	-0.0250***	-0.0244***	-0.0280***	-0.0217***	-0.0205***	-0.0202***	-0.0217***	-0.0191***
(-4.82)	(-4.72)	(-5.19)	(-4.61)	(-5.19)	(-5.06)	(-6.04)	(-4.63)	(-4.88)	(-4.79)	(-5.33)	(-4.69)
0.0078**	0.0077**	0.0062*	0.0091**	0.0081**	0.0081**	0.0063*	0.0101***	0.0078**	0.0078**	0.0062*	0.0092**
(2.68)	(2.68)	(2.19)	(3.24)	(2.66)	(2.64)	(2.14)	(3.42)	(2.70)	(2.69)	(2.22)	(3.27)
-0.0802***	-0.0809***	-0.0656***	-0.1370***	-0.0935***	-0.0944***	-0.0765***	-0.1450***	-0.0801***	-0.0808***	-0.0652***	-0.1360***
(-5.25)	(-5.29)	(-4.39)	(-8.78)	(-5.88)	(-5.93)	(-4.97)	(-8.95)	(-5.24)	(-5.29)	(-4.37)	(-8.73)
-0.5610***	-0.5600***	-0.5140***	-0.5270***	-0.5240***	-0.5230***	-0.4720***	-0.4980***	-0.5600***	-0.5600***	-0.5110***	-0.5240***
(-9.22)	(-9.20)	(-8.66)	(-8.94)	(-8.39)	(-8.36)	(-7.85)	(-8.22)	(-9.22)	(-9.20)	(-8.63)	(-8.90)
0.3380***	0.3350***	0.3440***	0.3550***	0.3980***	0.3940***	0.4240***	0.3860***	0.3380***	0.3350***	0.3440***	0.3550***
(7.72)	(7.63)	(8.11)	(8.40)	(7.87)	(7.77)	(8.71)	(7.86)	(7.72)	(7.64)	(8.11)	(8.39)
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
0.1570	0.1560	0.2040	0.2100	0.1630	0.1620	0.2260	0.2130	0.1570	0.1570	0.2050	0.2100
0.0950	0.0940	0.1460	0.1520	0.0946	0.0937	0.1630	0.1490	0.0952	0.0942	0.1460	0.1510
1499	1499	1499	1499	1367	1367	1367	1367	1499	1499	1499	1499

Table 7 presents the fixed effect regression of CSR Scores and IC on the FP variables. Models 13-16 use ESG Score, 17-20 E Score, and 21-24 S Score and 13-24 ROA, respectively. Standard errors are presented in parentheses. Year and Industry dummies are included. *,**, and *** indicate significance at 10%, 5%, and 1% level, respectively.

Table 7 (continued). Regression of effect of CSR on FP with OLS FE mediated IC

ROE											
ESG Score				E Score				S Score			
25	26	27	28	29	30	31	32	33	34	35	36
VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE
-0.0007	-0.0007	-0.0007	-0.0008	-0.0006**	-0.0006**	-0.0006**	-0.0007**	-0.0002	-0.0002	-0.0002	-0.0002
(-1.76)	(-1.74)	(-1.82)	(-1.92)	(-3.09)	(-3.08)	(-3.24)	(-3.22)	(-0.65)	(-0.62)	(-0.57)	(-0.71)
0.0085*	0.0091*	0.0045	0.0058	0.0057*	0.0063*	0.0158***	0.0043	0.0087*	0.0094*	0.0044	0.0054
(2.12)	(2.27)	(1.12)	(1.46)	(2.01)	(2.24)	(5.70)	(1.55)	(2.17)	(2.32)	(1.09)	(1.36)
0.0002	0.0002	0.0002	0.0003	0.0001	0.0001	0.0002	0.0002	0.0000	0.0000	0.0001	0.0001
(0.83)	(0.79)	(0.94)	(0.98)	(0.69)	(0.64)	(1.08)	(0.90)	(0.20)	(0.16)	(0.28)	(0.29)
0.00	0.0013	0.0001	0.0009	-0.0124	-0.0119	-0.0149	-0.0117	-0.0004	0.0002	-0.0013	-0.0005
(0.08)	(0.13)	(0.01)	(0.09)	(-1.59)	(-1.52)	(-1.93)	(-1.50)	(-0.04)	(0.02)	(-0.13)	(-0.05)
0.0167*	0.0167*	0.0165*	0.0173*	0.008	0.0079	0.0064	0.0087	0.0170*	0.0170*	0.0168*	0.0176*
(2.44)	(2.44)	(2.39)	(2.52)	(1.62)	(1.60)	(1.30)	(1.77)	(2.48)	(2.48)	(2.44)	(2.57)
-0.0635	-0.0639	-0.0626	-0.0848*	-0.1120***	-0.1120***	-0.0969***	-0.1250***	-0.0613	-0.0617	-0.0605	-0.0814*
(-1.75)	(-1.76)	(-1.71)	(-2.22)	(-4.35)	(-4.37)	(-3.80)	(-4.66)	(-1.69)	(-1.70)	(-1.65)	(-2.13)
-0.4830***	-0.4790***	-0.4910***	-0.4900***	-0.5300***	-0.5270***	-0.4840***	-0.5330***	-0.4700**	-0.4670**	-0.4790***	-0.4790***
(-3.34)	(-3.32)	(-3.38)	(-3.39)	(-5.27)	(-5.24)	(-4.85)	(-5.29)	(-3.26)	(-3.23)	(-3.30)	(-3.31)
0.0802	0.0750	0.0928	0.0960	0.2660**	0.2610**	0.2870***	0.2660**	0.0785	0.0732	0.0915	0.0944
(0.77)	(0.72)	(0.89)	(0.93)	(3.26)	(3.20)	(3.55)	(3.26)	(0.76)	(0.70)	(0.88)	(0.91)
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
0.0477	0.0481	0.0455	0.0460	0.0792	0.0799	0.0994	0.0780	0.0458	0.0463	0.0434	0.0439
-0.0227	-0.0222	-0.0251	-0.0244	0.0040	0.0048	0.0259	0.0027	-0.0247	-0.0242	-0.0273	-0.0268
1498	1498	1498	1498	1366	1366	1366	1366	1498	1498	1498	1498

Table 7 presents the fixed effect regression of CSR Scores and IC on the FP variables. Models 25-28 use ESG Score, 29-32 E Score, and 33-36 S Score and 25-36 TQ, respectively. Standard errors are presented in parentheses. Year and Industry dummies are included. *,**, and *** indicate significance at 10%, 5%, and 1% level, respectively.

4.3 Robustness Analysis

In the final stage of analysis, several robustness tests are included in order to promote a higher reliability and validity of the obtained results. Moreover, robustness checks address biases drawn from the results. As stated in chapter 3, for treating the endogeneity[4] of my study, I employed a Hausman test before running my regression analysis with STATA (Hausman, 1978). It indicated to perform a fixed-effect OLS regression.

4.3.1 Robustness Standard Error Test

At first, I employed cluster-robust standard errors as a first robustness test to correct for correlations within clusters, in this case CVCs. Robust standard errors test the OLS inherent standard errors and lay attention on the change in p-values of the former regression models. Also, they are robust to autocorrelation by clustering at panel level. For the first regression in Table 8 the significant results for all three positively correlated coefficients disappeared at a similar R-squared, and thus proved to be insignificant. In the second regression in Table 9 the impacts of the intellectual capital variables were furtherly supported, even lead to more significant T-statistics. For the third regression model in Table 10, the impact of ESG on CEE became more pronounced at a higher significance level of 5%. Furtherly, the relationship of the E Score and SCE became significant ($p < 0.10$), whereas the relationship of the S Score on CEE remained positively correlated at ($p < 0.05$). Additionally, all negative relationships of the control R&D where amplified at 1% significance level. In the fourth regression in Table 11, with the introduction of cluster-robust standard errors, the mediation of neither variable in the intellectual capital on the CSR-FP relationship could be proved. The beforehand established partial mediation of CEE on the ESG Score - TQ and S Score – TQ relationship, respectively, did not longer hold as obtained coefficients did not prove to be statistically significant.

[4] In econometrics, endogeneity is the high correlation of an error term with the predictor variable. This is caused either by omitted variable bias or a simultaneity bias. The first bias contains all the predictive power in the error term as it leaves out essential variables, the latter bias includes the predicted variables as predictors.

Table 8. Regression of effect of CSR on FP with OLS Cluster-fixed effects

	TQ			ROA			ROE		
	1	2	3	4	5	6	7	8	9
Variables	ESG Score	E Score	S Score	ESG Score	E Score	S Score	ESG Score	E Score	S Score
CSR	0.0066	-0.0013	0.0058	0.0000	-0.0001	0.0001	-0.0007	-0.0006	-0.0002
	-1.52	(-0.44)	(1.72)	(-0.12)	(-0.50)	(0.48)	(-1.59)	(-1.68)	(-0.72)
G Score	-0.0002	-0.0007	0.0010	0.0000	0.0000	0.0000	0.0002	0.0001	0.0001
	(-0.09)	(-0.34)	(0.49)	(0.10)	(0.32)	(-0.04)	(1.19)	(0.81)	(0.37)
SIZE	-0.2960	-0.2550	-0.2980	-0.0209**	-0.0254**	-0.0212**	0.0002	-0.0126	-0.0011
	(-1.23)	(-0.84)	(-1.24)	(-2.74)	(-2.87)	(-2.81)	(0.01)	(-1.21)	(-0.08)
LIQ	0.0978	0.0511	0.0970	0.0080	0.0087	0.0080	0.0170	0.0084*	0.0173
	(0.53)	(0.27)	(0.52)	(1.46)	(1.60)	(1.48)	(1.37)	(2.04)	(1.37)
LEV	-0.2150	0.0628	-0.2300	-0.0840*	-0.0954*	-0.0838*	-0.0675	-0.1130	-0.0653
	(-0.25)	(0.06)	(-0.26)	(-2.56)	(-2.54)	(-2.53)	(-0.99)	(-1.53)	(-0.95)
RD	-4.4800	-4.7390	-4.5510*	-0.5870***	-0.5450***	-0.5860***	-0.5100*	-0.5450	-0.4980*
	(-1.94)	(-1.71)	(-1.99)	(-4.00)	(-3.87)	(-4.01)	(-2.12)	(-1.93)	(-2.07)
Consistant	5.4970	5.3100	5.5130	0.3510***	0.4060***	0.3510***	0.0946	0.2710	0.0933
	(1.88)	(1.53)	(1.89)	(4.25)	(4.37)	(4.25)	(0.50)	(1.78)	(0.49)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.1620	0.1550	0.1630	0.1440	0.1490	0.1440	0.0446	0.0762	0.0426
R-squared adj.	0.1480	0.1400	0.1490	0.1300	0.1330	0.1300	0.0290	0.0597	0.0270
N	1499	1367	1499	1499	1367	1499	1498	1366	1498

Table 8 presents the cluster-fixed effect regression of CSR Scores on the FP variables. Model 1-3 use TQ, 4-6 ROA, and 7-9 ROE, respectively. Standard errors are presented in parentheses. Year and Industry dummies are included. *,**, and *** indicate

Table 9 Regression of effect of IC on FP with OLS Cluster-fixed effects

	TQ				ROA				ROE			
	1	2	3	4	5	6	7	8	9	10	11	12
Variables	VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE
IC	0.0367	0.0358	0.1870***	0.2420**	0.0080***	0.0077***	0.0168***	0.0174***	0.0087*	0.0094*	0.0045	0.0052
	(1.14)	(1.01)	(4.88)	(3.23)	(3.68)	(3.47)	(5.38)	(5.23)	(2.07)	(2.21)	(0.43)	(0.95)
G Score	0.00159	0.00156	0.00222	0.00217	0.00000	-0.00001	0.00006	0.00004	0.00002	0.00001	0.00005	0.00004
	(0.72)	(0.70)	(0.98)	(1.01)	(-0.04)	(-0.09)	(0.45)	(0.36)	(0.16)	(0.10)	(0.32)	(0.30)
SIZE	-0.2740	-0.2720	-0.2810	-0.2530	-0.0203**	-0.0199*	-0.0213*	-0.0192*	-0.0011	-0.0005	-0.0019	-0.0013
	(-1.12)	(-1.11)	(-1.18)	(-1.05)	(-2.67)	(-2.63)	(-2.64)	(-2.59)	(-0.07)	(-0.03)	(-0.13)	(-0.09)
LIQ	0.0928	0.0927	0.0737	0.1100	0.0078	0.0077	0.0062	0.0092	0.0171	0.0171	0.0169	0.0177
	(0.50)	(0.50)	(0.40)	(0.63)	(1.47)	(1.45)	(1.15)	(1.96)	(1.39)	(1.39)	(1.24)	(1.39)
LEV	-0.2180	-0.2220	-0.0315	-0.9540	-0.0803*	-0.0810*	-0.0657*	-0.1360***	-0.0610	-0.0615	-0.0602	-0.0803
	(-0.25)	(-0.26)	(-0.04)	(-1.03)	(-2.47)	(-2.51)	(-2.01)	(-3.64)	(-0.88)	(-0.89)	(-0.94)	(-1.37)
RD	-4.4950*	-4.4930*	-3.7880	-3.7480	-0.5600***	-0.5600***	-0.5120***	-0.5240***	-0.4690	-0.4650	-0.4770*	-0.4780
	(-2.02)	(-2.02)	(-1.95)	(-1.89)	(-4.08)	(-4.09)	(-4.43)	(-4.01)	(-1.95)	(-1.94)	(-2.01)	(-1.89)
Constant	5.4310	5.4160	5.4230	5.5400	0.3370***	0.3340***	0.3440***	0.3540***	0.0781	0.0726	0.0909	0.0936
	(1.85)	(1.85)	(1.87)	(1.98)	(4.08)	(4.07)	(3.92)	(4.58)	(0.40)	(0.37)	(0.48)	(0.50)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.1590	0.1590	0.1840	0.2020	0.1570	0.1560	0.2040	0.2100	0.0456	0.0461	0.0432	0.0435
R-squared adj.	0.1460	0.1460	0.1710	0.1890	0.1430	0.1430	0.1910	0.1970	0.0300	0.0305	0.0276	0.0280
N	1501	1501	1501	1501	1501	1501	1501	1501	1500	1500	1500	1500

Table 9 presents the cluster-fixed effect regression of IC variables on the FP variables. Model 1-4 use TQ, 4-8 ROA, and 9-12 ROE, respectively. Standard errors are presented in parentheses. Year and Industry dummies are included. *,**, and *** indicate significance at 10%, 5%, and 1% level, respectively.

Table 10. Regression of effect of CSR on IC with OLS Cluster-fixed effects

	VAIC			HCE			SCE			CEE		
	1	2	3	4	5	6	7	8	9	10	11	12
Variables	ESG Score	E Score	S Score	ESG Score	E Score	S Score	ESG Score	E Score	S Score	ESG Score	E Score	S Score
CSR	-0.0022	-0.0016	0.0016	-0.0030	-0.0018	0.0005	0.0008	0.0009	-0.0027	0.0080*	0.0041	0.0066*
	(-0.63)	(-0.69)	(0.51)	(-0.82)	(-0.74)	(0.14)	(0.22)	(0.25)	(-0.94)	(2.34)	(1.70)	(2.18)
G Score	0.0015	0.0022	0.0007	0.0026	0.0033	0.0017	-0.0034	-0.0033	-0.0029	-0.0045*	-0.0056*	-0.0030
	(0.73)	(1.07)	(0.37)	(1.18)	(1.52)	(0.82)	(-1.45)	(-1.28)	(-1.28)	(-2.01)	(-2.39)	(-1.36)
SIZE	-0.0766	-0.0429	-0.0885	-0.1290	-0.1180	-0.1390	0.0182	0.1430	0.0300	-0.1200	-0.2170	-0.1220
	(-0.82)	(-0.38)	(-0.94)	(-1.22)	(-0.94)	(-1.32)	(0.13)	(1.06)	(0.22)	(-0.67)	(-0.98)	(-0.69)
LIQ	0.0256	0.0701	0.0277	0.0286	0.0767	0.0306	0.1080*	0.1270*	0.1060*	-0.0637	-0.0856	-0.0649
	(0.45)	(1.26)	(0.49)	(0.52)	(1.44)	(0.56)	(2.20)	(2.53)	(2.16)	(-0.84)	(-0.99)	(-0.85)
LEV	-0.474	-0.23	-0.464	-0.398	-0.122	-0.387	-1.0930*	-1.0040*	-1.1000*	2.9970***	2.9340***	2.9790***
	(-1.64)	(-0.88)	(-1.60)	(-1.15)	(-0.36)	(-1.10)	(-2.62)	(-2.17)	(-2.63)	(4.42)	(3.80)	(4.40)
RD	-3.2580*	-2.6720*	-3.2010*	-3.4250*	-2.9030*	-3.3640*	-4350	-3889	-4390	-3.4310*	-2.8330*	-3.5210*
	(-2.40)	(-2.15)	(-2.36)	(-2.41)	(-2.15)	(-2.38)	(-1.82)	(-1.61)	(-1.86)	(-2.41)	(-2.07)	(-2.50)
Constant	1679	0.9240	1677	2.1370*	1554	2.1320*	0.4090	-0.9570	0.4080	-0.2240	1197	-0.2060
	(1.77)	(0.83)	(1.76)	(2.08)	(1.31)	(2.07)	(0.30)	(-0.72)	(0.30)	(-0.13)	(0.56)	(-0.12)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.0607	0.0444	0.0606	0.0627	0.0462	0.0619	0.1260	0.1390	0.1270	0.1550	0.1580	0.1550
R-squared adj	0.0454	0.0273	0.0453	0.0475	0.0291	0.0467	0.1120	0.1230	0.1120	0.1410	0.1430	0.1420
N	1499	1367	1499	1499	1367	1499	1499	1367	1499	1499	1367	1499

Table 10 presents the cluster-fixed effect regression of CSR Scores on the IC variables. Model 1-3 use VAIC, 4-6 HCE, 7-9 SCE, and 10-12 CEE, respectively. Standard errors are presented in parentheses. Year and Industry dummies are included. *,**, and *** indicate significance at 10%, 5%, and 1% level, respectively.

Table 11. Regression of effect of CSR on IC with OLS Cluster-fixed effects mediated IC

	TQ											
	ESG Score				E Score				S Score			
	1	2	3	4	5	6	7	8	9	10	11	12
Variables	VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE
CSR	0.0067	0.0067	0.0064	0.0047	-0.0012	-0.0012	-0.0015	-0.0023	0.0058	0.0058	0.0063	0.0042
	(1.54)	(1.55)	(1.52)	(1.15)	(-0.42)	(-0.41)	(-0.53)	(-0.77)	(1.69)	(1.71)	(1.88)	(1.32)
IC	0.0378	0.0374	0.1870***	0.2390**	0.0466	0.0477	0.1790***	0.2350**	0.0349	0.0350	0.1900***	0.2380**
	(1.19)	(1.07)	(4.89)	(3.22)	(1.67)	(1.63)	(4.85)	(2.93)	(1.08)	(0.98)	(4.90)	(3.22)
G Score	-0.0002	-0.0002	0.0005	0.0009	-0.0008	-0.0008	-0.0001	0.0006	0.0010	0.0009	0.0015	0.0017
	(-0.12)	(-0.14)	(0.27)	(0.51)	(-0.39)	(-0.41)	(-0.05)	(0.30)	(0.47)	(0.45)	(0.73)	(0.84)
SIZE	-0.2930	-0.2910	-0.2990	-0.2670	-0.2530	-0.2500	-0.2810	-0.2040	-0.2950	-0.2940	-0.3040	-0.2690
	(-1.21)	(-1.21)	(-1.27)	(-1.12)	(-0.83)	(-0.82)	(-0.95)	(-0.67)	(-1.22)	(-1.22)	(-1.29)	(-1.13)
LIQ	0.0968	0.0967	0.0777	0.1130	0.0478	0.0474	0.0284	0.0712	0.0960	0.0959	0.0769	0.1120
	(0.52)	(0.52)	(0.43)	(0.65)	(0.25)	(0.25)	(0.15)	(0.40)	(0.52)	(0.52)	(0.42)	(0.64)
LEV	-0.1970	-0.2000	-0.0109	-0.9300	0.0735	0.0686	0.2420	-0.6250	-0.2130	-0.2160	-0.0208	-0.9380
	(-0.23)	(-0.23)	(-0.01)	(-0.99)	(0.07)	(0.07)	(0.24)	(-0.60)	(-0.25)	(-0.25)	(-0.02)	(-1.00)
RD	-4.3570	-4.3520	-3.6680	-3.6610	-4.6140	-4.6000	-4.0430	-4.0740	-4.4390	-4.4330	-3.7170	-3.7140
	(-1.91)	(-1.91)	(-1.84)	(-1.80)	(-1.69)	(-1.68)	(-1.65)	(-1.66)	(-1.97)	(-1.96)	(-1.88)	(-1.84)
Constant	5.4340	5.4180	5.4210	5.5510	5.2670	5.2360	5.4810	5.0290	5.4540	5.4380	5.4350	5.5620
	(1.85)	(1.85)	(1.88)	(1.98)	(1.51)	(1.50)	(1.60)	(1.48)	(1.86)	(1.86)	(1.88)	(1.98)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.1630	0.1630	0.1870	0.2040	0.1570	0.1570	0.1780	0.1960	0.1630	0.1630	0.1890	0.2040
R-squared adj	0.1480	0.1480	0.1730	0.1900	0.1410	0.1410	0.1630	0.1810	0.1490	0.1490	0.1750	0.1910
N	1499	1499	1499	1499	1367	1367	1367	1367	1499	1499	1499	1499

Table 11 presents the cluster-fixed effect regression of CSR Scores and IC on the FP variables. Models 1-4 use ESG Score, 5-8 E Score, and 9-12 S Score and 1-12 TQ, respectively. Standard errors are presented in parentheses. Year and Industry dummies are included. *,**, and *** indicate significance at 10%, 5%, and 1% level, respectively.

Table 11 (continued). Regression of effect of CSR on IC with OLS Cluster-fixed effects mediated IC

ROA											
ESG Score				E Score				S Score			
13	14	15	16	17	18	19	20	21	22	23	24
VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE
0.0000	0.0000	0.0000	-0.0002	-0.0001	-0.0001	-0.0001	-0.0002	0.0001	0.0001	0.0001	0.0000
(-0.04)	(-0.02)	(-0.18)	(-0.73)	(-0.43)	(-0.43)	(-0.68)	(-0.93)	(0.42)	(0.48)	(0.74)	(-0.22)
0.0080***	0.0077***	0.0168***	0.0175***	0.0080***	0.0078**	0.0188***	0.0168***	0.0080***	0.0077***	0.0169***	0.0174***
(3.68)	(3.47)	(5.36)	(5.27)	(3.47)	(3.30)	(6.87)	(4.87)	(3.65)	(3.44)	(5.34)	(5.26)
0.0000	0.0000	0.0001	0.0001	0.0000	0.0000	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000
(-0.01)	(-0.07)	(0.59)	(0.80)	(0.18)	(0.12)	(0.75)	(1.04)	(-0.09)	(-0.16)	(0.37)	(0.43)
-0.0203**	-0.0199*	-0.0212*	-0.0188*	-0.0250**	-0.0244**	-0.0280**	-0.0217*	-0.0205**	-0.0202**	-0.0217**	-0.0191*
(-2.67)	(-2.63)	(-2.62)	(-2.52)	(-2.85)	(-2.78)	(-3.29)	(-2.23)	(-2.72)	(-2.68)	(-2.70)	(-2.57)
0.0078	0.0077	0.0062	0.0091	0.0081	0.0081	0.0063	0.0101*	0.0078	0.0078	0.0062	0.0092
(1.46)	(1.45)	(1.14)	(1.92)	(1.53)	(1.51)	(1.18)	(2.20)	(1.48)	(1.47)	(1.17)	(1.96)
-0.0802*	-0.0809*	-0.0656*	-0.1370***	-0.0935*	-0.0944*	-0.0765*	-0.1450**	-0.0801*	-0.0808*	-0.0652	-0.136***
(-2.47)	(-2.51)	(-2.02)	(-3.73)	(-2.52)	(-2.57)	(-2.02)	(-3.34)	(-2.45)	(-2.49)	(-1.97)	(-3.66)
-0.5610***	-0.5600***	-0.5140***	-0.5270***	-0.5240***	-0.5230***	-0.4720***	-0.4980***	-0.5600***	-0.5600***	-0.5110***	-0.5240***
(-4.04)	(-4.04)	(-4.39)	(-4.01)	(-3.88)	(-3.89)	(-4.40)	(-3.82)	(-4.06)	(-4.06)	(-4.39)	(-4.01)
0.3380***	0.3350***	0.3440***	0.3550***	0.3980***	0.3940***	0.4240***	0.3860***	0.3380***	0.3350***	0.3440***	0.3550***
(4.08)	(4.06)	(3.91)	(4.60)	(4.28)	(4.24)	(4.57)	(3.85)	(4.08)	(4.07)	(3.91)	(4.59)
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
0.1570	0.1560	0.2040	0.2100	0.1630	0.1620	0.2260	0.2130	0.1570	0.1570	0.2050	0.2100
0.1430	0.1420	0.1910	0.1970	0.1470	0.1460	0.2120	0.1980	0.1430	0.1420	0.1910	0.1960
1499	1499	1499	1499	1367	1367	1367	1367	1499	1499	1499	1499

Table 11 presents the Cluster-fixed effect regression of CSR Scores and IC on the FP variables. Models 13-16 use ESG Score, 17-20 E Score, and 21-24 S Score and 13-24 ROA, respectively. Standard errors are presented in parentheses. Year and Industry dummies are included. *,**, and *** indicate significance at 10%, 5%, and 1% level, respectively.

Table 11 (continued). Regression of effect of CSR on IC with OLS Cluster-fixed effects mediated IC

ROE											
ESG Score				E Score				S Score			
25	26	27	28	29	30	31	32	33	34	35	36
VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE
-0.0007	-0.0007	-0.0007	-0.0008	-0.0006	-0.0006	-0.0006	-0.0006	-0.0002	-0.0002	-0.0002	-0.0002
(-1.57)	(-1.56)	(-1.61)	(-1.70)	(-1.65)	(-1.65)	(-1.76)	(-1.81)	(-0.79)	(-0.76)	(-0.64)	(-0.90)
0.0085*	0.0091*	0.0045	0.0058	0.0057*	0.0063*	0.0158***	0.0043	0.00873*	0.0094*	0.0044	0.0054
(2.03)	(2.17)	(0.44)	(1.07)	(2.08)	(2.32)	(4.20)	(0.72)	(2.06)	(2.20)	(0.42)	(1.01)
0.0002	0.0002	0.0002	0.0003	0.0001	0.0001	0.0002	0.0002	0.0000	0.0000	0.0001	0.0001
(1.12)	(1.08)	(1.39)	(1.30)	(0.73)	(0.68)	(1.13)	(0.94)	(0.32)	(0.25)	(0.47)	(0.48)
0.0008	0.0013	0.0001	0.0009	-0.0124	-0.0119	-0.0149	-0.0117	-0.0004	0.0002	-0.0013	-0.0005
(0.05)	(0.09)	(0.01)	(0.06)	(-1.16)	(-1.11)	(-1.41)	(-1.00)	(-0.03)	(0.01)	(-0.09)	(-0.03)
0.0167	0.0167	0.0165	0.0173	0.0080	0.0079	0.0064	0.0087*	0.0170	0.0170	0.0168	0.0176
(1.39)	(1.39)	(1.23)	(1.39)	(1.96)	(1.94)	(1.60)	(2.09)	(1.39)	(1.39)	(1.24)	(1.39)
-0.0635	-0.0639	-0.0626	-0.0848	-0.1120	-0.1120	-0.0969	-0.1250	-0.0613	-0.0617	-0.0605	-0.0814
(-0.93)	(-0.94)	(-0.99)	(-1.49)	(-1.51)	(-1.52)	(-1.33)	(-1.97)	(-0.89)	(-0.90)	(-0.95)	(-1.40)
-0.4830*	-0.4790*	-0.4910*	-0.4900	-0.5300	-0.5270	-0.4840	-0.5330	-0.4700	-0.4670	-0.4790*	-0.4790
(-2.00)	(-2.00)	(-2.05)	(-1.94)	(-1.87)	(-1.87)	(-1.81)	(-1.81)	(-1.96)	(-1.95)	(-2.01)	(-1.90)
0.0802	0.0750	0.0928	0.0960	0.2660	0.2610	0.2870	0.2660	0.0785	0.0732	0.0915	0.0944
(0.41)	(0.39)	(0.50)	(0.52)	(1.71)	(1.68)	(1.85)	(1.65)	(0.40)	(0.38)	(0.49)	(0.50)
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
0.0477	0.0481	0.0455	0.0460	0.0792	0.0799	0.0994	0.0780	0.0458	0.0463	0.0434	0.0439
0.0315	0.0319	0.0293	0.0298	0.0620	0.0627	0.0826	0.0608	0.0296	0.0301	0.0272	0.0276
1498	1498	1498	1498	1366	1366	1366	1366	1498	1498	1498	1498

Table 11 presents the Cluster-fixed effect regression of CSR Scores and IC on the FP variables. Models 25-28 use ESG Score, 29-32 E Score, and 33-36 S Score and 25-36 TQ, respectively. Standard errors are presented in parentheses. Year and Industry dummies are included. *,**, and *** indicate significance at 10%, 5%, and 1% level, respectively.

4.3.3 Effect of Time Lag

As the next robustness test, I tackle the potential of reverse causality. Thus, I not only lag CSR performance by one year (equation 1 in section 3.3.1). I also lag the components of VAIC and the dependent variables which is financial performance. This form of applying two autoregressive terms places the mediator variables of VAIC in t+1 and the independent variable of financial performance in t+2. This is performed to account for biased estimates in cross-sectional longitudinal data (Maxwell et al., 2011). This structural equation modeling (SEM) procedure is used, as Surroca et al. (2010) pointed to potential over- and underestimation biases in running OLS. Also, the SEM is preferred over Sobel test due to higher flexibility and robustness. These regressions were also performed with robust fixed effects.

For the first regression (Table 12), the coefficient of ESG Score rose in significance with Tobin's Q (TQ) at 1.70 percentage point for a significance level of 1%. Tobin's Q also became positive and significantly correlated with E Score and S Score on a 1% significance level. Also, ESG Score, E Score and S Score are correlated significantly with ROA at the 1% significance level. Interestingly, the control variable R&D intensity changed its relationship to be strongly and statistically significant related to Tobin's Q as R&D seems to pay off in increasing firm value, which is in line with research of Benkraiem et al. (2023). Contrastingly, negative impacts of R&D investments on the short-term financial performance (ROE) were recorded, evidencing that research and development costs increase short-term costs that only pay-off in the long run (when turned into patents).

In the second regression of IC on financial performance (Table 13), VAIC showed significant relation with the short-term financial performance variables of ROA and ROE, at a 5% significance level, respectively. The same correlations apply for the Human Capital Coefficient (HCE) and the Capital Employed Coefficient (CEE). However, Structural Capital Coefficient (SCE) presents positive and statistically significant relationships with Tobin's Q and ROA at a significance level of 1%,

For the third regression model in Table 14, an additional negative effect of ESG Score on CEE was observed. Furtherly, a similar varying relationship between E Score and VAIC, HCE, SCE and CEE can be obtained, in accordance with the results of the ESG Score. The impact of E Score on the Structural Capital Coefficient (SCE), however, is significant at a 10% significance level. S Score recorded positive relationships with VAIC, and CEE. On the other hand, with SCE, and CEE,

however, it recorded a negative relationship. None of the relationships between the social performance score and any VAIC coefficient was statistically significant, adding new findings to the relationship of social corporate responsibility strategies and their impact on intellectual capital efficiency. In the fourth regression model (Table 15), the relationship of E Score and Tobin's Q was mediated through the Structural Capital Coefficient (SCE). Also, the E Score and ROA relationship qualified to be fully mediated by the Structural Capital Coefficient (SCE). While E Score significance lowered in the first relationship between the first ($\beta_1 = 0.00955; p < 0.01$) and the fourth model ($\beta_1 = 0.00691; p < 0.01$), the coefficient for E Score decreased in the second relationship with ROA from the first model ($\beta_1 = 0.00551; p < 0.01$) to the fourth model ($\beta_1 = 0.00451; p < 0.01$). This partial mediation effect implies that the E Score relationship with firm value (TQ) and return on assets (ROA) was partially explained by the mediator, decreasing the direct effect of the E Score. The robust findings conclude that partial and complete mediation under autoregressive models allow for better estimation of the mediation of intellectual capital in the CSR and financial performance relationship, as is evidenced by higher explained portions of variance for almost all regressions conducted (indicated through R^2).

Table 12. Regression of effect of CSR on FP with OLS robust FE, time lag

	TQ (t+2)			ROA (t+2)			ROE (t+2)		
	1	2	3	4	5	6	7	8	9
Variables	ESG Score	E Score	S Score	ESG Score	E Score	S Score	ESG Score	E Score	S Score
CSR	0.0170***	0.0096***	0.0102***	0.0013***	0.0006***	0.0008***	0.0005	0.0001	0.0003
	(5.90)	(5.17)	(4.85)	(9.38)	(6.03)	(9.12)	(2.00)	(0.86)	(1.89)
G Score	-0.0016	0.0045***	0.0046**	-0.0004**	0.0001	0.0001	-0.0002	0.0002*	0.0000
	(-0.87)	(4.01)	(3.34)	(-3.50)	(1.05)	(0.75)	(-0.82)	(2.18)	(0.15)
SIZE	-0.2440***	-0.2660***	-0.2350***	0.0014	0.0000	0.0023	0.0176	0.0102***	0.0179
	(-7.03)	(-7.73)	(-6.89)	(0.57)	(0.02)	(0.86)	(1.84)	(4.04)	(1.86)
LIQ	0.0893	0.0753	0.0901	0.0082**	0.0074**	0.0082**	-0.0017	0.0016	-0.0017
	(1.02)	(0.85)	(1.04)	(3.26)	(3.08)	(3.31)	(-0.74)	(1.10)	(-0.74)
LEV	-0.1090	-0.2240	-0.1340	-0.0421**	-0.0484**	-0.0439**	-0.0289	-0.0475	-0.0296
	(-0.38)	(-0.72)	(-0.46)	(-3.75)	(-3.90)	(-3.90)	(-1.66)	(-2.01)	(-1.71)
RD	4.6260***	4.5910***	4.7110***	0.0325	0.0443	0.0394	-0.0795	-0.1620*	-0.0769
	(7.41)	(6.60)	(7.61)	(0.94)	(1.15)	(1.15)	(-1.66)	(-2.56)	(-1.59)
Constant	3.2420***	3.6020***	3.2320***	-0.0184	0.0148	-0.0194	-0.1670	-0.0687*	-0.1680
	(7.86)	(8.43)	(7.85)	(-0.58)	(0.66)	(-0.61)	(-1.47)	(-2.73)	(-1.47)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.2560	0.2640	0.2540	0.1330	0.1180	0.1260	0.0402	0.0441	0.0400
R-squared adj.	0.2480	0.2550	0.2450	0.1230	0.1070	0.1160	0.0293	0.0326	0.0291
N	1422	1349	1422	1422	1349	1422	1420	1347	1420

Table 12 presents the time-lagged robust fixed effect regression of CSR Scores on the FP variables. Stuctural model starting in t=2003 for CSR. Model 1-3 use TQ, 4-6 ROA, and 7-9 ROE, respectively. Standard errors are presented in parentheses. Year and Industry dummies are included. *,**, and *** indicate significance at 10%, 5%, and 1% level.

Table 13. Regression of effect of IC on FP with OLS robust FE, time lag

	TQ (t+2)				ROA (t+2)				ROE (t+2)			
	1	2	3	4	5	6	7	8	9	10	11	12
Variables	VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE
IC (t+1)	0.0574	0.0545	0.2300***	0.0574	0.0054**	0.0054**	0.0108***	0.0054**	0.0062**	0.0070**	0.0039	0.0062**
	(1.75)	(1.64)	(6.66)	(1.75)	(3.27)	(3.09)	(4.99)	(3.27)	(3.84)	(3.78)	(1.69)	(3.84)
G Score	0.0070***	0.0070***	0.0073***	0.0070***	0.0002**	0.0002**	0.0003**	0.0002**	0.0001	0.0001	0.0001	0.0001
	(6.74)	(6.72)	(7.55)	(6.74)	(3.08)	(3.04)	(3.16)	(3.08)	(0.79)	(0.77)	(0.84)	(0.79)
SIZE	-0.1860***	-0.1850***	-0.1890***	-0.1860***	0.0058*	0.0058*	0.00566	0.0058*	0.0193	0.0194	0.0192	0.0193
	(-6.95)	(-6.96)	(-6.90)	(-6.95)	(2.18)	(2.20)	(2.09)	(2.18)	(1.93)	(1.94)	(1.91)	(1.93)
LIQ	0.0902	0.0903	0.0766	0.0902	0.0082**	0.0082**	0.0076**	0.0082**	-0.0018	-0.0018	-0.0019	-0.0018
	(1.06)	(1.05)	(0.90)	(1.06)	(3.36)	(3.34)	(3.20)	(3.36)	(-0.77)	(-0.77)	(-0.85)	(-0.77)
LEV	-0.1070	-0.1100	-0.0285	-0.107	-0.0417**	-0.0420**	-0.0385**	-0.0417**	-0.0282	-0.0284	-0.0276	-0.0282
	(-0.37)	(-0.38)	(-0.10)	(-0.37)	(-3.77)	(-3.79)	(-3.56)	(-3.77)	(-1.63)	(-1.65)	(-1.61)	(-1.63)
RD	4.9060***	4.9040***	5.0420***	4.9060***	0.054	0.054	0.0589	0.054	-0.0689	-0.0685	-0.0694	-0.0689
	(7.57)	(7.56)	(8.04)	(7.57)	(1.57)	(1.57)	(1.89)	(1.57)	(-1.41)	(-1.40)	(-1.45)	(-1.41)
Constant	3.1430***	3.1430***	3.1060***	3.1430***	-0.0258	-0.0258	-0.0274	-0.0258	-0.1700	-0.1700	-0.1710	-0.1700
	(7.89)	(7.86)	(8.29)	(7.89)	(-0.82)	(-0.83)	(-0.90)	(-0.82)	(-1.50)	(-1.50)	(-1.49)	(-1.50)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.243	0.243	0.265	0.243	0.11	0.11	0.123	0.11	0.0406	0.041	0.0398	0.0406
R-squared adj.	0.235	0.235	0.257	0.235	0.0996	0.0998	0.113	0.0996	0.0297	0.0301	0.0288	0.0297
N	1422	1422	1422	1422	1422	1422	1422	1422	1420	1420	1420	1420

Table 13 presents time-lagged robust fixed effect regression of IC variables on the FP variables. Stuctural model starting in t+1=2004 for IC. Model 1-4 use TQ, 4-8 ROA, and 9-12 ROE, respectively. Standard errors are presented in parentheses. Year and Industry dummies are included. *,**, and *** indicate significance at 10%, 5%, and 1% level, respectively.

Table 142. Regression of effect of CSR on IC with OLS robust FE, time lag

	VAIC (t+1)			HCE (t+1)			SCE (t+1)			CEE (t+1)		
	1	2	3	4	5	6	7	8	9	10	11	12
Variables	ESG Score	E Score	S Score	ESG Score	E Score	S Score	ESG Score	E Score	S Score	ESG Score	E Score	S Score
CSR	-0.0020	-0.0030	0.0000	-0.0032	-0.0031	-0.0005	0.0028	0.0041**	-0.0019	-0.0020	-0.0030	0.0000
	(-0.64)	(-1.92)	(0.01)	(-1.98)	(-2.08)	(-0.28)	(0.98)	(2.99)	(-0.82)	(-0.64)	(-1.92)	(0.01)
G Score	0.0021	0.0016	0.0011	0.0027	0.0019	0.0015	-0.0031	-0.0027*	-0.0012	0.0021	0.0016	0.0011
	(1.06)	(1.12)	(0.74)	(1.30)	(1.28)	(0.95)	(-1.86)	(-2.23)	(-1.11)	(1.06)	(1.12)	(0.74)
SIZE	-0.0124	-0.00454	-0.0193	-0.0158	-0.00895	-0.0225	0.00197	0.0133	0.0209	-0.0124	-0.00454	-0.0193
	(-0.44)	(-0.16)	(-0.67)	(-0.50)	(-0.27)	(-0.70)	(0.09)	(0.55)	(0.90)	(-0.44)	(-0.16)	(-0.67)
LIQ	-0.0245	-0.0192	-0.0245	-0.0261	-0.0197	-0.0261	0.0437	0.0597*	0.0438	-0.0245	-0.0192	-0.0245
	(-0.49)	(-0.38)	(-0.50)	(-0.52)	(-0.39)	(-0.53)	(1.48)	(2.38)	(1.49)	(-0.49)	(-0.38)	(-0.50)
LEV	-0.3780	-0.2100	-0.3760	-0.3340	-0.1540	-0.3300	-0.4100**	-0.3240*	-0.4100**	-0.3780	-0.2100	-0.3760
	(-1.26)	(-0.92)	(-1.26)	(-1.13)	(-0.72)	(-1.13)	(-3.25)	(-2.42)	(-3.21)	(-1.26)	(-0.92)	(-1.26)
RD	-0.4340	-0.4040	-0.4630	-0.4170	-0.4070	-0.4480	-0.6600	-0.4830	-0.5880	-0.4340	-0.4040	-0.4630
	(-1.27)	(-1.09)	(-1.35)	(-1.23)	(-1.11)	(-1.32)	(-1.30)	(-0.85)	(-1.17)	(-1.27)	(-1.09)	(-1.35)
Constant	0.3920	0.2640	0.3990	0.4120	0.2700	0.4230	0.1650	-0.1340	0.1520	0.3920	0.2640	0.3990
	(0.97)	(0.64)	(0.99)	(0.97)	(0.62)	(1.01)	(0.80)	(-0.61)	(0.73)	(0.97)	(0.64)	(0.99)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.0038	0.0053	0.0035	0.0040	0.0063	0.0034	0.0097	0.0148	0.0095	0.0038	0.0053	0.0035
R-squared adj.	-0.0002	0.0010	-0.0005	0.0000	0.0020	-0.0006	0.0058	0.0106	0.0055	-0.0002	0.0010	-0.0005
N	1501	1399	1501	1501	1399	1501	1501	1399	1501	1501	1399	1501

Table 14 presents the time-lagged robust fixed effect regression of CSR Scores on the IC variables. Structural model starting in t= 2003 for CSR. Model 1-3 use VAIC, 4-6 HCE, 7-9 SCE, and 10-12 CEE, respectively. Standard errors are presented in parentheses. Year and Industry dummies are included. *,**, and *** indicate significance at 10%, 5%, and 1% level, respectively.

Table 15. Regression of effect of CSR on FP with OLS robust FE, time lag mediated IC

	TQ (t+2)											
	ESG Score				E Score				S Score			
	1	2	3	4	5	6	7	8	9	10	11	12
Variables	VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE
CSR	0.0142***	0.0142***	0.0131***	0.0142***	0.0077***	0.0077***	0.0069***	0.0077***	0.0092***	0.0093***	0.0093***	0.0092***
	(5.49)	(5.51)	(4.78)	(5.49)	(5.36)	(5.40)	(4.62)	(5.36)	(4.96)	(4.97)	(4.47)	(4.96)
IC (t+1)	0.0651	0.0641	0.2210***	0.0651	0.0545	0.0524	0.1810***	0.0545	0.0613	0.0605	0.2280***	0.0613
	(1.84)	(1.74)	(7.02)	(1.84)	(1.49)	(1.40)	(5.81)	(1.49)	(1.74)	(1.65)	(7.35)	(1.74)
G Score	-0.0008	-0.0008	0.0001	-0.0008	0.0044**	0.0044**	0.0049***	0.0044**	0.0042**	0.0042*	0.0045**	0.0042**
	(-0.39)	(-0.40)	(0.03)	(-0.39)	(3.67)	(3.66)	(4.06)	(3.67)	(2.91)	(2.89)	(3.20)	(2.91)
SIZE	0.2500***	0.2490***	0.2490***	0.2500***	0.2520***	0.2520***	0.2530***	0.2520***	0.2440***	0.2440***	0.2480***	0.2440***
	(-7.25)	(-7.27)	(-7.33)	(-7.25)	(-8.22)	(-8.23)	(-8.31)	(-8.22)	(-7.10)	(-7.13)	(-7.10)	(-7.10)
LIQ	0.0562	0.0563	0.0427	0.0562	0.0466	0.0466	0.0352	0.0466	0.0553	0.0554	0.0416	0.0553
	(0.70)	(0.70)	(0.53)	(0.70)	(0.57)	(0.57)	(0.43)	(0.57)	(0.69)	(0.69)	(0.52)	(0.69)
LEV	-0.4220	-0.4250	-0.3630	-0.4220	-0.4740	-0.4770	-0.4320	-0.4740	-0.4550	-0.4580	-0.3920	-0.4550
	(-1.54)	(-1.54)	(-1.30)	(-1.54)	(-1.66)	(-1.65)	(-1.49)	(-1.66)	(-1.66)	(-1.65)	(-1.40)	(-1.66)
RD	4.8260***	4.8230***	4.9770***	4.8260***	5.0900***	5.0880***	5.1780***	5.0900***	4.8450***	4.8430***	4.9810***	4.8450***
	(6.47)	(6.47)	(6.87)	(6.47)	(6.47)	(6.47)	(6.79)	(6.47)	(6.61)	(6.61)	(7.04)	(6.61)
Constant	3.8040***	3.8040***	3.7870***	3.8040***	3.9600***	3.9600***	3.9690***	3.9600***	3.7460***	3.7460***	3.7320***	3.7460***
	(8.87)	(8.86)	(9.17)	(8.87)	(9.94)	(9.91)	(10.31)	(9.94)	(8.81)	(8.80)	(9.14)	(8.81)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ind FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squarec	0.2060	0.2060	0.2260	0.2060	0.2250	0.2250	0.2390	0.2250	0.2060	0.2060	0.2270	0.2060
R-squarec	0.2020	0.2020	0.2220	0.2020	0.2210	0.2210	0.2350	0.2210	0.2020	0.2020	0.2230	0.2020
N	1422	1422	1422	1422	1349	1349	1349	1349	1422	1422	1422	1422

Table 15 presents the time-lagged robust fixed effect regression of CSR Scores and IC on the FP variables. Structural model starting in t=2003 for CSR, t+1 for IC and t+2 for FP. Models 1-4 use ESG Score, 5-8 E Score, and 9-12 S Score and 1-12 TQ, respectively. Standard errors are presented in parentheses. Year and Industry dummies are included. *,**, and *** indicate

Table 15 (continued). Regression of effect of CSR on FP with OLS robust FE, time lag mediated IC

ROA (t+2)											
ESG Score				E Score				S Score			
13	14	15	16	17	18	19	20	21	22	23	24
VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE
0.0013***	0.0013***	0.0013***	0.0013***	0.0005***	0.0005***	0.0005***	0.0005***	0.0008***	0.0008***	0.0008***	0.0008***
(9.74)	(9.71)	(9.38)	(9.74)	(5.60)	(5.64)	(5.26)	(5.60)	(11.30)	(11.25)	(10.86)	(11.30)
0.0060**	0.0063**	0.0099***	0.0060**	0.0048*	0.0050*	0.0088***	0.0048*	0.0056**	0.0059**	0.01060**	0.0056**
(3.86)	(3.78)	(5.91)	(3.86)	(2.83)	(2.80)	(4.72)	(2.83)	(3.70)	(3.64)	(6.22)	(3.70)
0.0005**	0.0005**	-0.0004**	0.0005**	0.0000	0.0000	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000
(-4.23)	(-4.25)	(-3.69)	(-4.23)	(0.55)	(0.53)	(0.82)	(0.55)	(-0.15)	(-0.18)	(0.05)	(-0.15)
0.0009	0.0010	0.0010	0.0009	0.0002	0.0002	0.0002	0.0002	0.0016	0.0017	0.0015	0.0016
(0.39)	(0.39)	(0.39)	(0.39)	(0.12)	(0.13)	(0.11)	(0.12)	(0.64)	(0.64)	(0.55)	(0.64)
0.0083**	0.0083**	0.0077*	0.0083**	0.0077**	0.0077**	0.0072**	0.0077**	0.0082**	0.0082**	0.0076*	0.0082**
(2.98)	(2.97)	(2.83)	(2.98)	(3.19)	(3.16)	(3.00)	(3.19)	(2.97)	(2.96)	(2.81)	(2.97)
-0.0472**	-0.0474**	-0.0448**	-0.0472**	-0.0475**	-0.0477**	-0.0454**	-0.0475**	-0.0502**	-0.0504**	-0.0475**	-0.0502**
(-3.50)	(-3.53)	(-3.30)	(-3.50)	(-3.73)	(-3.76)	(-3.55)	(-3.73)	(-3.67)	(-3.70)	(-3.45)	(-3.67)
0.0564	0.0563	0.0617	0.0564	0.0831*	0.0831*	0.0863*	0.0831*	0.0595	0.0594	0.0643	0.0595
(1.60)	(1.59)	(1.93)	(1.60)	(2.23)	(2.22)	(2.51)	(2.23)	(1.73)	(1.72)	(2.08)	(1.73)
0.0163	0.0163	0.0159	0.0163	0.0451*	0.0451*	0.0455**	0.0451*	0.0110	0.0109	0.0107	0.0110
(0.59)	(0.58)	(0.57)	(0.59)	(2.84)	(2.83)	(2.95)	(2.84)	(0.38)	(0.38)	(0.37)	(0.38)
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
0.1090	0.1100	0.1190	0.1090	0.0962	0.0964	0.1050	0.0962	0.1050	0.1060	0.1180	0.1050
0.1050	0.1050	0.1140	0.1050	0.0915	0.0917	0.1000	0.0915	0.1010	0.1010	0.1130	0.1010
1422	1422	1422	1422	1349	1349	1349	1349	1422	1422	1422	1422

Table 15 presents the time-lagged robust fixed effect regression of CSR Scores and IC on the FP variables. Structural model starting in t=2003 for CSR, t+1 for IC and t+2 for FP. Models 1-4 use ESG Score, 5-8 E Score, and 9-12 S Score and 1-12 ROA, respectively. Standard errors are presented in parentheses. Year and Industry dummies are included. *,**, and *** indicate significance at 10%, 5%, and 1% level, respectively.

Table 15 (continued). Regression of effect of CSR on FP with OLS robust FE, time lag mediated IC

ROE (t+2)											
ESG Score				E Score				S Score			
25	26	27	28	29	30	31	32	33	34	35	36
VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE	VAIC	HCE	SCE	CEE
0.0006*	0.0006*	0.0005*	0.0006*	0.0000	0.0000	0.0000	0.0000	0.0004**	0.0004**	0.0004*	0.0004**
(2.80)	(2.83)	(2.58)	(2.80)	(0.37)	(0.41)	(0.15)	(0.37)	(2.96)	(3.01)	(2.89)	(2.96)
0.0066**	0.0075**	0.0037	0.0066**	0.0031	0.0038	0.0051	0.0031	0.0064**	0.0074**	0.0040	0.0064**
(3.76)	(3.82)	(1.79)	(3.76)	(1.16)	(1.53)	(2.08)	(1.16)	(3.71)	(3.78)	(1.94)	(3.71)
-0.0002	-0.0002	-0.0002	-0.0002	0.0001	0.0001	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000
(-1.63)	(-1.66)	(-1.43)	(-1.63)	(1.11)	(1.08)	(1.25)	(1.11)	(-0.45)	(-0.48)	(-0.37)	(-0.45)
0.0177	0.0177	0.0177	0.0177	0.0104***	0.0104***	0.0104***	0.0104***	0.0179	0.0180	0.0179	0.0179
(1.85)	(1.86)	(1.85)	(1.85)	(3.97)	(4.00)	(4.00)	(3.97)	(1.87)	(1.88)	(1.85)	(1.87)
-0.0003	-0.0003	-0.0004	-0.0003	0.0023	0.0022	0.0020	0.0023	-0.0004	-0.0004	-0.0005	-0.0004
(-0.14)	(-0.14)	(-0.18)	(-0.14)	(1.28)	(1.28)	(1.20)	(1.28)	(-0.15)	(-0.16)	(-0.21)	(-0.15)
-0.0225	-0.0227	-0.0220	-0.0225	-0.0392	-0.0394	-0.0380	-0.0392	-0.0238	-0.0240	-0.0232	-0.0238
(-0.86)	(-0.87)	(-0.84)	(-0.86)	(-1.96)	(-1.98)	(-1.93)	(-1.96)	(-0.91)	(-0.93)	(-0.90)	(-0.91)
-0.0657	-0.0655	-0.0659	-0.0657	-0.1300*	-0.1300*	-0.1290*	-0.1300*	-0.0649	-0.0646	-0.0654	-0.0649
(-1.71)	(-1.70)	(-1.78)	(-1.71)	(-2.13)	(-2.13)	(-2.20)	(-2.13)	(-1.66)	(-1.66)	(-1.74)	(-1.66)
-0.1460	-0.1460	-0.1460	-0.1460	-0.0422*	-0.0421*	-0.0420*	-0.0422*	-0.1480	-0.1490	-0.1480	-0.1480
(-1.29)	(-1.29)	(-1.28)	(-1.29)	(-2.72)	(-2.73)	(-2.66)	(-2.72)	(-1.30)	(-1.31)	(-1.29)	(-1.30)
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	YES
Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	YES
0.0319	0.0324	0.0309	0.0319	0.0347	0.0352	0.0361	0.0347	0.0318	0.0323	0.0309	0.0318
0.0271	0.0276	0.0260	0.0271	0.0297	0.0301	0.0310	0.0297	0.0270	0.0275	0.0261	0.0270
1420	1420	1420	1420	1347	1347	1347	1347	1420	1420	1420	1420

Table 15 presents the time-lagged robust fixed effect regression of CSR Scores and IC on the FP variables. Structural model starting in t=2003 for CSR, t+1 for IC and t+2 for FP. Models 1-4 use ESG Score, 5-8 E Score, and 9-12 S Score and 1-12 ROE, respectively. Standard errors are presented in parentheses. Year and Industry dummies are included. *,**, and *** indicate significance at 10%, 5%, and 1% level, respectively.

5. Discussion and conclusion

The motivation of this thesis was to examine the mediation of intellectual capital in the CVC investor's corporate social responsibility and financial performance relationship. While previous research focused mainly on the intra-organizational relationships of CVCs as well as on innovation performance, there remained a gap in understanding the role of intellectual capital for the ambidextrous CVC. This study puts emphasis corporate venture capital investors and is the first to investigate a potential mediation of intellectual capital on corporate responsibility performance and financial performance.

This thesis study is based on a 79 US American panel dataset of listed corporate investors. It contains 1,580 firm-year observations including the years between 2003 and 2022. The four hypotheses of the study are tested by conducting fixed-effect OLS regression analyses, following the Baron and Kenny (1986) mediation approach. Various variables for financial performance, CSR performance, intellectual capital, and control variables comprise the exhaustive dataset. I employ additional tests of robustness by analyzing results under cluster-robust standard errors and an autoregressive analysis that delays the effects of the variables among each other. The analysis of my four hypotheses reveals several perceptions. At first, the impact of CSR performance on financial performance is hypothesized and analyzed subsequently. Results reveal an overall impact of ESG on the firm value evidenced by fixed-effect OLS and time-lagged analysis, indicating that investments that are reflected in ESG Scores increase the corporate investor's firm value. Robust time-lagged analysis proves the temporal decay of environmental and social strategies in firm value but is revealed to be highly significant and positive. Similar significant results were obtained for return on assets. Thus, integrating an overall ESG strategy or pursuing dedicated environmental or social strategies increases financial value for the corporate investor in the long term. In a second hypothesis, the impact of intellectual capital on financial performance was tested. The analysis through the VAIC method revealed mostly positive and significant relationships between the overall Value-Added Intellectual coefficient and the three subdimensions with financial performance. The impact on the short-term financial figure return on assets suggests that human capital, structural capital, and relational capital are vital in improving returns on investment as they lead to higher profitability as robust results implicate. Results also show that while structural and relational capital increases firm value (Tobin's Q), VAIC and human capital increase return on

equity. This indicates that investments in structures and relationships benefit the corporate investor in the long term, while human capital increases shareholder equity indicating the importance of all decisions regarding personnel of the CVC to the shareholders. The third hypothesis revealed a positive significant impact of ESG Score, S Score, and E Score on CEE for the main OLS model. This indicates that ESG initiatives increase the relational capital of CVCs, referring to positive impacts on the CVCs networks with external stakeholders. In the lagged model, environmental performance revealed a significant correlation with structural capital, referring to the considerable impact of environmental initiatives on procedures and processes with a time decay. Lastly, mediation through intellectual capital was tested through my fourth hypothesis. This resulted in varying results regarding partial mediation. In the OLS model, overall ESG and social performance were partially mediated through relational capital (CEE) on firm value, demonstrating that social practices are carried through relational capital, which partially explains the positive effect on firm value. Conversely, in the robust fixed-effect model, evidence showed a partial mediation of E Score through structural capital on firm value and return on assets. With temporal decay, this demonstrates a partial explanation of the effect of environmental initiatives on firm value and profitability is caused and explained by structures inherent to the corporate investor. Next, the theoretical and practical contributions of the results are discussed.

5.1 Theoretical implications

The results of my findings contain multiple theoretical implications and links to existing research. First, I add to the notion of the NRBV theory of the firm (Hart, 1995), that natural resources of a corporate investor create a sustained competitive advantage by confirming CSR's strategic importance for CVCs. This extends the primary study of Battisti (2022) indicating that CVC investments lead to better environmental and social performance. Adding to the CSR literature, the positive impact of CSR on financial performance was furtherly evidenced (Alareeni & Hamdan, 2020; Baird et al., 2012; Benkraiem et al., 2023; Cho et al., 2019). With my study, I add to the CSR and financial performance link by suggesting knowledge-intensive CVCs with ambidextrous strategies fit best in achieving combined strategic objectives.

Furthermore, I contribute to intellectual capital research by confirming links of organizational sustainability with intellectual capital (Beretta et al., 2018; Y.-S. Chen, 2008), indicating that corporate social responsibility initiatives enhance the knowledge equity of firms and its ability to create value for the firm. Lastly, I contribute to CVC knowledge management literature. For this,

I shed light on the relationship of internal resource use and value creation for corporate investors, as a subject of study, enhancing existing literature on the knowledge management perspective in CVCs (Rossi et al., 2019, 2020). My results point to the importance of managing internal intangible resources wisely when pursuing non-financial and financial strategies as this holistic view of objectives emphasizes.

5.2 Managerial implications

The exploration of the role of intellectual capital in light of CSR and financial strategies has many managerial implications. Corporate investors that undertake CVC investments and pursue environmental, social, and financial strategies should effectively manage and enhance their intellectual capital. Pursuing these ambidextrous goals highlights the importance of an interconnected view on the resource of the firm, especially the intangible resource. As evidenced by this study's results, corporate investors should strategically choose when and which CSR or financial strategies to follow. This will likely be reflected in key performance metrices. I accentuate the notion that corporate investors should closely monitor their intellectual capital as VRIN resource as it likely produces value for the firm. Corporate investors failing in intellectual capital retention likely experience backdrops concerning their competitive advantage. From a stakeholder perspective and financial signaling theory, managers of corporate investors may pursue strategies that serve the disclosure of competitive financial performance in addition to non-financial performance figures like CSR disclosures as stakeholders may believe in higher intangible resources as underlying driver.

5.3 Limitations and Further Research

Attaining the conclusions made in the previous sub-chapters, this study entails various weaknesses that are related to the choices made in setting up this study.

First, previous studies point to the virtuous cycle effect of CSR on FP through the mediation of IC and its bi-directionality as confirmed by Surroca et al. (2010). For an extensive study, this view accounts for a more dynamic, certainly realistic perspective on intra-organizational resource allocation (including financial slack theory in the research design). Next, our study is exclusively on US listed corporate investors, thus it remains to be seen whether future studies of other geographies can evidence the results. Regarding the research design, choosing the CSR strategy

outputs ESG Score, E Score and S Score despite their evident advantages, allows for spurious interpretations although create bigger generalizability. For example, choosing lower-level outputs, like category scores for product innovation or resource use could raise closer attention to detail and allow for better interpretation of results. As other researchers pointed out there are certain limitations to the VAIC model (Andriessen, 2003; Marzo, 2022; Ståhle et al., 2011). For example, in my sample I attained high negative values due to the special computation of items. This could raise problems with heteroskedasticity. Another limitation was limited database access and finding consistent data in general for all corporate investor when analyzing the years between 2003 and 2022. Thus, the data cleansing and treatment process could be inflicted by incorrect data handling as some of the corporate investors had to be hand-matched, potentially causing errors. This data handling error could likely incur, too, when writing code for Stata. Here, I point to the calculation with z-transforming the VAIC coefficients or introducing time lags. In line with other research on corporate social responsibility and financial performance (Surroca et al., 2010), I acknowledge the possible omission of other variables that could significantly explain the associations in this study, which could potentially inflict the replicability and reliability of the obtained results. Lastly, as pointed out by Surroca et al. (2010), mediation analysis pertains to perils of overestimation and underestimation of effects due to the econometric structure. The chosen autoregressive mediation model (in chapter 4.3.3) might still not fully grasp the right directional effects as more pronounced models exist. Future research could take advantage of these limitations by ruling out the stated limitations of this study.

This study sheds light on the relationship of inter-organizational resources of the corporate investor, still, the several limitations of this study point to potential avenues of future research. The knowledge-attaining open innovation vehicle of corporate venture capital units poses as an ideal research subject for the creation of intellectual capital. Antecedents of intellectual capital and the overall subject of intangibles for corporate investors may be of interest in analyzing this strategic resource. Further research could take the knowledge management perspective in CVC's intellectual capital driving innovation performance. As this is a common theme in VC literature, highly distinguished studies could examine the interrelatedness of the various organizational features in contributing to the innovation performance of CVC. Additionally, new research on differing CVC types (i.e., exoisomorphous and endoidiomorphous) with regards to IC can increase predictions regarding knowledge absorption, innovation performance, and financial performance. This further

research would possibly point to insights in the differing nature of CVCs depending on their operational focus and industry. In the field of CSR performance, studies on the ESG controversies and corporate irresponsibility in the context of CVC could create a more consistent, holistic view on the CSR performance of CVC. A comparison with corporations not undertaking CVC investments may reveal new insights into the CSR and financial performance relationship of CVCs.

References

Aggarwal, P. (2013). Impact of Corporate Governance on Corporate Financial Performance. *IOSR Journal of Business and Management*, *13*(3). https://doi.org/10.9790/487x-1330105

Ahmad, M., Ahmed, N., & Luqman, M. (2016). Intellectual capital efficiency and the performance of mutual funds: A panel data analyses. *Science International*, *28*, 4867–4872.

Akgün, A. İ., & Türkoğlu, S. P. (2023). Intellectual capital and performance of listed firms during the global financial crisis: The effects of legal origin. *International Journal of Organizational Analysis*, *32*(4). https://doi.org/10.1108/ijoa-01-2023-3587

Alakent, E., Goktan, M. S., & Khoury, T. A. (2020a). Is venture capital socially responsible? Exploring the imprinting effect of VC funding on CSR practices. *Journal of Business Venturing*, *35*(3), 106005. https://doi.org/10.1016/j.jbusvent.2020.106005

Alakent, E., Goktan, M. S., & Khoury, T. A. (2020b). Is venture capital socially responsible? Exploring the imprinting effect of VC funding on CSR practices. *Journal of Business Venturing*, *35*(3), 106005. https://doi.org/10.1016/j.jbusvent.2020.106005

Alareeni, B. A., & Hamdan, A. (2020). ESG impact on performance of US S&P 500-listed firms. *Corporate Governance: The International Journal of Business in Society*, *20*(7), 1409–1428. https://doi.org/10.1108/CG-06-2020-0258

Albareda, L., Lozano, J. M., Tencati, A., Midttun, A., & Perrini, F. (2008). The changing role of governments in corporate social responsibility: Drivers and responses. *Business Ethics: A European Review*, *17*(4). https://doi.org/10.1111/j.1467-8608.2008.00539.x

Ali, J., Naaz, I., & Ali, T. (2024). Does corporate social responsibility improve value-added intellectual capital efficiency in food and agribusiness firms in India? *International Journal of Disclosure and Governance*, *21*(1), 93–106. https://doi.org/10.1057/s41310-023-00196-2

Al-Musali, M. A., & Ku Ismail, K. N. I. (2016). Cross-country comparison of intellectual capital performance and its impact on financial performance of commercial banks in GCC countries. *International Journal of Islamic and Middle Eastern Finance and Management*, *9*(4), 512–531. https://doi.org/10.1108/IMEFM-03-2015-0029

Andriessen, D. (2003). *Making sense of intellectual capital designing a method for the valuation of intangibles*. Elsevier Butterworth-Heinemann. http://www.gbv.de/dms/hbz/toc/ht013920911.pdf

Antarciuc, E., Zhu, Q., Almarri, J., Zhao, S., Yunting, F., & Agyemang, M. (2018). Sustainable Venture Capital Investments: An Enabler Investigation. *Sustainability*, *10*, 1204. https://doi.org/10.3390/su10041204

Aras, G., Aybars, A., & Kutlu, O. (2011). The interaction between corporate social responsibility and value added intellectual capital: Empirical evidence from Turkey. *Social Responsibility Journal*, *7*, 622–637. https://doi.org/10.1108/17471111111175173

Baird, P. L., Geylani, P. C., & Roberts, J. A. (2012). Corporate Social and Financial Performance Re-Examined: Industry Effects in a Linear Mixed Model Analysis. *Journal of Business Ethics*, *109*(3), 367–388. https://doi.org/10.1007/s10551-011-1135-z

Barnett, M. L., & Salomon, R. M. (2012). Does it pay to be really good? Addressing the shape of the relationship between social and financial performance. *Strategic Management Journal*, *33*(11), 1304–1320. https://doi.org/10.1002/smj.1980

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, *17*(1), 99–120. https://doi.org/10.1177/014920639101700108

Barney, J. B., Ketchen, D. J., Wright, M., Hart, S. L., & Dowell, G. (2011). Invited Editorial: A Natural-Resource-Based View of the Firm: Fifteen Years After. *Journal of Management*, *37*(5), 1464–1479. https://doi.org/10.1177/0149206310390219

Barney, J. B., Ketchen, D. J., Wright, M., McWilliams, A., & Siegel, D. S. (2011). Creating and Capturing Value: Strategic Corporate Social Responsibility, Resource-Based Theory, and Sustainable Competitive Advantage. *Journal of Management*, *37*(5), 1480–1495. https://doi.org/10.1177/0149206310385696

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173–1182. https://doi.org/10.1037/0022-3514.51.6.1173

Basu, S., Phelps, C., & Kotha, S. (2011). Towards understanding who makes corporate venture capital investments and why. *Journal of Business Venturing*, *26*(2), 153–171. https://doi.org/10.1016/j.jbusvent.2009.07.001

Bataineh, H., Abbadi, S. S., Alabood, E., & Alkurdi, A. (2022). The effect of intellectual capital on firm performance: The mediating role of family management. *Journal of Islamic Accounting and Business Research*, *13*(5). https://doi.org/10.1108/jiabr-02-2022-0032

Battisti, E., Nirino, N., Leonidou, E., & Thrassou, A. (2022). Corporate venture capital and CSR performance: An extended resource based view's perspective. *Journal of Business Research*, *139*, 1058–1066. https://doi.org/10.1016/j.jbusres.2021.10.054

Bayraktaroglu, A. E., Çalışır, F., & Baskak, M. (2019). Intellectual capital and firm performance: An extended VAIC model. *Journal of Intellectual Capital*, *20*(3). https://doi.org/10.1108/jic-12-2017-0184

Belderbos, R., Jacob, J., & Lokshin, B. (2018). Corporate venture capital (CVC) investments and technological performance: Geographic diversity and the interplay with technology

alliances. *Journal of Business Venturing*, *33*(1), 20–34. https://doi.org/10.1016/j.jbusvent.2017.10.003

Bendig, D., Göttel, V., Eckardt, D., & Schulz, C. (2024). Human capital in corporate venture capital units and its relation to parent firms' innovative performance. *Research Policy*, *53*(6), 105003. https://doi.org/10.1016/j.respol.2024.105003

Benkraiem, R., Boubaker, S., Brinette, S., & Khemiri, S. (2021). Board feminization and innovation through corporate venture capital investments: The moderating effects of independence and management skills. *Technological Forecasting and Social Change*, *163*, 120467. https://doi.org/10.1016/j.techfore.2020.120467

Benkraiem, R., Dubocage, E., Lelong, Y., & Shuwaikh, F. (2023). The effects of environmental performance and green innovation on corporate venture capital. *Ecological Economics*, *210*, 107860. https://doi.org/10.1016/j.ecolecon.2023.107860

Benson, D., & Ziedonis, R. H. (2009). Corporate Venture Capital as a Window on New Technologies: Implications for the Performance of Corporate Investors When Acquiring Startups. *Organization Science*, *20*(2). https://doi.org/10.1287/orsc.1080.0386

Beretta, V., Demartini, C., & Trucco, S. (2018). Does environmental, social and governance performance influence intellectual capital disclosure tone in integrated reporting? *Journal of Intellectual Capital*, *20*(1), 100–124. https://doi.org/10.1108/JIC-02-2018-0049

Bocquet, R., Bas, C. L., Mothe, C., & Poussing, N. (2015). CSR, Innovation, and Firm Performance in Sluggish Growth Contexts: A Firm-Level Empirical Analysis. *Journal of Business Ethics*, *146*(1). https://doi.org/10.1007/s10551-015-2959-8

Bontis, N. (2001). Assessing knowledge assets: A review of the models used to measure intellectual capital. *International Journal of Management Reviews*, *3*(1), 41–60. https://doi.org/10.1111/1468-2370.00053

Bontis, N., Janošević, S., & Dženopoljac, V. (2015). Intellectual capital in Serbia's hotel industry. *International Journal of Contemporary Hospitality Management*, *27*(6). https://doi.org/10.1108/ijchm-12-2013-0541

Cabrita, M., Cruz-Machado, V., & Grilo, A. (2011). *Intellectual Capital: How Knowledge Creates Value* (pp. 237–252). https://doi.org/10.4018/978-1-61520-829-6.cha015

Chang, C. H., & Chen, Y. S. (2012). The determinants of green intellectual capital. *Management Decision*, *50*(1). https://doi.org/10.1108/00251741211194886

Chemmanur, T. J., Loutskina, E., & Tian, X. (2014). Corporate Venture Capital, Value Creation, and Innovation. *The Review of Financial Studies*, *27*(8), 2434–2473. https://doi.org/10.1093/rfs/hhu033

Chen, M.-C., Cheng, S.-J., & Hwang, Y. (2005). An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance. *Journal of Intellectual Capital*, *6*(2). https://doi.org/10.1108/14691930510592771

Chen, Y.-S. (2008). The Positive Effect of Green Intellectual Capital on Competitive Advantages of Firms. *Journal of Business Ethics*, *77*(3), 271–286. https://doi.org/10.1007/s10551-006-9349-1

Chininga, E., Alhassan, A. L., & Zeka, B. (2024). ESG ratings and corporate financial performance in South Africa. *Journal of Accounting in Emerging Economies*, *14*(3), 692–713. https://doi.org/10.1108/JAEE-03-2023-0072

Cho, S. J., Chung, C. Y., & Young, J. (2019). Study on the Relationship between CSR and Financial Performance. *Sustainability*, *11*(2). https://doi.org/10.3390/su11020343

Chowdhury, L. A. M., Rana, T., & Azim, M. I. (2019). Intellectual capital efficiency and organisational performance. *Journal of Intellectual Capital*, *20*(6). https://doi.org/10.1108/jic-10-2018-0171

Chung, K. H., & Pruitt, S. W. (1994). A Simple Approximation of Tobin's q. *Financial Management*, *23*(3), 70–74. https://doi.org/10.2307/3665623

Craighead, C. W., Hult, G. T. M., & Ketchen, D. J. (2009). The effects of innovation–cost strategy, knowledge, and action in the supply chain on firm performance. *Journal of Operations Management*, *27*(5). https://doi.org/10.1016/j.jom.2009.01.002

Crunchbase (Ed.). (2024). VC Funding Report Global 2023 Q4. *Crunchbase News*. https://news.crunchbase.com/venture/global-funding-data-analysis-ai-eoy-2023/

Dalle, J.-M., Besten, M. den, & Menon, C. (2017). Using Crunchbase for economic and managerial research. *OECD Science, Technology and Industry Working Papers*. https://doi.org/10.1787/6c418d60-en

Dashwood, H. S. (2012). CSR norms and organizational learning in the mining sector. *Corporate Governance: The International Journal of Business in Society*, *12*(1), 118–138. https://doi.org/10.1108/14720701211191373

de Villiers, C., Jia, J., & Li, Z. (2022). Corporate social responsibility: A review of empirical research using Thomson Reuters Asset4 data. *Accounting & Finance*, *62*(4), 4523–4568. https://doi.org/10.1111/acfi.13004

Drover, W., Busenitz, L., Matusik, S., Townsend, D., Anglin, A., & Dushnitsky, G. (2017). A Review and Road Map of Entrepreneurial Equity Financing Research: Venture Capital, Corporate Venture Capital, Angel Investment, Crowdfunding, and Accelerators. *Journal of Management*, *43*, 014920631769058. https://doi.org/10.1177/0149206317690584

Duque-Grisales, E., & Aguilera-Caracuel, J. (2021). Environmental, Social and Governance (ESG) Scores and Financial Performance of Multilatinas: Moderating Effects of Geographic

International Diversification and Financial Slack. *Journal of Business Ethics*, *168*(2), 315–334. https://doi.org/10.1007/s10551-019-04177-w

Dushnitsky, G. (2008). Corporate Venture Capital: Past Evidence and Future Directions. In A. Basu, M. Casson, N. Wadeson, & B. Yeung (Eds.), *The Oxford Handbook of Entrepreneurship* (p. 0). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199546992.003.0015

Dushnitsky, G., & Lenox, M. J. (2005). When do incumbents learn from entrepreneurial ventures?: Corporate venture capital and investing firm innovation rates. *Research Policy*, *34*(5), 615–639.

Dushnitsky, G., & Lenox, M. J. (2006). When does corporate venture capital investment create firm value? *Journal of Business Venturing*, *21*(6), 753–772. https://doi.org/10.1016/j.jbusvent.2005.04.012

Dushnitsky, G., & Shaver, J. M. (2009). Limitations to interorganizational knowledge acquisition: The paradox of corporate venture capital. *Strategic Management Journal*, *30*(10). https://doi.org/10.1002/smj.781

Emmanuelle, D., & Shuwaikh, F. (2020). *"The Corporate Venture Capital as Strategy for Knowledge Transfer"*.

Escribano, A., Fosfuri, A., & Tribó, J. A. (2009). Managing external knowledge flows: The moderating role of absorptive capacity. *Research Policy*, *38*(1), 96–105. https://doi.org/10.1016/j.respol.2008.10.022

Freeman, R. E., & Reed, D. L. (1983). Stockholders and Stakeholders: A New Perspective on Corporate Governance. *California Management Review*, *25*(3), 88–106. https://doi.org/10.2307/41165018

Gangi, F., Salerno, D., Meles, A., & Daniele, L. M. (2019). Do Corporate Social Responsibility and Corporate Governance Influence Intellectual Capital Efficiency? *Sustainability*, *11*(7). https://doi.org/10.3390/su11071899

Grant, R. (1996). Toward A Knowledge-Based Theory of the Firm. *Strategic Management Journal*, *17*, 109–122. https://doi.org/10.1002/smj.4250171110

Gutmann, T., Chochoiek, C., & Chesbrough, H. (2023). Extending Open Innovation: Orchestrating Knowledge Flows from Corporate Venture Capital Investments. *California Management Review*, *65*(2). https://doi.org/10.1177/00081256221147342

Halid, S., Abdul Rahman, R., Mahmud, R., Mansor, N., & Abdul Wahab, R. (2023). A Literature Review on ESG Score and Its Impact on Firm Performance. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, *13*(1), Pages 272-282. https://doi.org/10.6007/IJARAFMS/v13-i1/15101

Haque, S., & Islam, M. A. (2015). Stakeholder pressures on corporate climate change-related accountability and disclosures: Australian evidence. *Business and Politics*, *17*(2). https://doi.org/10.1017/s1369525800001674

Harrison, J. S., & Freeman, R. E. (1999). Stakeholders, Social responsibility, and Performance: Emprical Evidence And Theoretical Perspectives. *Academy of Management Journal*, *42*(5), 479–485. https://doi.org/10.2307/256971

Hart, S. L. (1995). A Natural-Resource-Based View of the Firm. *The Academy of Management Review*, *20*(4), 986–1014. https://doi.org/10.2307/258963

Hart, S. L. (2005). Innovation, Creative Destruction and Sustainability. *Research-Technology Management*, *48*(5), 21–27. https://doi.org/10.1080/08956308.2005.11657334

Hausman, J. A. (1978). Specification Tests in Econometrics. *Econometrica*, *46*(6), 1251–1271. https://doi.org/10.2307/1913827

Hegeman, P. D., & Sørheim, R. (2021). Why do they do it? Corporate venture capital investments in cleantech startups. *Journal of Cleaner Production*, *294*, 126315. https://doi.org/10.1016/j.jclepro.2021.126315

Hellmann, T. (2002). A theory of strategic venture investing. *Journal of Financial Economics*, *64*(2), 285–314. https://doi.org/10.1016/S0304-405X(02)00078-8

Hill, S. A., & Birkinshaw, J. (2014). Ambidexterity and Survival in Corporate Venture Units. *Journal of Management*, *40*(7), 1899–1931. https://doi.org/10.1177/0149206312445925

Hörisch, J., Freeman, R. E., & Schaltegger, S. (2014). Applying Stakeholder Theory in Sustainability Management: Links, Similarities, Dissimilarities, and a Conceptual Framework. *Organization & Environment*, *27*(4), 328–346. https://doi.org/10.1177/1086026614535786

Hsiao, C., & Pesaran, M. H. (2008). Random Coefficient Models. In L. Mátyás & P. Sevestre (Eds.), *The Econometrics of Panel Data: Fundamentals and Recent Developments in Theory and Practice* (pp. 185–213). Springer. https://doi.org/10.1007/978-3-540-75892-1_6

Jamali, D. (2007). A Stakeholder Approach to Corporate Social Responsibility: A Fresh Perspective into Theory and Practice. *Journal of Business Ethics*, *82*(1). https://doi.org/10.1007/s10551-007-9572-4

Jeon, E., & Maula, M. (2022). Progress toward understanding tensions in corporate venture capital: A systematic review. *Journal of Business Venturing*, *37*(4), 106226. https://doi.org/10.1016/j.jbusvent.2022.106226

Kengatharan, N. (2019). A knowledge-based theory of the firm: Nexus of intellectual capital, productivity and firms' performance. *International Journal of Manpower*, *40*(6), 1056–1074. https://doi.org/10.1108/IJM-03-2018-0096

Khan, S. Z., Yang, Q., & Waheed, A. (2019). Investment in intangible resources and capabilities spurs sustainable competitive advantage and firm performance. *Corporate Social Responsibility and Environmental Management*, *26*(2), 285–295. https://doi.org/10.1002/csr.1678

Kianto, A., Ritala, P., Spender, J.-C., & Vanhala, M. (2014). The interaction of intellectual capital assets and knowledge management practices in organizational value creation. *Journal of Intellectual Capital*, *15*(3), 362–375. https://doi.org/10.1108/JIC-05-2014-0059

Komnenić, B., & Pokrajčić, D. (2012). Intellectual capital and corporate performance of MNCs in Serbia. *Journal of Intellectual Capital*, *13*(1). https://doi.org/10.1108/14691931211196231

Lee, L., & Chen, L. (2018). Boosting employee retention through CSR: A configurational analysis. *Corporate Social Responsibility and Environmental Management*, *25*(5). https://doi.org/10.1002/csr.1511

Lee, S. M., Kim, T., & Jang, S. H. (2015a). Inter-organizational knowledge transfer through corporate venture capital investment. *Management Decision*, *53*(7), 1601–1618. https://doi.org/10.1108/MD-12-2014-0668

Lee, S. M., Kim, T.-W., & Jang, S. H. (2015b). Inter-organizational knowledge transfer through corporate venture capital investment. *Management Decision*, *53*(7). https://doi.org/10.1108/md-12-2014-0668

Li, W.-X., Chen, C., & French, J. (2012). The relationship between liquidity, corporate governance, and firm valuation: Evidence from Russia. *Emerging Markets Review*, *13*, 465–477. https://doi.org/10.1016/j.ememar.2012.07.004

Lindenberg, E. B., & Ross, S. (1981). Tobin's q Ratio and Industrial Organization. *The Journal of Business*, *54*(1), 1–32.

Lorenzo, F. D., & Vrande, V. V. D. (2018). Tapping into the knowledge of incumbents: The role of corporate venture capital investments and inventor mobility. *Strategic Entrepreneurship Journal*, *13*(1). https://doi.org/10.1002/sej.1304

Marzo, G. (2022). A theoretical analysis of the value added intellectual coefficient (VAIC). *Journal of Management and Governance*, *26*(2), 551–577. https://doi.org/10.1007/s10997-021-09565-x

Maula, M., Keil, T., & Zahra, S. A. (2013). Top Management's Attention to Discontinuous Technological Change: Corporate Venture Capital as an Alert Mechanism. *Organization Science*, *24*(3). https://doi.org/10.1287/orsc.1120.0775

Maula, M., & Murray, G. (2001). *Complementary value-adding roles of corporate venture capital and independent venture capital investors*. *5*.

Maula, M. V. J., Autio, E., & Murray, G. C. (2009). Corporate venture capital and the balance of risks and rewards for portfolio companies. *Journal of Business Venturing*, *24*(3), 274–286. https://doi.org/10.1016/j.jbusvent.2008.10.012

Maxwell, S. E., Cole, D. A., & Mitchell, M. A. (2011). Bias in Cross-Sectional Analyses of Longitudinal Mediation: Partial and Complete Mediation Under an Autoregressive Model. *Multivariate Behavioral Research*, *46*(5), 816–841. https://doi.org/10.1080/00273171.2011.606716

McWilliams, A., & Siegel, D. (2001). Corporate Social Responsibility: A Theory of the Firm Perspective. *The Academy of Management Review*, *26*(1), 117–127. https://doi.org/10.2307/259398

Menor, L. J., Kristal, M. M., & Rosenzweig, E. D. (2007). Examining the Influence of Operational Intellectual Capital on Capabilities and Performance. *Manufacturing &Amp; Service Operations Management*, *9*(4). https://doi.org/10.1287/msom.1060.0131

Mention, A., & Bontis, N. (2013). Intellectual capital and performance within the banking sector of Luxembourg and Belgium. *Journal of Intellectual Capital*, *14*(2), 286–309. https://doi.org/10.1108/14691931311323896

Mohamed, M., Murray, A., & Mohamed, M. (2010). The role of information and communication technology (ICT) in mobilization of sustainable development knowledge: A quantitative evaluation. *Journal of Knowledge Management*, *14*(5), 744–758. https://doi.org/10.1108/13673271011074872

NCVA. (2023). *NVCA Yearbook 2024*. https://nvca.org/wp-content/uploads/2024/04/NVCA-2024-Yearbook.pdf

Nielsen, B. B., & Raswant, A. (2018). The selection, use, and reporting of control variables in international business research: A review and recommendations. *Journal of World Business*, *53*(6), 958–968. https://doi.org/10.1016/j.jwb.2018.05.003

Nikolaou, I. E. (2019). A Framework to Explicate the Relationship Between CSER and Financial Performance: An Intellectual Capital-Based Approach and Knowledge-Based View of Firm. *Journal of the Knowledge Economy*, *10*(4), 1427–1446. https://doi.org/10.1007/s13132-017-0491-z

Nimtrakoon, S. (2015). The relationship between intellectual capital, firms' market value and financial performance. *Journal of Intellectual Capital*, *16*(3). https://doi.org/10.1108/jic-09-2014-0104

Nirino, N., Ferraris, A., Miglietta, N., & Invernizzi, A. C. (2020). Intellectual capital: The missing link in the corporate social responsibility–financial performance relationship. *Journal of Intellectual Capital*, *23*(2), 420–438. https://doi.org/10.1108/JIC-02-2020-0038

Omran, M., & Ramdhony, D. (2015). Theoretical Perspectives on Corporate Social Responsibility Disclosure: A Critical Review. *International Journal of Accounting and Financial Reporting*, *5*(2). https://doi.org/10.5296/ijafr.v5i2.8035

Onofrei, G., Prester, J., Fynes, B., Humphreys, P., & Wiengarten, F. (2019). The relationship between investments in lean practices and operational performance. *International Journal of Operations &Amp; Production Management*, *39*(3). https://doi.org/10.1108/ijopm-04-2018-0201

Pan, X., Sinha, P., & Chen, X. (2020). Corporate social responsibility and eco-innovation: The triple bottom line perspective. *Corporate Social Responsibility and Environmental Management*, *28*(1). https://doi.org/10.1002/csr.2043

Pulic, A. (2000). VAIC™ – an accounting tool for IC management. *International Journal of Technology Management*, *20*(5–8), 702–714. https://doi.org/10.1504/IJTM.2000.002891

Pulic, A. (2004). Intellectual capital – does it create or destroy value? *Measuring Business Excellence*, *8*(1), 62–68. https://doi.org/10.1108/13683040410524757

Reboredo, J. C., & Sowaity, S. M. A. (2021). Environmental, Social, and Governance Information Disclosure and Intellectual Capital Efficiency in Jordanian Listed Firms. *Sustainability*, *14*(1). https://doi.org/10.3390/su14010115

Röhm, P. (2018). Exploring the landscape of corporate venture capital: A systematic review of the entrepreneurial and finance literature. *Management Review Quarterly*, *68*(3), 279–319. https://doi.org/10.1007/s11301-018-0140-z

Röhm, P., Merz, M., & Kuckertz, A. (2020). Identifying corporate venture capital investors – A data-cleaning procedure. *Finance Research Letters*, *32*, 101092. https://doi.org/10.1016/j.frl.2019.01.004

Rossi, M., Festa, G., Fiano, F., & Giacobbe, R. (2019). To invest or to harvest? *Business Process Management Journal*, *26*(5). https://doi.org/10.1108/bpmj-05-2019-0204

Rossi, M., Festa, G., Papa, A., Kolte, A., & Piccolo, R. (2020). Knowledge management behaviors in venture capital crossroads: A comparison between IVC and CVC ambidexterity. *Journal of Knowledge Management*, *24*(10). https://doi.org/10.1108/jkm-05-2020-0328

Rossi, M., Festa, G., Solima, L., & Popa, S. (2016). Financing knowledge-intensive enterprises: Evidence from CVCs in the US. *The Journal of Technology Transfer*, *42*(2). https://doi.org/10.1007/s10961-016-9495-2

Saad, S. B., & Belkacem, L. (2021). How does corporate social responsibility influence firm financial performance? *Corporate Governance: The International Journal of Business in Society*, *22*(1). https://doi.org/10.1108/cg-10-2020-0467

Sancho-Zamora, R., Gutiérrez-Broncano, S., Hernández-Perlines, F., & Peña-García, I. (2021). A Multidimensional Study of Absorptive Capacity and Innovation Capacity and Their Impact

on Business Performance. *Frontiers in Psychology*, *12*. https://www.frontiersin.org/articles/10.3389/fpsyg.2021.751997

Sardo, F., & Serrasqueiro, Z. (2017). A European empirical study of the relationship between firms' intellectual capital, financial performance and market value. *Journal of Intellectual Capital*, *18*(4). https://doi.org/10.1108/jic-10-2016-0105

Shahwan, T. M., & Fathalla, M. M. (2020). The mediating role of intellectual capital in corporate governance and the corporate performance relationship. *International Journal of Ethics and Systems*, *36*(4), 531–561. https://doi.org/10.1108/IJOES-03-2020-0022

Shahzad, F., Baig, M. H., Rehman, I. U., Saeed, A., & Asim, G. A. (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 Istanbul Review*, *22*(2), 295–305. https://doi.org/10.1016/j.bir.2021.05.003

Shuwaikh, F., & Dubocage, E. (2022). Access to the Corporate Investors' Complementary Resources: A Leverage for Innovation in Biotech Venture Capital-Backed Companies. *Technological Forecasting and Social Change*, *175*, 121374. https://doi.org/10.1016/j.techfore.2021.121374

Silicon Valley Bank. (2023). *The State of CVC 2023*. https://www.svb.com/globalassets/trendsandinsights/reports/state-of-cvc-report-2023.pdf

Silicon Valley Bank. (2024). *State of the Markets H1 2024*. 33.

Smedlund, A. (2008). The knowledge system of a firm: Social capital for explicit, tacit and potential knowledge. *Journal of Knowledge Management*, *12*(1). https://doi.org/10.1108/13673270810852395

Spender, J.-C. (1996). Making knowledge the basis of a dynamic theory of the firm. *Strategic Management Journal*, *17*(S2), 45–62. https://doi.org/10.1002/smj.4250171106

Ståhle, P., Ståhle, S., & Aho, S. (2011). Value added intellectual coefficient (VAIC): A critical analysis. *Journal of Intellectual Capital*, *12*(4). https://doi.org/10.1108/14691931111181715

Surroca, J., Tribó, J. A., & Waddock, S. (2010). Corporate responsibility and financial performance: The role of intangible resources. *Strategic Management Journal*, *31*(5), 463–490. https://doi.org/10.1002/smj.820

Tanggamani, V., Bakar, S., & Rani Diana, O. (2017). Incorporating Role of Stakeholders into Corporate CSR Strategy For Sustainable Growth: An Exploratory Study. *SHS Web of Conferences*, *36*, 00040. https://doi.org/10.1051/shsconf/20173600040

TDK Ventures, & 6Pages, Inc. (2023). *The State of Venture and CVCs: Taking stock of the past 18 months*. https://tdk-ventures.com/woakawuw/2023/10/6Pages-Report-for-TDK-Ventures-Oct-2023-The-State-of-Venture-and-CVCs.pdf

Thomson Reuters. (2013). *Thomson Reuters ESG scores*. Thomson Reuters. https://www.thomsonreuters.com/content/dam/openweb/documents/pdf/tr-com-financial/methodology/corporate-responsibility-ratings.pdf

Tran, N. P., & Vo, D. H. (2020). Human capital efficiency and firm performance across sectors in an emerging market. *Cogent Business &Amp; Management*, *7*(1). https://doi.org/10.1080/23311975.2020.1738832

Trauth, E. M. (2012). Barriers to Knowledge Acquisition, Transfer and Management in Regional Knowledge Economy Development. *2012 45th Hawaii International Conference on System Sciences*. https://doi.org/10.1109/hicss.2012.131

Tseng, K.-A., Lan, Y.-W., Lu, H.-C., & Chen, P.-Y. (2013). Mediation of strategy on intellectual capital and performance. *Management Decision*, *51*(7). https://doi.org/10.1108/md-03-2012-0143

Tsoutsoura, M. (2004). *Corporate Social Responsibility and Financial Performance*. https://escholarship.org/uc/item/111799p2

Vázquez-Carrasco, R., & López-Pérez, M. (2012). Small and Medium-Sized Enterprises and Corporate Social Responsibility: A Systematic Review of the Literature. *Quality & Quantity*, *47*. https://doi.org/10.1007/s11135-012-9713-4

Vrande, V. V. D., Vanhaverbeke, W., & Duysters, G. (2011). Additivity and Complementarity in External Technology Sourcing: The Added Value of Corporate Venture Capital Investments. *IEEE Transactions on Engineering Management*, *58*(3). https://doi.org/10.1109/tem.2010.2091134

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, *5*(2), 171–180. https://doi.org/10.1002/smj.4250050207

Wooldridge, J. M. (2016). *Introductory econometrics: A modern approach* (6th edition, student edition). Cengage Learning.

Xiao, L. (2020). The effectiveness of internal control and innovation performance: An intermediary effect based on corporate social responsibility. *Plos One*, *15*(6). https://doi.org/10.1371/journal.pone.0234506

Xu, J., & Wang, B. (2018). Intellectual Capital, Financial Performance and Companies' Sustainable Growth: Evidence from the Korean Manufacturing Industry. *Sustainability*, *10*(12). https://doi.org/10.3390/su10124651

Xuetong, W., Hussain, M., Rasool, S., & Mohelska, H. (2023). Impact of corporate social responsibility on sustainable competitive advantages: The mediating role of corporate

reputation. *Environmental Science and Pollution Research*, *31*, 1–14. https://doi.org/10.1007/s11356-023-28192-7

Yang, Y., Narayanan, V. K., & Carolis, D. M. D. (2013). The relationship between portfolio diversification and firm value: The evidence from corporate venture capital activity. *Strategic Management Journal*, *35*(13). https://doi.org/10.1002/smj.2190

Yiu, L. M. D., Lam, H. K. S., Yeung, A. C. L., & Cheng, T. C. E. (2020). Enhancing the Financial Returns of R&D Investments through Operations Management. *Production and Operations Management*, *29*(7). https://doi.org/10.1111/poms.13186

Appendices

Appendix A: Table 1. Variables Overview

Variables	Variable Definition	Operationalization	Data Source
Dependent Variables			
TQ	Tobin's Q	Firm Value as Market Value of Equity and book value of total liabilities, divided by value of Total Assets	Compustat
ROA	Return on Assets	Net income to Total Assets	Compustat
ROE	Return on Equity	Net income to Equity	Compustat
Independent variables			
ESG Score	ESG Score from Thomson Reuters	Weighted Score of Pillar Scores(E Score, S Score, G Score)	ASSET4 Datastream
E Score	E Score from Thomson Reuters	Weighted Score consisting of 70 KPIs	ASSET4 Datastream
S Score	S Score from Thomson Reuters	Weighted Score consisting of 88 KPIs	ASSET4 Datastream
Mediator variables			
VAIC	Value Added Intellectual Coefficient	VAIC is the aggregate sum of HCE, SCE and CEE	Compustat
HCE	Human Capital Coefficient	Human Capital Coeffiecient is the ratio of Valued Added and Human Capital	Compustat
SCE	Structural Capital Coefficient	Structural Capital Coefficient is the Valued Added minus Human Capital devided by Value Added	Compustat
CEE	Capital Employed Coefficient	Capital Employed Coefficient is the ratio of Valued Added minus the net asset of the company	Compustat
Control variables			
SIZE	Firm size	Natural log of firm's total assets	Compustat
LIQ	Liquidity	Ratio of current assets and current liabilites	Compustat
LEV	Financial Leverage	Ratio of financial debt and total equity	Compustat
R&D	R&D intensity	R&D expenses devided by Sales	Compustat
G Score	G Score from Thomson Reuters	Weighted Score consisting of 68 KPIs	ASSET4 Datastream