Gordon Institute of Business Science
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The impact of corporate venture capital

on CSR outcomes in BRICS countries

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Abstract

Growth of economies in the BRICS nations (Brazil, Russia, India, China and South Africa) are estimated to outpace that of developed nations by 2050. However this comes at a high cost of energy consumption which is in contrast with global sustainability and Corporate Social Responsibility (CSR) goals. New forms of open innovation such as Corporate Venture Capital (CVC) programmes may offer solutions to persistent CSR challenges. However, there is a lack of research at the intersection of CSR outcomes and CVC programmes, especially outside of developed markets. This study addressed the gap by investigating if CVC programmes are effective at improving CSR outcomes of firms in BRICS nations. A multiple regression analysis was conducted on the environmental and social components of CSR for 171 companies in India and South Africa. The results show that CVC programmes positively impact companies' social outcomes but has no immediate impact on its environmental outcomes. The study further contributes to the literature by demonstrating that the environmental and social outcomes have significant impacts on each other. Additional contributions include proving that governance scores influence the social outcomes and that the industry type has an impact on the environmental scores. However, firm location has no impact on the environmental or social outcomes in this study.

Keywords

Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Philosophy Corporate Strategy at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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1. Introduction

1.1. Background to the research problem

The exponential growth in global trade over the last several decades is a clear indication of the rising interdependence of national economies (Dima, Karam, Yin & Soundararajan, 2022; Seniuk, 2019). Simultaneously, recent paradigm shifts on the urgency of sustainability and the role of the corporate in society have resulted in great focus being placed on sustainable business models and specific sustainability goals (Kaul & Luo, 2018; Nguyen et al., 2018; Pandey & Hassan, 2020). In fact, companies now routinely report on and are increasingly being regulated to enhance reporting on sustainability performance in relation to global, national and industry sustainability goals (KPMG, 2020; Liang & Renneboog, 2017).

The roles of blocs of nations are also undergoing transformation - it is estimated that by 2050 the economic growth of the BRICS group of countries (Brazil, Russia, India, China and South Africa) may outpace that of the most prominent group of developed nations, the so-called G6 (US, Germany, France, Italy, UK and Japan) (Chen et al., 2021). This is due to the BRICS' large and growing economic weight across continents, their great potential as consumers as well as their significant impetus to strengthen global value chains, given that they are home to an estimated 41.53 per cent of the global population and produce 23 per cent of world output (Chen et al., 2021; Dijkhuizen & Onderco, 2019). However, uneven global economic dynamics is impacting the growth of these interconnected global value chains and, for some nations, putting at risk the sustainability of national development and even national security (Chen et al., 2021; Seniuk, 2019). Therefore, a deeper understanding of emerging markets like the BRICS nations and drivers of its growth and impact is vital.

The changing role of business in society can be a critical catalyst to achieving national and international sustainability goals. Increasingly, businesses are expected to contribute to solving many of the current social and environmental challenges by adopting or improving their corporate social responsibility (CSR) activities (Nguyen et al., 2018; Pandey & Hassan, 2020). In many cases, businesses are better at solving some of these challenges than government or non-profit organisations (Kaul & Luo, 2018). In BRICS countries, businesses more generally and CSR in particular, has a much larger role to play in society and can have enormous power to change individual lives for better or worse (Khan & Lockhart, 2022).

Companies' sustainability strategies can lead to long term competitive advantages by creating sustainable resource positions and relationships (Kaul & Luo, 2018; Porter &

Kramer, 2011). To achieve this in emerging markets like BRICS, the creation of entirely new resources and knowledge is needed at firms to address the unique social and environmental challenges in these nations (Battisti et al., 2022; Sajdak & Brümmer, 2020; Santoro et al., 2018). However, large and established companies are often at a disadvantage and face several internal obstacles to true innovation (Dushnitsky, 2011; Sajdak & Brümmer, 2020). Finding ways of improving the innovation process of a company can serve to enhance a company's characteristics, like its capabilities and business models, thereby improving its competitive advantage and even some of its sustainability or CSR outcomes.

Corporate venturing is one way that companies could develop new capabilities and business models by exploring and exploiting business opportunities that fall outside the company's current boundaries (Enkel & Sagmeister, 2020). The Corporate Venture Capital programme is a specific form of Corporate Venturing has increased in popularity over the last two decades (Gutmann, 2019). Corporate Venture Capital (CVC) programmes are long term projects by companies through which the companies make minority equity investments into startup firms, primarily in order to get early access to new technology trends and developing innovation. It is different from Independent Venture Capital firms (IVC), which usually has a pure financial aim, in that it has strategic and financial aims to achieve for the parent firm (Ceccagnoli et al., 2018; Röhm, 2018).

Companies that have active CVC programmes have been found to have better CSR outcomes than companies who do not embark on this strategy (Battisti et al., 2022; Hegeman & Sørheim, 2021). However, the relationship has only been studied for developed nations. Given the differences in size, sophistication and characteristics of the markets and economies in emerging markets, as well as the ever-growing interconnectedness with other parts of the world, there is a need to investigate whether this relationship holds for those emerging economies, such as the BRICS nations.

This study contributes to the literature by extending previous research on the impact of CVC outcomes on the firm by investigating the relevant impact in emerging markets, specifically BRICS nations (Battisti et al., 2022; Kim et al., 2013; Nirino et al., 2022; Wang & Sarkis, 2017). It also investigates the codependence of the factors of CSR, namely environmental and social impact, on the overall CSR outcomes as a further contribution to provide additional insight. Moreover, it addresses the business need to improve on CSR outcomes, giving firms insight into an effective strategy to access innovation that may be especially impactful in BRICS nations where there is great scope for this to become a more entrenched

way to support startup businesses and harness innovation (Han et al., 2019; Nguyen et al., 2018).

1.2. Definition of the research problem and research aims

The influence of CVC programmes on a company's CSR strategy started receiving more attention in recent years and CVC programmes have been shown to have a significant positive impact on a company's CSR outcomes in North American and European countries (Battisti et al., 2022). The positive impact is attributed to the new resources and capabilities acquired through CVC programmes from startup firms that are often more nimble in response to stakeholder needs and pressures, such as CSR issues, as well as contributing to other elements such as employee motivation (Lee et al., 2015; Nirino et al., 2022). However, there has to date not been any research on this relationship in developing or emerging market countries (Battisti et al., 2022). Given greater inequality, poverty and the sheer diversity of socioeconomic, historical and political realities in emerging markets, understanding how enhanced social and environmental impact can be achieved is both fascinating and, given its increasing role on the global economic front, of critical importance (Dima et al., 2022; Zou et al., 2019).

Financial development can significantly reduce income inequality, especially in emerging markets like the sub-Saharan African region (Tabash et al., 2022). This region has seen its share of extreme poverty rise as the reduction in poverty has not kept up with population growth. An estimated 433 million Africans are living in extreme poverty, with a key reason for this being the slow progress in market development (The World Bank, 2020). Worldwide, this figure is estimated to be around 689 million people, with most being in the emerging economies (UN, 2020; World Vision, 2020).

IVC in emerging markets have been shown to play a very important role as ecosystem engineers, i.e. supporting the growth and development of local economies by driving the resource flow to innovative activities and supporting entrepreneurs (Autio & Thomas, 2014; Li Sun et al., 2019). This can support local firms to overcome some of the barriers to growth in emerging markets such as the lack of professional networks, underdeveloped institutions and legal frameworks and since the effect is cumulative over time, IVCs can play a critical role in the overall economic development of a country. In fact, there have been calls to governments to lower the barriers of entry for IVC investors to unlock market development as a growth policy (Li Sun et al., 2019). Since start-ups are mostly ambivalent to the source of the capital, whether from IVCs or CVCs, this role can be extended to CVCs as well.

The COVID-19 pandemic has pushed an additional 30-40 million people into extreme poverty across the world (The World Bank, 2020). The call on business and capital markets to address social inequalities and environmental challenges to alleviate poverty and reduce climate change has never been greater. If there is a strategy that could make meaningful strides to address these challenges it should receive urgent attention and further investigation. However, to date there has been a lack of meaningful research connecting CSR outcomes to innovative strategies like CVC programmes, especially in emerging markets (Battisti et al., 2022; Nirino et al., 2022).

Previous studies on CSR outcomes of firms based in emerging markets have focused mainly on how institutional conditions influence the particular CSR strategies that firms select to embark on (Dima et al., 2022; Sahasranamam et al., 2020). The link between particularly BRICS companies' CSR strategies and having specific innovation strategies such as a CVC unit has not been studied (Battisti et al., 2022; K. Kim et al., 2018; Wang & Sarkis, 2017).

In order to address this gap, this study focusses on companies based in the BRICS countries and aims to answer the research question: *Do CVC programmes have an impact on a company's CSR performance, specifically in emerging markets?*

The aim is to understand the influence of CVC programmes on CSR outcomes in order to offer a view on a potentially impactful strategy for companies based in the BRICS nations to further their social and environmental agenda outcomes. Not only will this strengthen their own competitive advantage, but its impact on the local economy as well as the ever deeper integrated international market could be vastly more significant that what may have been previously understood (Chen et al., 2021).

This study contributes to the literature by extending the understanding of CSR outcomes of the firm, specifically in emerging markets and the role that specific innovations like CVC has on it. It also extends the understanding of the interconnected role of the components of CSR, namely social and environmental aspects.

1.3. Academic need

Corporate Social Responsibility and climate change are high on the agenda of many nations and world bodies with a call business and the private sector to improve environmental and social outcomes to ensure that the effects of climate change can be slowed down (Senadheera et al., 2021; UN, 2020; Zakarya et al., 2015). While it has been shown that CVC programmes support the environmental and social outcomes of firms in developed nations, particularly Europe and America, the same effect has not been tested in the

emerging market context (Battisti et al., 2022). Emerging markets differ in many aspects from their developed market counterparts in terms of political and social systems, capital markets, labour markets, product markets and openness (Khanna et al., 2015). There is also a more urgent need in emerging markets for strategies that address environmental and social issues, given the high rate of poverty, poor infrastructure and over-exposure these nations have to the effects of climate change (Zakarya et al., 2015). It is therefore crucial to investigate if a strategy such as a CVC programme can indeed have a material impact on the environmental and social outcomes that a firm is purported to exert on the local economy in which it operates. This study contributes to the literature that investigates open innovation, since CVC is a form of open innovation (Galloway et al., 2017; Santoro et al., 2018). It also contributes to the literature on CSR and its principle components, environmental outcomes and social outcomes, as well as the emerging markets as a setting for business strategies and innovation.

1.4. Business need

Companies that face the most significant impacts from climate change consequences also have strong incentives to find and implement strategies to deal with it (Hart & Dowell, 2011). Companies situated in emerging markets are exposed to the most dire impacts of climate change and therefore will need to find new and innovative ways to deal with stubborn environmental and societal problems (UN, 2020). The CVC programme is a strategy that has grown exponentially over the last couple of decades and early indications are that these programmes can materially improve environmental outcomes and social outcomes, at least in developed markets (Battisti et al., 2022; CB Insights, 2020; Röhm et al., 2020). The effect of CVC programmes as a strategy to impact environmental and social outcomes of the firm has not been studied in an emerging market context. This study will support businesses in their understanding of the impact of CVC programmes on CSR outcomes in order to assist business leaders with long term capital allocation strategies.

1.5. Conclusion

There is a gap in the literature regarding the impact that innovation strategies like CVC programmes have on the CSR outcomes of companies, especially in the emerging market context. This study aims to address the gap and also investigates the influence of the components of CSR, namely the environmental and social impact on each other. Not only does this contribute to the literature on innovation, CVC, CSR and emerging markets, but it supports a very urgent need to address the impacts of climate change and extreme poverty

on the nations of the world that are desperate for solutions to complex and persistent problems. It therefore fills a crucial void in addressing the urgent need to address ever-increasing social and environmental aspects of emerging market economies that are worsening despite the fast growth. Given that emerging economies like the BRIC nations will overtake the top developed markets in terms of economic growth over the next two decades, finding new, innovative strategies to address and improve the environmental and social outcomes of these countries will prove critical for the sustainability and security of all nations (Dima et al., 2022; Nguyen et al., 2018; Seniuk, 2019).

The rest of this document is set out as follows. Section 2 sets out the literature review which culminates in the research question and hypotheses in section 3. Section 4 covers the research methodology and design, including the population, sampling, unit of analysis, data collection, processing and analysis as well as the research quality and the limitations. Section 5 sets out the results from the analysis and this is discussed in detail in section 6. Section 7 offers a conclusion, limitations to the study as a whole and suggestions for future research.

2. Literature Review

Prior studies have investigated the impact of CVC programmes on CSR outcomes of the firm, exclusively focusing on developed markets (Battisti et al., 2022; Li et al., 2021). Other studies have examined the interconnectedness of CSR outcome effects, but again it was limited in its geographical scope (Alareeni & Hamdan, 2020; Zou et al., 2019). This is the first study to cover BRICS countries in analysing the effect of CVC programmes on CSR outcomes of the firm.

This section explores the literature on BRICS nations, including the pace of acceleration of the research, to demonstrate the importance and impact of this group of nations on international markets. It then defines CSR along with its components and establishes its role within the firm, as well as its significance in the context of BRICS nations. To understand the strategic intent of CVC programmes, the concept of innovation in the firm is examined. Next, the CVC programme as a strategic tool to strengthen innovation is investigated within the BRICS context. Finally, the impact of CVC programmes on CSR outcomes of companies is reviewed, again with the BRICS nations as the focal backdrop.

2.1. BRICS nations in the context of international markets

Emerging markets, and particularly the BRICS countries, provide an interesting setting for the investigation of CVC programmes on companies' CSR outcomes since it comprises some of the largest and fastest growing markets in the world. Global companies avoiding investment there will not be competitive over the long term (Alareeni & Hamdan, 2020; Khanna et al., 2015; Sakarya et al., 2007). However, emerging markets are characterised by a myriad of challenges, including a lower level of economic maturity, weak institutions, lack of regulatory oversight and lower living standards. The BRICS countries all display these attributes in varying degrees (Gregory, 2020; Khan & Lockhart, 2022).

The BRICS nations of Brazil, Russia, India, China and South Africa have grown in prominence in the media as well as literature (UN, 2020; Zakarya et al., 2015). It shares features such as large population size, a relatively under-developed economy with rapid development and a readiness to participate in global markets (Dijkhuizen & Onderco, 2019). Despite their developmental disadvantages, emerging economies were the primary beneficiaries of global value chain expansion during the period 1980 – 2009 (Seniuk, 2019). In fact, China had been the lead contributer due to its dominance in innovative technology and services (Li et al., 2021). The high complementarity between imports and export needs in BRICS nations allows for ever growing opportunities for even greater integration within

global value chains (Seniuk, 2019). This illustrates the mounting importance of the BRICS nations for international economic markets and especially for their future growth trajectories.

In fact, future growth of BRICS nations as an economic bloc is estimated to surpass that of the G6 countries as early as 2050, with its size purported to equal half that of the G6 nations by 2025 (Chen et al., 2021). By 2018, it was already producing more than 23 per cent of world output, however this comes at a very high cost of energy consumption which is in contrast with sustainabilty and CSR goals (Dijkhuizen & Onderco, 2019; Sahasranamam et al., 2020; Wang & Sarkis, 2017).

India and South Africa are two countries in the BRICS group that were the focal point for this study. Both nations offer settings for the study that, while representative of emerging markets, are unique in their constitutions and it is worth delving into some level of detail to understand each country's distinctive environmental and social landscape.

India has grown at a relentless pace over the last decade and it is expected to be the fastest growing economy in 2022 (The Economist, 2022). However, India has some of the worst environmental statistics with severe impacts on society. India is home to 63 out of the 100 most polluted cities in the world, including the city with the worst air quality in the world, New Delhi. Water pollution due to rapid urban expansion has resulted in 70% of surface water being unfit for consumption. On top of this, food and water shortages resulting from climate change is expected to hit India the hardest. There is also loss of biodiversity and increasingly insurmountable challenges in waste management due to being the second-largest population of around 1.4 billion people (Igini, 2022; Lai, 2022; World Vision, 2020). India is therefore in great need of new strategies to radically improve its environmental and societal problems, as its economy speeds ahead (Igini, 2022; The Economist, 2022).

South Africa is the smallest nation in the BRICS group in terms of its economy and demographics, however since it accounts for around a third of the sub-Saharan African economy. With its relatively sophisticated financial infrastructure and markets, it offers an ideal entry point for expansion and access to Africa and its untapped market of about 1 billion consumers (African Development Bank Group, 2013). However, South Africa also has the unenviable title of the world's most unequal society, ranked among 164 nations. This is evidenced in sharp inequality in education, land ownership and limits to intergenerational economic mobility as well as the skewed distribution of productive assets. This unequalness not only impacts the ability to respond to climate change and economic shocks, which generally affect the poor more harshly, but it also contributes to increasing unemployent, crime and corruption (The World Bank, 2022b; World Report, 2019). Added

to these social and economic problems, South Africa also faces severe environmental challenges of climate variablilty, deforesetation, waste mangement, pollution and health hazards (Bernard & Darkoh, 2014). As entry point to the African markets, it is crucial that strategies be found to address the inequality and other persistent societal problems, in addition to the environmental challenges in South Africa.

Due to the nuances in these and the other BRICS nations' environmental and societal make-up, the BRICS nations' CSR practises need a more unique and tailored appoarch than the dominant global CSR practises in order to address its diverse characteristics (Dima et al., 2022). This is discussed in the next section.

2.2. CSR and its components

CSR has been defined as a concept that emphasises a company's responsibility to its various stakeholders, including its employees and the broader society (Greening & Turban, 1996). What started out as a worthy commitment to ensure sustainability, has become a necessary and even a required contribution from companies for the upliftment of communities and the environment as a whole (Haack et al., 2021; Urip, 2010). More recently, the definition has evolved to describe a firm's behaviour and actions with the goal of creating various benefits for the different stakeholders of the company that can lead to a variety of positive outcomes, not least of which is firm performance and firm sustainability (Nirino et al., 2022).

The literature on CSR is extensive and largely focused on the business benefits in terms of financial performance outcomes for the firm (Godfrey et al., 2009; Kaul & Luo, 2018; M. Khan & Lockhart, 2022; Liang & Renneboog, 2017). However, public perceptions about the role of business in society is shifting away from pure economic ambitions to that of contributors to non-economic aims. Companies are facing increasing pressure from stakeholders, including governments and institutions on issues relating to sustainability (Battisti et al., 2022). Expectations are for businesses to solve or at least contribute to solving the current critical environmental and social challenges, such as water availability, climate change, health care and food security (Nguyen et al., 2018).

Responding to this, reporting on sustainability has seen impressive growth rates, with over 80 per cent of global firms reporting on sustainability measures in 2020, up from 12 per cent 30 years ago. This is resulting in CSR becoming a critical base for firms to create trust in their stakeholders as well as potentially offering an important competitive edge (KPMG, 2020).

CSR has been studied widely, and in many contexts, as well as from multiple perspectives, such as the impact on firm performance, agency theory and other fields (Alareeni & Hamdan, 2020; Godfrey et al., 2009; Saleh et al., 2011). Increasingly, studies have indicated CSR's strategic importance for companies (Khan & Lockhart, 2022; Pandey & Hassan, 2020). However, it remains a voluntary action, not required by law but initiated by discretion. In fact, it has found to be heavily influenced by individual management decisions in many cases (Godfrey et al., 2009; Han et al., 2019).

The principle components of CSR have been identified as environmental and social aspects (Han et al., 2019; Nirino et al., 2022; Wang & Sarkis, 2017). However, some scholars include governance as a third dimension of CSR (Pandey & Hassan, 2020; Sahasranamam et al., 2020). Practically, separating the governance factor that oversees the implementation and reporting of CSR, from the outcomes of CSR in the environmental and social spheres, is a helpful lens (Battisti et al., 2022).

Data is increasingly available on all three dimensions of CSR, but they key factors of impact across most studies are the environmental and social impact, with the governance outcomes acting as a type of hygiene factor (Battisti et al., 2022; Sahasranamam et al., 2020). Therefore, this study focused on the two principle components of environmental and social outcomes to measure CSR outcomes of the firm as being representative of the overall outcomes of CSR. It did however, examine the influence of the governance outcome as a contributor to the outcomes of the other two factors.

2.2.1. CSR components: Environmental outcomes

Environmental outcomes include the impact firms may have on the carbon footprint, energy efficiency, toxic emissions, waste management, renewable energy usage, and others (Kim et al., 2013). For measurement purposes, the components of the environmental score have been grouped into three categories, namely emissions, innovation and resource use (Revinitiv, 2022):

- Emissions scores measure a company's commitment and effectiveness toward reducing harmful emissions.
- Innovation scores measure the reduction of environmental cost by using eco-friendly technology and processes.
- Resource scores is concerned with supply chain management and the reduction of the use of scarce resources.

Environmental impact concerns can be traced back to 1966 with the publication of a report describing the earth as a small spaceship where all economic activity took place (Boulding, 1966). This described the growth in scarcity and waste problems that accompany population growth and the increase in economic activity and with that, radically impacted economic thought about the subject.

The next three decades saw the increase in CO2 emissions becoming a significant topic at national and international level, and in 1997 the Kyoto protocol was one of the first intra-national frameworks set up to deal with the adverse effects of global warning and climate change on the earth. BRICS countries were signatories to the Kyoto protocol, which had aims for greenhouse gas emissions, but given its economic growth there were concerns about being able to reach the target (Saleh et al., 2011; Zakarya et al., 2015). This is compounded by the fact that BRICS nations have an outsized contribution on issues such as climate change because of their dependency on pollutant minerals like coal for economic growth, due to their own endowment of resources as well as the relatively lower maturity of their economies (Dijkhuizen & Onderco, 2019; Sahasranamam et al., 2020).

Consumers around the world are increasingly more aware and playing a more active role in holding companies to account for their effects on the environment (Saleh et al., 2011). At the same time, the BRICS countries attract a significant amount of media and academic attention, due to the common denominator that they share – the relentless economic growth, especially compared to the slower rates of developed nations (Zakarya et al., 2015). There is a great amount of literature that sets out the relationship between energy consumption and economic growth in nations, but criticisms of some of these include the selection of measurement method, the length of period it covers and the omission of certain variables (Chen et al., 2021; S. Lee et al., 2018; Pham et al., 2022; Zakarya et al., 2015). However, there is an undeniable link between CO2 emissions and energy consumption and this link is especially strong in developing countries (Niu et al., 2011; Zakarya et al., 2015). Therefore, if the global environmental concerns are to be addressed, there is a great need to focus on solving the complex dynamic in emerging markets of continued high economic growth and slowing the trajectory of environmental damage inflicted by these nations.

2.2.2. CSR components: Social outcomes

Social outcomes denote the firm's investments in health and safety, development of human capital and other employee rights, safety and quality of products, working conditions including employee satisfaction, privacy and data security etc. (Battisti et al., 2022; Liang &

Renneboog, 2017). The main factors contributing to a company's social pillar score have been categorised as follows (Revinitiv, 2022):

- Human rights scores reflecting a firm's respect of human rights conventions
- Product responsibility scores measuring a firm's production of goods and services in a way that respects the customer's health, safety, integrity and data privacy
- Workforce management scores measuring work satisfaction, health & safety, diversity and inclusion as well as staff developmental opportunities
- Community scores reflecting a firm's commitment to protecting public health and conducting business in an ethical way.

The roots of measuring the social impact of companies can be traced back to the 1800s when there is evidence of concern for the welfare of employees and their working conditions, as well as the employment conditions of women and children, notably in America and Great Brittan. The 1950's was classified as the era of awareness of the responsibility that businesses carry with regards to its involvement in community affairs. In the 1960's, common issues such as urban decay, racial discrimination and pollution were starting to be addressed and by the 1970's the era of responsiveness had started with actions including the examination of corporate ethics and increasingly, the disclosure of social performance of companies.

The 1980s saw the emergence of stakeholder theory, the notion that there are more parties that are affected by a business' operations that what is immediately apparent, as well as business ethics, with references to Maslow's need hierarchy as a framework for assessing CSR (Carroll, 2015; Nirino et al., 2021; Tuzzolino & Armandi, 1981). The concept expanded in the 2000's with new research and empirical methods to link CSR with company performance. Importantly, during this period the notion of splitting CSR into components, including a separate dimensions for the environment, community relations, employee relations and others such as product issues were first floated. Best practices for CSR also received attention on an international scale.

Over the last 20 years, the CSR movement has grown into a global sensation. Europe has taken the lead, especially on social issues and it has been concluded, at least in that region, that CSR initiatives are closely linked to effective broader social systems (Boffo et al., 2020; Carroll, 2015).

CSR has a large impact on building trust in the market (Carroll, 2015) It is this trust that is the basis for the social outcome that measures a company's ability to "generate trust and

loyalty with its workforce, customers and society, through its use of best management practices" (Doni et al., 2022, p. 646) The social outcome offers a view on a company's reputation and the health of its operations, which are both key in determining long term value to shareholders. The list of stakeholders have increased over the years to include investors, regulators and government officials, along with employees and customers. However, there is a trade-off to manage in terms of cost of social impact and financial performance. While there is arguably a long term benefit to social impact such as charitable giving, just how it shows up in firm performance is a subject of ongoing debate (Kaul & Luo, 2018; Khan & Lockhart, 2022; Pham et al., 2022)

The BRICS nations are home to an estimated 41.6 per cent of the global population and but a far smaller percentage of the world's wealth. Further, the BRICS nations are characterised by fast growth at the expense of social and environmental concerns. Given the size of its population, a future humanitarian crises will likely play out in these nations if social factors are not taken seriously and improved upon over the period leading up to 2050 (Seniuk, 2019; UN, 2020; World Vision, 2020).

Though there have been valiant efforts by CSR initiatives in terms of poverty reduction, improvement in health & safety and data security, these have been more localized to economies in which the largest firms in the world operate and the same impact have been lacking in BRICS countries. For these nations in particular, innovative solutions are needed that will allow a broader positive impact on society in order to bring about sustainable social improvement and thwart a humanitarian crises (Dima et al., 2022; Nguyen et al., 2018; Sahasranamam et al., 2020).

Although the environmental impact was split out from the social impact during the 2000's, there is some overlap in the measures and impact of environmental and social outcomes. Throughout literature, the two components are usually discussed alongside each other, but rarely in comparison to or in terms of the influence of one on each other. In fact, no literature was found on the influence of environmental outcomes on social outcomes or vice versa. This study addresses that gap by investigating the moderating impact of these factors on each other (Alareeni & Hamdan, 2020; Nirino et al., 2022; Pham et al., 2022; Thomson Reuters, 2022; Zakarya et al., 2015).

2.2.3. CSR in BRICS countries

In BRICS nations, CSR studies have mainly focused on the effect of CSR on the firm's performance, agency theory and the relationship between CSR, innovation and other, broad

firm characteristics (Dai et al., 2022; Han et al., 2019; Pandey & Hassan, 2020; Sahasranamam et al., 2020). This specific bloc of nations, like other subsets of countries, requires a different emphasis on the implementation of CSR strategies, due to its unique social, political, economic and demographical makeup (Urip, 2010). In fact, has been argued that emerging markets have CSR challenges that is in contrast to those in developed nations (Amos, 2018). Large variability in CSR implementation in emerging markets make it a complex topic to investigate, therefore selecting a specific set of emerging markets can be both insightful but it may also hide the true heterogeneity of each specific nation (Amos, 2018; Pandey & Hassan, 2020).

CSR's positive impact on firm performance in many instances has been well documented, (Saleh et al., 2011). However, this is not universally the case and despite the impressive growth in reporting, the actual effectiveness of CSR programmes have come under more scrutiny recently (Dima et al., 2022; Haack et al., 2021). This has been observed in emerging markets and developed markets alike where companies report lofty social and environmental impacts, despite lacking in real performance in these areas (Khan & Lockhart, 2022). However, even where CSR reporting have been found to be mostly 'ceremonial', it can often be the first step in true adoption of CSR practices (Haack et al., 2021).

A potential key for unlocking real effectiveness of CSR programmes may be found in innovation (Alareeni & Hamdan, 2020). While some CSR impacts may come easier, there is a class of persistent CSR concerns (e.g. reduction of pollution and sustainable material production), that can only be addressed by finding new ways of solving tough problems (Battisti et al., 2022). Importantly, these innovations should provide solutions that address the conflict between economic growth and environmental and social degradation (Hermundsdottir & Aspelund, 2022). Therefore, CSR programmes are in need of investment in forms of innovation that will move it away from window dressing in reporting to solving real world problems in a practical way.

2.3. Innovation and CVC programmes

There are two ways of developing innovation within a business context: closed innovation and open innovation (OI). Closed innovation is the process of developing new knowledge and skills within its own ecosystem such as the R&D process, whereas OI is the means of acquiring new knowledge and skills from outside of the firm (Galloway et al., 2017; Giudice et al., 2016; Santoro et al., 2018). To implement the latter, classic strategic choices include merger & acquisition activities, corporate alliances, joint ventures, as well as more

contemporary corporate venturing activities such as accelerators programmes, incubators and partnerships with startup businesses (Battisti et al., 2022; Enkel & Sagmeister, 2020).

Larger firms have in recent years started to implement a new form of open innovation called Corporate Venture Capital (CVC) programmes (Gutmann, 2019; Ma, 2019).   CVC programmes can be defined as "wholly-owned subsidiaries of nonfinancial corporations that invest in start-ups on behalf of their corporate parent" (Röhm et al., 2020, p. 2). In essence, corporations use CVC programmes to acquire minority equity stakes of smaller or start-up firms. Both parties benefit by gaining access to valuable resources of the other (Ceccagnoli et al., 2018).

Resources of the larger investor firm include access to distribution channels, brand, experience and production facilities, whereas the smaller firms and startups offer insight into new technology and trends, technically skilled resources and alternative distribution channels among others (Fels et al., 2021). In fact, CVC managers consistently rank the benefit of access to external technologies as the key motive for CVC investment (Lee et al., 2015).   However, a disadvantage for entrepreneurial firms receiving funding from CVC programmes are the these firms are less likely to access other forms of capital, like publicly listing on an exchange (Dai et al., 2022).

The increase in CVC investment activity has resulted in significant academic interest in the topic and a rapidly expanding body of research (Röhm et al., 2020). CVC Investment deals were at an all-time high in 2019: globally, 25% of all venture capital deals involve CVCs, with a total of $57.1 billion in more than 3,234 CVC deals recorded worldwide during 2019, a five-fold increase since 2013 (CB Insights, 2020).

This type of strategic investment into open innovation is most useful where companies have lower internal technology or scientific capabilities, or want to make use of technologies or innovation in a field removed from their own core capabilities (Ceccagnoli et al., 2018). In addition, many corporations use CVC to strengthen their institutional learning in an effort to improve their existing business models and capabilities (Chemmanur et al., 2014; Lee et al., 2018; Lee et al., 2015). CVC is also a capital efficient way to access the latest trends and innovative ideas, therefore supporting innovation in all areas of the firm (Dushnitsky, 2011).

The strength of CVC programmes may be found in that it does not purely have a financial motive for the investment, but often, if not primarily, a stronger strategic imperative such as access to new markets and early insight into emerging technology trends (Ceccagnoli et al., 2018; Dushnitsky & Lenox, 2006; Lee et al., 2018).   This is in contrast to Independent

Venture Capital (IVC) that has a purely financial goal and motive. Other key differences between IVC and CVC programmes include staff selection and compensation, as well as investment practices and measurement (Dushnitsky & Shapira, 2010).

Related to this, most large CVC programmes face the competing forces from the two distinct institutional environments – that of the corporate parent's and the norms of the IVC industry. CVC units who adopt the corporate's norms (called endoisomorphism) develop concentrated, command-like structures and decision making with clearly documented procedures and division of tasks. In comparison, CVC units aligning with the norms of the IVC industry (called exoisomorphism) typically display a more consultative and flexible style of communication, unwritten procedures and evenly dispersed decision making. However, there have not been large enough studies to draw significant conclusions between these structural options and outcomes for the firm (Souitaris et al., 2012).

CVC programmes have been shown to vastly improve the outcomes for start-up firms, through the array of benefits, services and support offered by the CVC programme to the start-up firm. Where there is a strong strategic fit, the value added is even greater (Ivanov & Xie, 2010). In countries like the BRICS nations, where there is still widespread unemployment as well as an uneven distribution of wealth and opportunities, support for start-up firms is crucial to build the grassroots economy and support emergent ideas, entrepreneurs and fledgling businesses that might otherwise not have access to formal market mechanisms like capital and credit that is needed to grow. In this way, CVC programmes can be a catalyst for social upliftment that will improve not only the social outcomes of firms, but also the overall social and economic performance of a country, by having more people in formal employment, attracting further capital from international capital pools and supporting overall economic growth (Kaul & Luo, 2018; Li et al., 2021; Röhm et al., 2018).

As companies seek options for innovation and growth in an increasingly competitive and technologically driven market, sourcing the innovation internally with a large Research & Development budget is no longer adequate to compete in the market. No firm can independently create all the capabilities needed to compete in this fast paced environment by itself anymore. Sourcing external knowledge for innovation via CVC programmes has been shown to reap rewards in terms of an increased in registered patents as well as increasing in the explorative learning capabilities of the parent firm. In fact, the benefits for the firm are extended across a wide range of areas, touching on product and process improvements which affects their environmental impact, as well as many social impacts from

improved employment, to opportunities for staff development as well as increase in diversity and inclusion of minorities. CVC programmes may therefore offer access to new innovation, both for competing in the traditional sense, as well as in addressing persistent social and environmental challenges that would improve the overall CSR outcomes of the firm (Ceccagnoli et al., 2018; S. M. Lee et al., 2015; Röhm et al., 2020).

2.4. CSR and CVC programmes in the context of BRICS nations

There is a lack of research at the intersection of CSR outcomes and innovation such as CVC programmes within emerging markets countries (Battisti et al., 2022; Khan & Lockhart, 2022). Yet as described before, the stakeholder expectation and need for greater corporate impact of companies in these nations have never been greater, or more urgent.

A recurring theme in the literature is the growing tensions between local sustainability challenges, universal expectations of CSR and business outcomes within developing countries, especially as it relates to western standards (Haack et al., 2021; Khan & Lockhart, 2022; Nguyen et al., 2018). There is often a mismatch between global expectations and local demands in developing countries due to the latter's distinctive cultural, historical and institutional peculiarities (Gregory, 2020; Khan & Lockhart, 2022). Subsequently, some antecedents and impacts of CSR practices adopted by developed nations can be regarded as irrelevant to developing countries and in some cases even harmful (Khan et al., 2010). However, for certain measures such as financial flexibility, the outcomes in developed markets are supported by those observed in emerging markets (Gregory, 2020).

CVC programmes have been shown to affect CSR in the context of developed markets. Given the positive outcome, it is well worth investigating if this innovative strategy can address the particular requirements of emerging nations, as it relates to CSR outcomes (Battisti et al., 2022).

India with its unequalled air pollution, increasing water pollution, shortage of food, loss of biodiversity and waste management, along with its rapid economic expansion makes for a fascinating setting for the study of the impact of strategies such as CVC programmes, to establish if rapid growth and investment in the right strategies such as CVC programmes can contribute positively in a way that society and the environment desperately needs (Igini, 2022; The Economist, 2022). Similarly, South Africa with its unique social dynamics of inequality, racial diversity and high unemployment, along with its distinctive entry point to

the African markets can offer a very helpful lens on the effectiveness of innovation strategies such as CVC programmes to address persistent environmental and social challenges.

3. Research Question

This research will address the invitation for a study into the effect of CVC investments on CSR outcomes of companies in the BRICS countries (Battisti et al., 2022). Empirical methods will be employed to answer the research question: Do CVC programmes have an impact on a company's CSR performance in BRICS markets? To answer the research question, a set of hypothesis will need to be tested.

Hypothesis 1

CVC programmes positively influence a firm's environmental impact outcomes in BRICS nations.

Corporates face increasing pressure from all stakeholders to improve their CSR impact by including it as a core strategy, especially in BRICS nations (Khan & Lockhart, 2022; Nguyen et al., 2018; Pandey & Hassan, 2020). The CVC programme is a particular tool that may enhance a company's knowledge and capabilities with the goal of furthering its strategic aims (Chemmanur et al., 2014; Enkel & Sagmeister, 2020). However, it is unclear if having a CVC programme will in fact improve its CSR performance in the dimension of environmental impact, specifically in BRICS nations. The rapid growth of BRICS economies comes at a cost of high energy consumption, which leads to a undesirable impact on the environment that is becoming much worse than that of developed nations (Sahasranamam et al., 2020). Investigating if this relationship holds for BRICS nations would be a worthy objective (Battisti et al., 2022).

Hypothesis 2

CVC programmes positively influence a firm's social impact outcomes in BRICS nations.

Hypothesis 2 is as per hypothesis 1 above, but with a focus on the social impact within BRICS nations. This is a critical dimension due to the unique social, demographic and political dynamics in BRICS nations and the fact that all BRICS nations face significant uphill battles in improving the social welfare of its many millions of citizens (Dima et al., 2022; Gregory, 2020; Sahasranamam et al., 2020; Seniuk, 2019).

Hypothesis 3

Social impact outcomes moderate environmental impact outcomes of companies in BRICS nations.

Hypothesis 4

Environmental impact outcomes moderate social impact outcomes of companies in BRICS nations.

Finally, hypotheses 3 and 4 will investigate the relationship between the environmental and social factors to understand if the outcome of the one is influenced by the existence of the other. This contributes to the literature as the impact of these factors in relation to each other has not been investigated in detail before (Hegeman & Sørheim, 2021; Nirino et al., 2022). Given the unique nature and differences between developed and emerging markets such as BRICS, together with the urgency of the CSR impact improvements, it would be insightful to understand this relationship better for theoretical as well as practical application (Chen et al., 2021; Haack et al., 2021; Urip, 2010).

These four hypotheses and the relationship between them as described above are depicted in figure 1 below. The hypotheses will be tested using statistical data analysis with the data from relevant industry sources as described in section 4. The aim will be to test the data for substantiating proof supporting the hypotheses in an effort to address the research question.
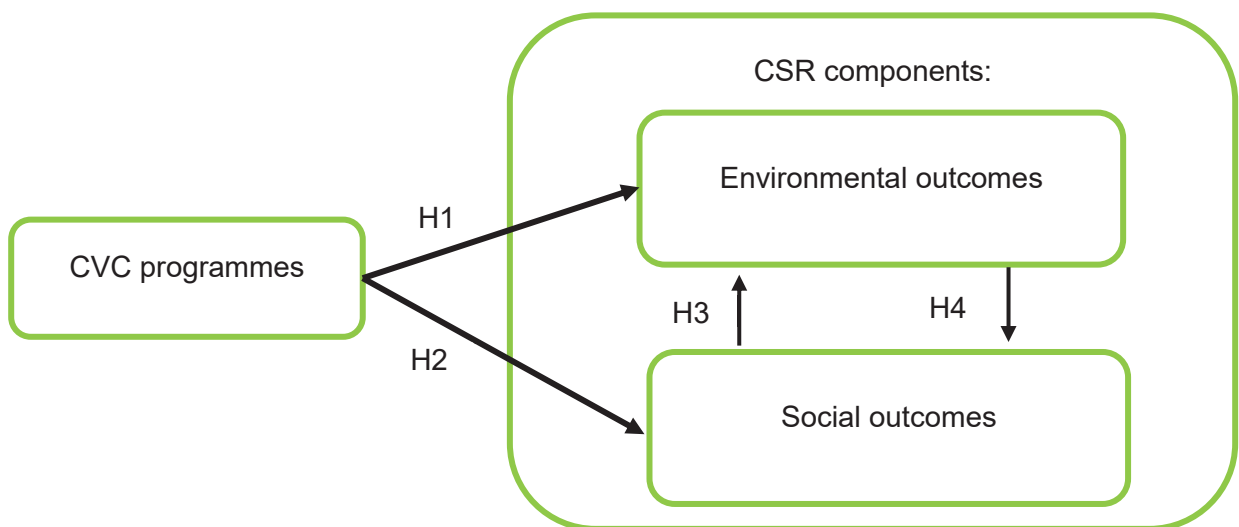
Figure 1

The relationships of interest between firms' CVC programmes and the components of CSR, namely environmental outcomes and social outcomes. Source: Author's own.

4. Research methodology

This section sets out the methodology used to investigate the research question. Firstly, an outline of the research philosophy is provided, followed by a framework of the research design and choices of methodology, including the population, sample and unit of analysis. This is followed by details on data collection, the process of data analysis, as well as the procedures to ensure research quality and rigour. Finally, the limitations of the research design and methodology is outlined. The overall approach is congruent with the research objective of seeking to establish a relationship between the existence of a CVC programme and the CSR outcomes of the firms in BRICS nations.

4.1. Research design

For this research, the ontological stance and assumptions of positivism were relied on, primarily because it takes an objective and explanatory view of reality in examining the data (Bell et al., 2019). Positivism posits that only observed phenomena can be described as knowledge (Sajdak & Brümmer, 2020). Where observed and measured data exists, it therefore makes sense to assume it is an accurate reflection of reality and thus the research employed here analyses objective, measureable data in order to arrive at the conclusions. The deductive approach is deemed most suitable in this situation (Bell et al., 2019). The research question is formulated using established concepts from the literature as described above and used to arrive at a set of hypothesis, which is then evaluated using empirical data.

The methodology chosen was a quantitative research design, which aligns with the above philosophical stance (Bell et al., 2019). It allowed the investigation of the research questions with the available datasets in order to arrive at conclusions. Quantitative analysis is also the prevailing method of studying CVC phenomena (Fels et al., 2021; Hill et al., 2009; Hill & Birkinshaw, 2014; Lee et al., 2018; Lee et al., 2015).

4.2. Population

While the effect of CVC programmes on companies' CSR outcomes has been studied for developed markets, there is a need to investigate if similar conclusions may be drawn for companies operating in emerging markets. The universe of emerging markets is very broad

and diverse, but the grouping of BRICS countries is a well-known as an important representation of emerging markets, given their economic weight and span across the world (Dijkhuizen & Onderco, 2019; Gregory, 2020; Seniuk, 2019). This study focusses specifically on the impact of CVC programmes on the outcome of CSR activities in companies located in BRICS countries. Therefore, all companies operating in the BRICS group of countries was the population of the study.

4.3. Sampling Method

The research was based on a sample of the top 100 firms by market capitalisation in each of the BRICS countries. Market capitalisation is a measure of a company's value as traded on a stock exchange, calculated by multiplying the total number of shares by the current share price (Investopedia, n.d.). Since CVC is heavily influenced by a company's financial resources, using market capitalisation allowed the study to concentrate on the largest firms with the most significant CVC programmes in each of the BRICS countries (Battisti et al., 2022; Bugl et al., 2022). This is consistent with similar studies on CVS and CSR covering different markets (Battisti et al., 2022; Godfrey et al., 2009; Nirino et al., 2022; Zou et al., 2019).

The research focused on the period 2018 – 2022 (inclusive), to study CVC activity of each of the companies in the sample over this period. Any CVC activity over this period contributed to a company being deemed as having a CVC programme in place. Five years is long enough to allow for some deal activity taking into account the economic cycle over the last number of years, as well as the growth in the industry (Battisti et al., 2022; Gutmann, 2019).

4.4. Unit of analysis

The research aimed to investigate if companies that make use of CVC programmes have seen an impact in their CSR outcomes. The individual companies are the legal entities that own and make resources available for the CVC programmes to operate. CVC programmes may be conducted internally or externally to a company's main activities, but the company as an entity remains responsible for the outcome not only of the CVC programme itself, but also the influence of the CVC programme on other areas of the business, like the CSR

outcomes (Enkel & Sagmeister, 2020; Sajdak & Brümmer, 2020). The unit of analysis is therefore at the organizational or company level (Battisti et al., 2022; Fels et al., 2021).

4.5. Data collection and processing

The dataset that had to be collected was information on the top 100 companies by market share in the BRICS nations, including companies' CSR performance, whether they have a CVC programme and several financial and other measures that were needed as control variables. The data would be used to test whether having a CVC programme materially affects the CSR performance of the companies in the analysis, while controlling for the variability in each company on several fronts such as industry, company performance, industry etc. The interdependency of the environmental and social pillar scores, in the presence or absence of a CVC programme at the firm was also investigated.

Companies in the study operate in specific contexts, like country and industry, and are also in different stages of maturity, as well as differing in size and other balance sheet components. These are important and influential characteristics that the study also gathered to potentially explain any variances.

The measures used to analyse the impact of CVC on companies' CSR performance are its components, namely the environmental outcome and social outcome. Thompson Reuters has developed measures of CSR efforts by firms by measuring each of the social and environmental outcomes of actions implemented by the firm as a social pillar score and an environmental pillar score (Battisti et al., 2022; Thomson Reuters, 2022; Wang & Sarkis, 2017).

The social pillar score is composed by measuring and scoring multiple items under the main headings of community, human rights, product responsibility and workforce of the company in question(Thomson Reuters, 2022). Similarly, the environmental score comprises of categories for emissions, innovation and resources used. Scoring for both is out of a 100 maximum points, with a higher score indicating a higher achievement for the factor. This is consistent with other analysis of CVC impact on CSR outcomes (Battisti et al., 2022; Hamm et al., 2021; Lee et al., 2018; Ma, 2019).

In order to establish the existence of a CVC programme at a company, it was assumed that information on CVC deals would be available on the Thomson Reuter Eikon platform as it was for companies based in North America and Europe where previous studies had focused

on (Battisti et al., 2022; Wang & Sarkis, 2017). However, data on CVC programmes in BRICS countries was not readily available on the Thomson Reuter Eikon platform for the BRICS nations. Several avenues were pursued in an effort to collect the data on CVC programmes in BRICS countries including contacting authors of previous studies (notably Battisti et al.), discussing data sources with representatives from Thomson Reuters and a prominent South African Venture Capital company that offers CVC services to companies. None of these were able to offer a list of CVC programmes by company in the BRICS nations. Therefore, a manual search for CVC programmes was conducted.

Due to time and language constraints, the countries of South Africa and India where selected from the BRICS nations to represent the bloc. India is currently the country with the second highest population in the world and home 63 of the world's worst polluted cities. It is therefore an important case study in terms of both its social and environmental outcomes due to the sheer number of people that are impacted along with their quality of life (Igini, 2022; Lai, 2022; World Vision, 2020). South Africa is a unique setting as a melting pot of cultures, persistent and growing inequality as well as being the gateway into Africa offering a largely untapped market potential of around 1 billion customers. South Africa may be the smallest of the BRICS nations, but it presents a typical mix of complex societal problems, environmental issues and economic challenges that are representative of the emergent and haphazard nature of emerging markets (Bernard & Darkoh, 2014; Levin, 2013; Seniuk, 2019). Both India and South Africa are therefore representative of emerging markets and specifically, BRICS nations, for studying the impact of CVC programmes on CSR outcomes of the firm.

The final dataset therefore contained information on companies from South Africa and India only. In order to establish the existence of a CVC programme at the top 100 firms in each of these countries, a manual financial statement search was conducted. Company annual financial statements from the top 100 firms in each of South Africa and India were searched extensively. Search terms included 'venture capital', 'venture', 'innovation', 'start-up' and 'investment'. The terms 'start-up' and 'innovation' were the most useful as this led to the description of the company's strategy which involved investments into start-up businesses that could be described as CVC investments according to the definition above.

For example, in South Africa, RMI Holdings Limited, a financial services holding company with insurance and bank assets, has invested capital in a subsidiary called AlphaCode which it describes as its "a platform to identify, partner and grow the next generation of extraordinary financial services entrepreneurs" (RMI Holdings, 2022, p. 21). Other large

financial services firms in South Africa like insurance companies Sanlam, Old Mutual and Momentum Metropolitan Holdings, banks like ABSA, and Standard Bank, food retailers like RCL Foods and Shoprite, and even mining companies Anglo American Platinum Ltd and hospital group Netcare have made similar investments into CVC programmes. In total, 19 out of the top 100 companies in South Africa were found to have active CVC programmes. This was cross-checked by some industry articles and directories mentioning the top CVC programmes in the country, confirming several of the programmes, though not all (Global Corporate Venturing, 2021, 2022).

In India the listed top 100 companies are dominated by state-owned enterprises (banks, insurers and industrial companies) which do not engage in venture capital activities. However, there are several large private conglomerates including large technology firms such as ITC Ltd and mining and industrial companies such as TATA Steel, Indian Oil Ltd and Vedanta Ltd that aim to "engage with innovative start-ups and leverage their technological capabilities and agility" (Vendanda Resources Ltd, 2022). In total, 20 of the top 100 companies in India have CVC programmes. Again, the data was cross-checked with industry articles (Inc42, 2020, 2021).

In the final list of 200 companies, it was observed that 29 of the companies did not have scores for the social and environmental pillars. The reason is unknown as the entries for these were blank on the Thomson Reuters Eikon platform. Therefore, these companies were excluded from the final dataset. The final dataset therefore comprised of 171 companies – 84 based in India and 87 based in South Africa.

Upon investigation of the data, there were two outliers on the social pillar score. However, on closer inspection, these were not significant outliers as they were just two observations (values of 7.78 and 18.21) further away from the mean (63.98) and median (65.86) than the other observations, but still within the range of 0 – 100 (see boxplots in Appendix A). These outliers were therefore not excluded (Pallant, 2020).

4.6. Data analysis approach

The assignment of variables to the elements of interest was the first step in the data analysis. The environmental pillar score and social pillar scores for each company in the study was used as dependent variables (Nirino et al., 2021, 2022; Wang & Sarkis, 2017) with continuous values. The independent variable was a nominal value, using an indicator to denote the existence of a CVC programme: For companies that have CVC programmes, a

value of 1 was assigned and 0 if no CVC programme existed (Battisti et al., 2022; Li et al., 2021).

Previous studies have indicated the need to introduce a number of control variables in order to avoid undue influence related to the specific context that the company operates in (Chemmanur et al., 2014; Hill et al., 2009). These include variables for governance, due to its influence on the effectiveness of CVC strategies, as well as several variables related to the companies' environment and characteristics e.g. industry, company performance, liquidity level, source of funding etc. (Battisti et al., 2022). Due to the availability of some of the data points for the companies selected, the analysis was limited to the following variables: governance score, industry and country.

The governance pillar score is a continuous variable like the environmental and social pillar scores. The industry is a categorical variable, where manufacturing companies were assigned a dummy variable of 1 and servicing companies a dummy variable of 0. This broad categorisation of industry type was used for simplicity, since at the outset it was not seen as a critical variable in the analysis. For location, dummy variable 1 denoted a company with headquarters in India and 0 for South African companies (Battisti et al., 2022; Da Gbadj et al., 2014; Wang & Sarkis, 2017). A summary of the variables is presented in Table 1.

Table 1

Variables' description

Variable	Abbreviation	Definition	Reference
Dependent variable	ENV	Environmental pillar score	Wang & Sarkis, 2017
Dependent variable	SOC	Social pillar score	Wang & Sarkis, 2017
Independent variable	CVC	Dummy variable, 1 if firm has a CVC programme, 0 otherwise	Li et al., 2021
Categorical variable	GOV	Governance pillar score	Wang & Sarkis, 2017
Categorical variable	INDUS	Dummy variable, 1 for manufacturing and 0 for servicing	Battisti et al., 2022
Categorical variable	LOCATION	Dummy variable, 1 if India, 0 if South Africa	Da Gbadj et al., 2014

From the list of the top 100 companies in each of South Africa and India, there remained 171 in total after the elimination of companies without environmental or social pillar scores.

In order to determine the type of statistical method to apply, it was necessary to check whether the dependent variables are normally distributed, since normally distributed variables behave differently from non-normal or skewed distributions (Pallant, 2020). A check on normality revealed that the environmental pillar score was normally distributed (Kolmogorov-Smirnov Sig. value of 0.2), while the social pillar score was not normally distributed (Kolmogorov-Smirnov Sig. value of 0.022). The former could therefore be tested using parametric tests, whereas the latter required the use of non-parametric methods.

A one-way, between groups analysis of variance was conducted to compare each of the environmental pillar scores and social pillar scores for companies with and without CVC programmes. For the parametric variable, the environmental pillar score, an independent sample t-test was used. An independent sample t-test is appropriate for comparing the

values on a continuous variable for two groups (Alareeni & Hamdan, 2020; Li et al., 2021; Pallant, 2020).   It is therefore appropriate for comparing the continuous variable (environmental pillar score) for two different groups - companies with and without CVC programmes.   This is appropriate to assess Hypothesis 1: CVC programmes positively influence a firm's environmental impact outcomes in BRICS nations.

For the non-parametric variable, the social pillar score, the equivalent non-parametric test of Mann-Whitney U-test was performed for a similar comparison of companies grouped according to whether they have or don't have a CVC programme (Godfrey et al., 2009; Liang & Renneboog, 2017; Pallant, 2020). The test translates the score of the continuous variable, the social pillar score in this case, to ranks across the groups and then the ranks are then evaluated for differences between the groups. Since it is using ranks and not the continuous values, the underlying distribution of the variable does not matter (Pallant, 2020).   It is therefore an appropriate test for Hypothesis 2: CVC programmes positively influence a firm's social impact outcomes in BRICS nations.

To understand if the outcome of one is moderated by the result of the other, a multiple regression model was ran on each of the environmental pillar scores and social pillar scores. Multiple regression is a method that explores the relationship between a certain continuous variable (the dependent variable) and a number of categorical variables (also called control or independent variables). The method allows for more detailed analysis of the contribution of each of the categorical variables on the dependent variable, as well as the significance and direction of influence on the dependent variable (Nason & Wiklund, 2018; Pallant, 2020).

This is therefore appropriate for both Hypothesis 3: Social impact outcomes moderate environmental impact outcomes of companies in BRICS nations; and Hypothesis 4: Environmental impact outcomes moderate social impact outcomes of companies in BRICS nations (Pallant, 2020).   The multiple regression model was also used to investigate the influence of the categorical variables, namely the governance score, industry and location, on each of the environmental and social pillar scores.

4.7. Research quality and rigour

The use of secondary data has been found to be an efficient and reliable way to conduct academic research, since it employs a vast array of existing data in a cost-effective and faster manner than could be obtained manually (Olabode et al., 2019). Moreover, it is also the primary data choice for the leading studies in the field of management innovation and

specifically CVC programmes (Battisti et al., 2022; Kim et al., 2013; Nirino et al., 2022; Wang & Sarkis, 2017).

The manual search for the CVC programmes was guided by ensuring adherence to the definition of a CVC offered in section 2.3, namely a "wholly-owned subsidiaries of nonfinancial corporations that invest in start-ups on behalf of their corporate parent", with the primary aim to get early access to new technology trends and developing innovation (Röhm et al., 2020, p. 2). A meticulous investigation of each company's financial statements and use of the terms 'venture capital', 'venture', 'innovation', 'start-up' and 'investment' was conducted. Additional cross-referencing to with industry articles and directories previously mentioned added to the rigour of the eventual list of CVC programmes at the top 100 South African and Indian companies.

For the rest of the data, the Thomson Reuters Eikon platform has been confirmed to be reliable and comparable to the other industry platform Venture Source from Dow Jones and even more comprehensive in terms of data on private equity and venture capital deals (Röhm et al., 2020).

Given the method and the data sources, the study is capable of being replicated and therefore reliable. India and South Africa are representative of the BRICS and the broader emerging market economies. India is the second highest populated country in the world, just eclipsed by China, and has significant and increasing environmental problems such as some of the world's worst polluted cities (Igini, 2022; Lai, 2022; World Vision, 2020). South Africa represents a combination of inequality, persistent and worsening social issues and stubborn environmental challenges that in combination is also representative of the typical emerging market context (Bernard & Darkoh, 2014; Levin, 2013; Seniuk, 2019). Since the samples used are fairly large (100 companies in each country) and the companies selected based on market capitalisation, which is a proxy for the size, it is therefore representative of the general population in this study, which is companies in BRICS nations.

4.8. Limitations of the research design and methods

The statistical methods are only as strong as their assumptions and the underlying models, and using more complex models may yield different results, but come with the higher risk of model error as well as errors in the interpretation (Pallant, 2020).

Due to the availability data, some potentially relevant financial factors could not be controlled for as it was in some of the previous studies, including firm size, liquidity, return on assets, global innovation index and R&D budget. The study was limited to the following control variables: governance score, industry and country. Controlling for further relevant financial variables might yield different results or further insights.

The industry of the firm was limited to servicing and manufacturing due to the complexities involved in defining industry in too many categories in the analysis as well as not being a critical variable in the study. Further defining of the categories in future research would be useful.

While India and South Africa are representative of emerging markets and specifically BRICS countries, each BRICS country has unique characteristic and factors not accounted for in this study. Further research is needed to establish if there are countries with other outcomes than what was found in this study. For example, China is responsible for a third of the world's greenhouse gasses and therefore its environmental scores may have different characteristics across its top 100 companies (The World Bank, 2022a).

4.9. Ethical considerations

Secondary data was used from publicly available sources including Thomson Reuters and the listed companies' published and audited financial statements. Therefore, there are no ethical concerns with the data subjects, information or processes of this study.

5. Results

5.1. Descriptive analysis

A summary of the descriptive statistics are given in Table 2. The dependent variable, the environmental pillar score, has a mean value of 53.60, whereas the dependent variable, social pillar score, has a mean of 63.98. The standard deviation for these variables are 23.31 and 18.30 respectively. The independent variable CVC has a mean of 0.23 and a standard deviation of 0.42. The full table of descriptive statistics are in Table A in Appendix A.

Table 2:

Descriptive statistic summary

Variable	Obs	Mean	Std Dev	Min	Max
ENV	171	53.60	23.31	0	98.00
SOC	171	63.98	18.30	7.78	95.61
CVC	171	0.23	0.42	0	1
GOV	171	53.65	21.80	11.13	95.30
INDUS	171	0.51	0.50	0	1
Location	171	0.53	0.50	0	1

5.2. Test for normality

Testing for normality included manually checking the distribution of the environmental and social pillar scores, both the histograms and Q-Q plots. This is shown in the graphs below. Figure 2 shows that the environmental pillar score has a fairly normal distribution, while Figure 3 shows that the social pillar scores are not in the typical shape for a normal distribution as it is skewed to the right. The Q-Q plots further confirms this, Figure 4 showing close adherence of the environmental pillar scores to the normality line, with Figure 5 showing that the social pillar scores have slightly more deviation from the line, especially at the tails but also in the middle, which is indicative of a non-normal distribution. To check more precisely for normality, a Kolmogorov-Smirnov test of normality was conducted.
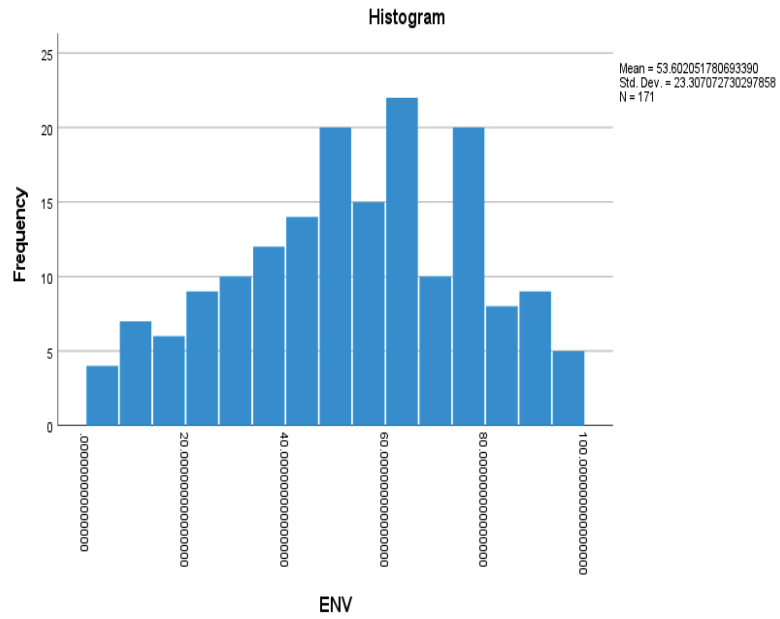
Figure 2

Histogram of environmental pillar scores
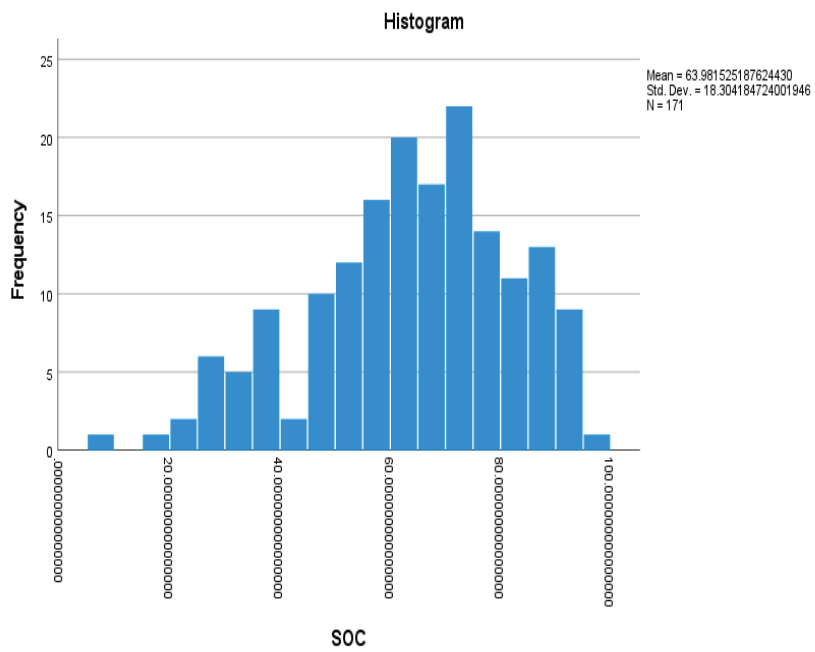
Figure 3

Histogram of social pillar scores
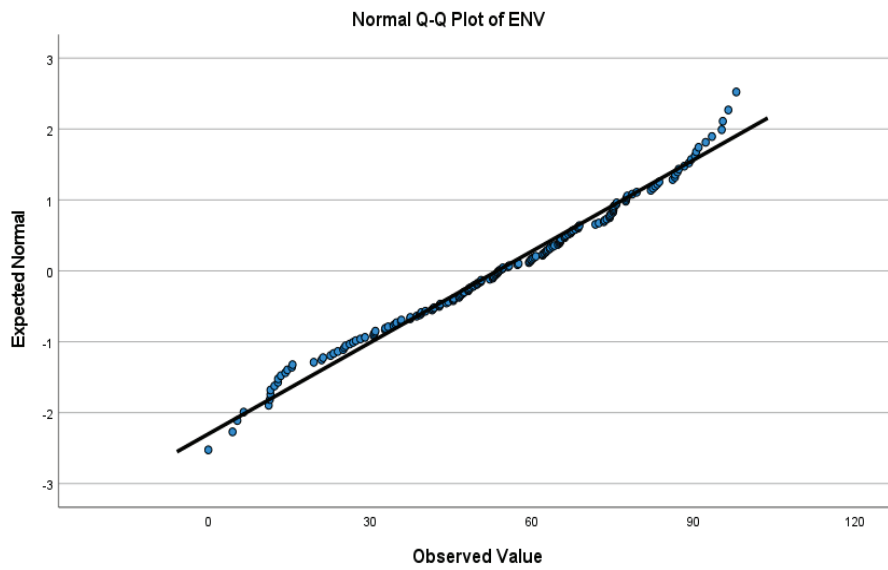
Figure 4

Q-Q plot of environmental pillar scores
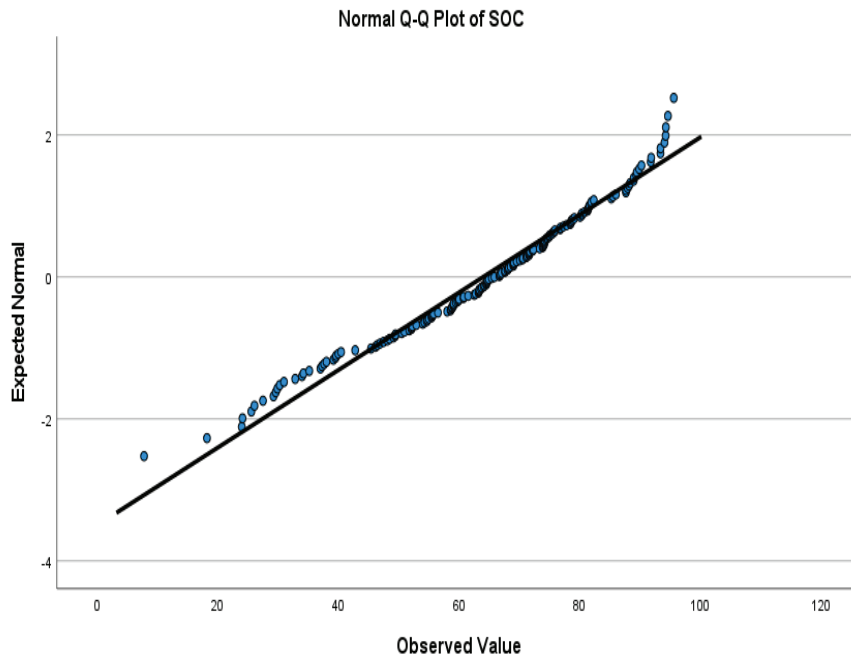
Figure 5

Q-Q plot of social pillar scores

The environmental pillar score was found to be normally distributed (Kolmogorov-Smirnov Sig. value of > 0.05), while the social pillar score was not normally distributed (Kolmogorov-Smirnov Sig. value of < 0.05). Therefore, the environmental pillar score could be tested using the parametric testing methods used on normally distributed variables. The social pillar score required a non-parametric method that is more appropriate for variables that are not normally distributed. The results of the test for normality is show in Table 3.

Table 3

Results of the Kolmogorov-Smirnov test for normality on dependent variables ENV and SOC

	Kolmogorov-Smirnov		
	Statistic	Obs	Sig.
ENV	0.057	171	.200
SOC	0.074	171	0.022

5.3. Correlation

In Table 4, the correlation between the variables are displayed. CVC is positively correlated with environmental pillar scores (0.042), but the value small and therefore the correlation is not very strong (Pallant, 2020). CVC is also positively correlated with social pillar scores (0.165), with the correlation being somewhat higher than for environmental outcomes, and is significant at the level $p < 0.05$. The other variables were not strongly correlated to CVC. Multicollinearity was also checked to investigate if a linear relationship between independent variables exist, which could lead them to lose their independence. All the VIF values were below 2, suggesting no multicollinearity since it is well below the threshold of 10 which is the generally accepted level for multicollinearity (Battisti et al., 2022; Pallant, 2020).

To check for outliers, the Cook's Distance result was obtained for dependent variables ENV and SOC, and the boxplots of the variables were investigated. The data contained no significant outliers that had an undue influence on the model, since Cook's Distance for the variables had a maximum of 0.071 for ENV and 0.076 for SOC, which was well below the tolerance level for this statistic of 1 (Pallant, 2020). Boxplots of the ENV and SOC data is shown in Appendix A.

Table 4

Correlation metrics

	ENV	SOC	CVC	GOV	INDUS	Location
ENV	1					
SOC	0.599**	1				
CVC	0.042	0.165*	1			
GOV	0.158*	0.289**	-0.041	1		
INDUS	0.212**	0.104	-0.126	0.115	1	
Location	-0.021	-0.052	0.004	-0.007	-0.206**	1

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

5.4. Results of modelling

5.4.1. Goodness of fit

A multiple regression model was ran on each of the environmental pillar scores and social pillar scores. The outcome of the multiple regression model had R-squared values of 0.416 and 0.451 respectively, and adjusted R-squared values of 0.399 and 0.434 respectively, for testing the environmental and social pillar scores respectively as dependent variables. The results are show in Table 6. The regression models therefore both presented a satisfactory level of detail.

A one-way, between groups analysis of variance was conducted to compare each of the environmental pillar scores and social pillar scores for companies with and without CVC programmes. For the parametric variable, the environmental pillar score, an independent sample t-test was used. For the non-parametric variable, the social pillar score, the equivalent non-parametric test of Mann-Whitney U-test was performed.

5.4.2. Results of Hypothesis 1

Running the independent sample t-test to test Hypothesis 1 it was firstly found that Levene's Test for Equality of Variances was significant ($p < 0.01$), indicating a violation of the requirement for equality of variances between the groups – the variances in the different

groups were not the same. Therefore, the alternative t-value associated with the 'equal variances not assumed' was used for this result.

It was found that there were no significant differences in the environmental pillar scores between companies with and companies without CVC programmes (t = -0.215, p > 0.05). The results are shown in Table 5.

Table 5

Results of the t-test on ENV

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference		
		F	Sig.	t	df					Lower	Upper
ENV	Equal variances assumed	7.508	0.007	-0.252	169	0.401	0.802	-1.07	4.26	-9.48	7.34
	Equal variances not assumed			-0.215	51	0.415	0.831	-1.07	5.00	-11.10	8.96

When controlling for the other variables in a multiple regression analysis, the same result was found for CVC (b = -0.051, p > 0.05). Summary results of the multiple regression analysis are reported in Table 6. Therefore, Hypothesis 1 was rejected.

Table 6

Summary of multiple regression model output

	ENV	SOC
CVC	-0.051	0.133*
	(0.407)	(0.024)
SOC/ENV	0.627**	0.590**
	(<0.001)	(<0.001)
GOV	-0.036	0.215**
	(0.573)	(<0.001)
INDUS	0.166**	-0.054
	(0.008)	(0.375)
Location	0.055	-0.067
	(0.364)	(0.257)
Observations	171	171
R squared	0.416	0.451
Adjusted R	0.399	0.434
F test	18.08	13.77

* Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

5.4.3. Results of Hypothesis 2

Hypothesis 2 was tested with the Mann-Whitney U-test for non-parametric data. The result of the test value was significant (Mann-Whitney U = 3157, $p < 0.05$), meaning that the social pillar scores are significantly different between companies with and without CVC programmes. The results of the Mann-Whitney U-test are shown in Table 7.

Table 7

Summary of the Independent Samples Mann-Whitney U-test Outcome

Total N	171
Mann-Whitney U	3157.00
Wilcoxon W	3937.00
Test Statistic	3157.00
Standard Error	271.64
Standardized Test Statistic	2.15
Asymptotic Sig. (2-sided test)	0.032

A frequency analysis of the social pillar scores grouped according to those with and without CVC programmes is shown in Figure 6. It clearly shows more instances of higher scores for companies with CVC programmes (CVC Exists) than for companies without CVC programmes (None).
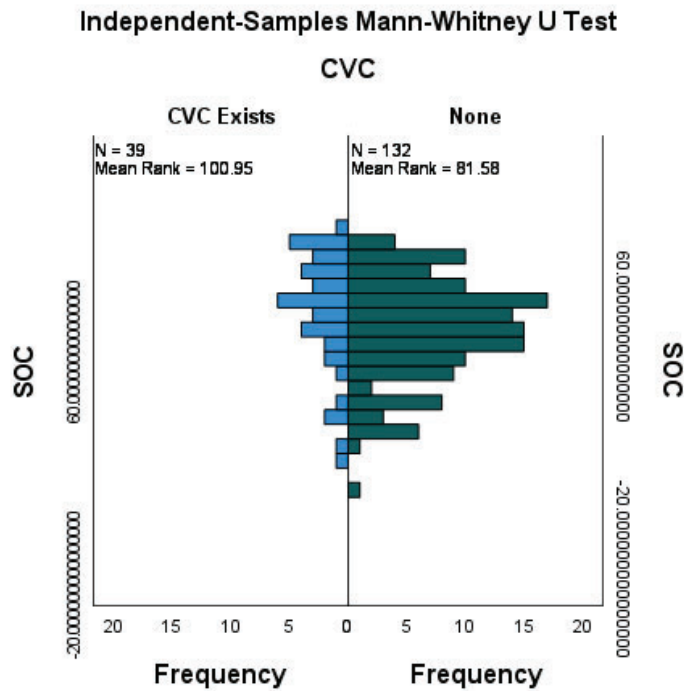
Figure 6

Social pillar score frequency graph split by CVC grouping

Further investigating the mean values showed that social pillar scores for companies with CVC programmes has a higher mean (68.76) and median (71.62) than companies without CVC programmes (62.57 and 64.52 respectively). The mean and median values for the variable SOC across CVC groups are shown in Table 8.

Table 8

Mean values of SOC variable across CVC groups

CVC	N	Median	Mean
0 None	132	64.52	62.57
1 CVC Exists	39	71.63	68.76
Total	171	65.86	63.98

This finding was also supported by the multiple regression model for the social pillar score, with CVC a significant contributor to its variance (b = 0.133, p < 0.05), although it only uniquely contributed 1.7% to the variance. The results of the multiple regression model is shown in Table 6. Therefore Hypothesis 2 cannot be rejected.

5.4.4. Results of Hypothesis 3

The multiple regression model of the environmental pillar score revealed that the social pillar score (b = 0.627, p < 0.001) has a significant effect on the environmental pillar score. The results of the multiple regression model are shown in Table 6 and Table 9. Table 9 sets out the control variable correlation coefficients for dependent variable ENV. The social pillar score uniquely contributes 34% (the square of the part correlation of 0.585) of the total variance of 42% explained by the model, therefore 81% of the total variance (34%/42%). The outcome is that Hypothesis 3 cannot be rejected.

Table 9

Control variable correlation coefficients for dependent variable ENV

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tole-rance	VIF
Dependent Variable: ENV	(Const)	-0.157	5.825		-0.027	0.978					
	CVC	-2.802	3.373	-0.051	-0.831	0.407	0.019	-0.065	-0.049	0.954	1.048
	SOC	0.798	0.081	0.627	9.836	0.000	0.621	0.608	0.585	0.871	1.148
	GOV	-0.038	0.067	-0.036	-0.565	0.573	0.179	-0.044	-0.034	0.890	1.124
	INDUS	7.717	2.878	0.166	2.681	0.008	0.216	0.204	0.159	0.925	1.081
	Location	2.577	2.831	0.055	0.910	0.364	-0.022	0.071	0.054	0.954	1.049

5.4.5. Results of Hypothesis 4

The regression model of the social pillar score revealed a similar result of the significant influence of the environmental pillar score (b = 0.590, p < 0.001) on the variance of the social pillar score. The results of the multiple regression model are shown in Table 6 and Table 10. Table 10 sets out the control variable correlation coefficients for dependent variable SOC. The environmental pillar score uniquely contributed 32% (the square of the part correlation of 0.567) of the 45% of variance explained by the model, which is 71% of the total variance (32%/45%). This result is that Hypothesis 4 cannot being rejected.

Table 10

Control variable correlation coefficients for dependent variable SOC

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tole-rance	VIF
Depen-dent Var-iable: SOC	(Const.)	30.442	3.751		8.115	0.000					
	CVC	5.795	2.535	0.133	2.286	0.024	0.142	0.175	0.132	0.980	1.020
	ENV	0.463	0.047	0.590	9.836	0.000	0.621	0.608	0.567	0.926	1.080
	GOV	0.181	0.049	0.215	3.653	0.000	0.309	0.274	0.211	0.960	1.042
	INDUS	-1.988	2.234	-0.054	-0.890	0.375	0.095	-0.069	-0.051	0.891	1.123
	Location	-2.450	2.154	-0.067	-1.138	0.257	-0.069	-0.088	-0.066	0.956	1.046

5.4.6. Categorical variables

It was found that some of the categorical variables had significant influence on the environmental and social pillar scores. The check for potential multicollinearity was satisfied as set out in section 5.1 above, therefore there was no undue influence or collinearity present in the data.

The environmental pillar score was found to be significantly influenced by the industry variable (b = 0.166, p < 0.05). Deriving the square of the part correlation coefficient (0.159) as a check on the explanatory power, it was found that the industry variable only explained 2.5% of the variance. The control variable correlation coefficient matrix for ENV is shown in Table 9.

To check the impact of the type of industry on the environmental score, the means of the subsets were extracted. The companies in the study were split roughly evenly (47%/53%) between servicing and manufacturing. A check on the means showed that companies in manufacturing had a higher average environmental pillar score (58.37) than companies in the servicing sector (48.31). The medians revealed a similar difference (61.43 and 47.50 for manufacturing and servicing respectively). These means and medians are shown in Table 11 below. This revealed that companies in the manufacturing sector had significantly better environmental outcomes that companies in the servicing sector.

Table 11

Means of variable ENV for servicing and manufacturing industries

INDUS	Obs	Mean	Std Dev.	Median
0 Servicing	81	48.31	24.06	47.50
1 Manufacturing	90	58.37	21.65	61.43
Total	171	53.60	23.31	53.96

Next, the multiple regression found that the social pillar score was influenced significantly by the governance score (b = 0.210, $p < 0.001$). This was confirmed by the correlation matrix (Table 4 above), showing that the correlation is positive (0.289) and significant ($p < 0.001$).

Governance scores contributed 4.5% to the variance of the social pillar scores, according to the square of the part correlation coefficient. The control variable correlation coefficient matrix for SOC is shown in Table 10.

Finally, it was found that the location (whether India or South Africa) of the company's headquarters had no impact on either its environmental (b = 0.055, $p > 0.05$) or social pillar scores (b = -0.067, $p > 0.05$).

5.5. Summary of results

To conclude the results, Table 12 below summarises the hypotheses, tests and the outcomes. It shows that Hypothesis 1 was rejected, however there was not enough evidence to reject Hypotheses 2, 3 or 4. This represents proof for the existence of a positive influence of a CVC programme on a firm's social impact. It also demonstrates that environmental and social pillar scores have significant impacts on each other.

Table 12

Summary of hypotheses and outcomes

Hypothesis	Description	Test Used	Outcome
Hypothesis 1	CVC programmes positively influence a firm's environmental impact outcomes in BRICS nations	T-test and multiple regression	Rejected
Hypothesis 2	CVC programmes positively influence a firm's social impact outcomes in BRICS nations	Mann-Whitney U-test and multiple regression	Not rejected
Hypothesis 3	Social impact outcomes moderate environmental impact outcomes of companies in BRICS nations	Multiple Regression	Not rejected
Hypothesis 4	Environmental impact outcomes moderate social impact outcomes of companies in BRICS nations.	Multiple Regression	Not rejected

5.6. Additional findings

In addition to the above, it was found that:

- The environmental pillar score is significantly influenced by the type of industry and that manufacturing companies have higher environmental pillar scores than companies in the service sector.
- The social pillar score is impacted positively and significantly by the governance score. This means that companies that have higher (or lower) governance scores, it will also have higher (or lower) social pillar scores.
- Location (whether India or South Africa) of the company's headquarters was not significant in explaining the variance of either of the environmental or social pillar scores.

6. Discussion

The overarching research question was whether CVC programmes influence and support the CSR outcomes of companies that are located in emerging markets such as the BRICS nations. The countries selected for the study were India and South Africa. These nations are representative of the emerging markets and BRICS nations in particular since they reflect many of the emerging market economic, social, environmental and demographic realities.   India has a large population with fast economic growth and well-ingrained challenges of environmental pollution and degradation, like many of the emerging markets. South Africa is a country with a very unequal economic endowment across its demography, along with many political, environmental and social problems. As the gateway to Africa, it has great economic potential and is therefore also representative of the emerging markets (Bernard & Darkoh, 2014; Igini, 2022; Lai, 2022; Levin, 2013; World Vision, 2020).

Given the rapidly increasing growth and paramount influence of emerging markets and specifically the BRICS nations on global markets, there is a great need to find new, innovative ways to deal with persistent and growing environmental and social challenges, which may result in devastating environmental and social realities for the most vulnerable economies if not addressed. This study aimed to establish if CVC programmes could be an effective innovation tool to improve the environmental and social outcomes of the CSR aims of firms in BRICS nations, as a catalyst for improving the environmental and social realities in these nations (Battisti et al., 2022; Chen et al., 2021; Dijkhuizen & Onderco, 2019).

The study proved that CVC programmes in BRICS nations can positively contribute a firm's social outcomes, but it did not find conclusive evidence for the same of environmental outcomes. It also set out to investigate if the environmental and social outcomes, as principle components of CSR, have moderating effects on each other, i.e. whether a strong outcome in one affects or predicts a strong outcome in the other. The effect of the two components of CSR has not been studied in this way before as far as could be established (Han et al., 2019; Nirino et al., 2022; Wang & Sarkis, 2017).   Finding that the components have considerable effects on each other is therefore a further major contribution to the literature. These results as well as some additional findings are described next.

6.1. Influence of CVC on Environmental Pillar Score (Hypothesis 1)

In this study it was found that having a CVC programme does not impact the environmental pillar score of firms in India and South Africa (as representatives of the BRICS nations) to a significant degree. This is in contrast with outcomes from a study of developed markets,

notably North America and Europe, where it was found that the environmental score does have a significant impact on the CSR outcomes of the firm (Battisti et al., 2022). In that study, a larger number of companies was used (380) than in this study (171), due to data being more readily available for developed nations than BRICS nations. However, the number of companies in this study is sufficient to be considered statistically satisfactory in terms of its outcomes (Pallant, 2020).

The reason that the outcome is different for BRICS nations, may be found it its current dependency on pollutant minerals and materials for economic growth as well as the timing impact of the measurement. Even though the BRICS nations were signatories to the Kyoto protocol, their problems with adhering to its greenhouse emission aims are well-documented (Saleh et al., 2011; Zakarya et al., 2015). BRICS nations are very dependent on fossil fuels due to both its local resource availability and the level of maturity of their economies (Dijkhuizen & Onderco, 2019; Sahasranamam et al., 2020).

Environmental pillar scores are strongly linked to environmental emissions and the BRICS nations specifically have an outsized contribution to emissions due to its dependency on sources of energy such as fossil fuels (Dijkhuizen & Onderco, 2019; Senadheera et al., 2021). Therefore, since BRICS nations will have higher emissions that developed nations, it is expected that the impact of any intervention such as CVC programmes on its environmental pillar score might be limited until such a time as it can be less dependent on fossil fuels and other pollution emitting energy sources.

It is similarly likely that innovations like CVC is in fact not focused on environmental outcomes due to the noninterchangeable role that fossil fuels, specifically carbon, still plays and the lack of any real alternatives at a reasonable cost over a reasonable time horizon. The result is that the environmental pillar score remains stubborn and uninfluenced by innovation such as CVC programmes. This is in contrast with the outcomes for developed nations, where CVC programmes were able to address the environmental outcomes. In those studies, it was found that CVC programmes were inclined to invest in companies that had a clear focus on sustainability and other environmental outcomes, due to the increased sensitivity of both customers and investors to environmental issues (Battisti et al., 2022). Due to the maturity of these economies and even the start-ups that the CVC programmes invest in, the environmental agenda and impact may be far more developed in those countries than is the case for emerging markets.

The length of time it takes for investment in measured factors like water quality, alternative energy sources and advances in resource use, obscures the current investment and

strategies that the companies may have initiated and therefore the impact it may have on the environmental pillar score in the short term (Revinitiv, 2022). For example, where CVC programmes were found to exists in several mining firms in South Africa, the very long term nature of the mining life cycle resulted in the impact not being reflected in the current environmental pillar scores. Therefore, while there may be a positive outcome in the future due to these firms having CVC programmes and investing in environmentally friendly technologies, the real impact and resulting effect on its environmental score may only be reported on in the future.

Furthermore, the components that make up the environmental pillar score favour factors that are practically easier to measure in developed markets. In fact, the measure itself has been criticized for its lack of alignment to current carbon emissions exposures and the difficulty to interpret the multitude of diverse metrics on environmental factors it requires (Boffo et al., 2020; Chen et al., 2021; Pham et al., 2022; Senadheera et al., 2021; Zakarya et al., 2015). However, despite the criticisms, the intention and exposure that the environmental pillar score offers investors and market participants is a critical driver of change and the race to sustainability and slowing climate change (Boffo et al., 2020)

Therefore, while it is far from the perfect measure, the environmental pillar score is an important indicator for all nations, but critically for the BRICS nations, on the progress of improving environmental outcomes and should be reviewed regularly over time. As discussed, even where CSR reporting have been found to be mostly 'ceremonial', it can often be the first step in true adoption of CSR practices. While the outcome of the study may prove that there is no clear impact in the short term, the impact of innovation and solutions created via mechanisms of open innovation like CVC programmes should not be overlooked and may, over the long term, prove itself to be a significant influencing factor of environmental outcomes, even in BRICS nations (Haack et al., 2021; Niu et al., 2011; Zakarya et al., 2015).

6.2. Influence of CVC on Social Pillar Score (Hypothesis 2)

Having a CVC programme was found to have a significant influence on the social pillar scores of firms in both India and South Africa and its influence was to increase the social pillar score of the firms with CVC programmes. This is a similar result to a study based on developed markets, that also proved that having a CVC programme influences the social pillar score of a company in a positive way (Battisti et al., 2022). The study cited the

companies' ability to generate innovation and knowledge from its investments in CVC programmes as a factor in bolstering its internal resources which in turn positively impacted its CSR scores. For the social pillar score, which comprises employee satisfaction as one of its criteria, it is also argued that employees are motivated by their firm's investment into activities that go beyond just earnings, and therefore it increases their satisfaction at work (Battisti et al., 2022).

Previous studies have shown that European companies have taken the lead on social issues, and that their CSR initiatives are closely linked to effective broader social systems (Boffo et al., 2020; Carroll, 2015). This study shows where companies in emerging markets invest in CVC programmes, it also has a demonstrable effect on the social outcomes for the company, which would then result in an improvement in the social issues of the country that it operates in.

In contrast to the long term nature of environmental outcomes, improvements in social outcomes such as data security and privacy, employee rights, and health and safety may be observed far quicker and more readily. Start-ups firms with less regulatory and legacy hurdles are known for, and might also be selected based on, their ability to make a fast impact by implementing the latest technologies and allowing the parent company as a whole to learn faster. This would have a positive impact on outcomes like job satisfaction, staff development, data security, privacy and even health and safety aspects. CVC programmes that make strategic investments into these firms will therefore also reap the benefits of improved scores, both by learning from and being invested in companies that succeed in CSR outcomes. Start-ups would use the capital provided by the parent firm to develop these technologies and to scale them up to full use and maximum effect. It would also serve to support employment opportunities if the start-ups expand their workforce. All of this would contribute to social pillar scores being positively affected by the presence of a CVC programme (Battisti et al., 2022; Ceccagnoli et al., 2018; Fels et al., 2021; Liang & Renneboog, 2017).

CSR initiatives have been proven to support social outcomes such as poverty reduction, improvement in health & safety and data security, but have mostly been localised to economies in which the largest firms in the world operate, usually North America and Europe (Dima et al., 2022; Nguyen et al., 2018; Sahasranamam et al., 2020). In light of the impending humanitarian crises if social factors are not address in the BRICS nations, as home to an estimated 41.6 per cent of the global population and some of the fastest growing economies in the world, the outcome of the study is encouraging. It demonstrates that CVC

programmes can and do have a significant and positive impact on the social outcomes in emerging markets and can therefore, with further investment, start to make improvements at the grassroots level of nations that are facing persistent social challenges, such as unemployment, inequality, poverty and poor working conditions (Liang & Renneboog, 2017; Seniuk, 2019; UN, 2020; World Vision, 2020).

The evidence from the results and the literature therefore leads us to conclude that insofar a company aims to improve its CSR outcomes in terms of the social pillar outcome, having a CVC programme can significantly bolster the result.

6.3. Influence of social pillar score on environmental pillar score (Hypothesis 3)

An aspect that has been overlooked in the literature on CSR outcomes of the firm has been the moderating impact that the environmental pillar and social pillar scores have on each other. The two components are usually discussed beside one another, but rarely in comparison to or in terms of the significance of one in light of the other (Thomson Reuters, 2022). No literature was found on the influence of environmental outcomes on social outcomes of the firm or vice versa (Hegeman & Sørheim, 2021; Nirino et al., 2022). This study contributes to the literature on CSR by investigating the influence of the social pillar score and the environmental pillar score on each other and offers reasons for this as well as avenues for further study.

The result of the multiple regression analysis in this study was that there is indeed a profound influence in both cases. The check on multicollinearity ruled out any concern for the lack of independence of each of the social pillar score and the environmental pillar score.

Firstly, the social pillar score was found to have a significant impact on the environmental pillar score. In fact, it was uniquely responsible 81% of the total variance explained by the model. This means that for firms that have higher social pillar scores, the environmental pillar score is expected to move in tandem with it and also be higher. But since it was found that the reason for a high environmental score cannot be attributed to having a CVC, other explanations of this result was required.

Social factors are concerned with a company's effect on the people it employs and groups of people it may have an impact on. This is in contrast to the environmental factors, that are primarily concerned with a company's impact on the planet (S&P Global, 2020). We therefore need to understand why it is that a company's effect on the planet (environmental score) is impacted by its effect on people (social score). Many companies with exposure to critical environmental factors, like mining and oil & gas companies also have a high exposure

to social factors given the impact that accidents or even political and policy changes could have on such firms. For such firms it would make sense to not only address the environmental aspect while neglecting the social aspect, as this could result in adverse financial and reputational outcomes. It is therefore intuitive for companies to address both of these aspects and in doing so, there will be an impact on both environmental and social scores and to some extent, to the same relative degree. The conclusion is that management action seeks to address both social and environmental aspects, which affects its outcome to the same relative extent (Revinitiv, 2022; S&P Global, 2020).

Another lens on this is that the environmental pillar scores and the social pillar scores are intrinsically closely related, despite any actions that management may take on distinctive strategies. Several studies have reported the human and environmental impact of climate change being interlinked (Alareeni & Hamdan, 2020; Pham et al., 2022; Zakarya et al., 2015). Issues that affect the people also affect the planet and vice versa. Examples of this include the emittance of greenhouse gasses that affect both the environment as well as quality of air for citizens of affected reasons, as in the case of China (Pham et al., 2022).

The factors contributing to the social pillar score are categorised as follows (Revinitiv, 2022):

- Human rights scores reflect a firm's respect of human rights conventions, which has a direct link to environmental issues such as clean air, water sanitation and other resource use.
- Product responsibility scores measure a firm's production of goods and services in a way that respects the customer's health, safety, integrity and data privacy. There is also a clear link to environmental issues due to the production element as well as the health and safety aspects.
- Workforce management scores measure work satisfaction, health & safety, diversity and inclusion as well as staff developmental opportunities. This does not have a clear link to environmental issues.
- Community scores reflect a firm's commitment to protecting public health and conducting business in an ethical way. This has a strong link to environmental issues for example through lower emissions and protecting scares resources such as access to water.

While there are factors of the social pillar score that are not directly related to the environmental score, such workforce management, others such as product responsibility, human rights and community have a direct link to environmental issues (Pandey & Hassan, 2020). In fact, in deriving the scores, more weight is placed on items such as product

responsibility (13%), human rights (17%) and community (28%) versus workforce management (43%) (Nirino et al., 2022; Revinitiv, 2022). It stands to reason that companies that score highly on social issues will have a similar relative ranking of their environmental pillar score. Therefore, the finding of a statistically significant relationship is justified.

The finding is also encouraging for firms in that any investment into social aspects should have positive implications for the environmental outcomes for the firm as well.

6.4. Influence of environmental pillar score on social pillar score (Hypothesis 4)

This section considers a very similar outcome for many of the same reasons, based on a distinct set of results but similar literary evidence as the previous section. The contribution of this to the literature on CSR is the finding of significant influence of the environmental pillar score on the social pillar score, as this aspect has also not been addressed in previous studies (Hegeman & Sørheim, 2021; Nirino et al., 2022).

The result of the multiple regression analysis for this aspect in this study was the environmental pillar score also had a significant impact on the social pillar score for the companies in the study. In fact, it was uniquely responsible for 32% out of the 45% of the variance explained by the model, which is 71% of the total variance. Interestingly, this is somewhat lower than the explanatory power of the social pillar score on the environmental pillar score, which explained 81% of the variance.

We can therefore conclude from the results of the analysis that if firms report high environmental pillar scores, we can expect their social pillar scores to be high as well. The reasoning for this would follow a similar trajectory as the discussion above on the impact of social pillar scores on environmental pillar scores. The conclusions that management action are aimed at both scores, as well as the interconnectedness of the scores are both valid arguments for the case of the impact of environmental pillar scores on social pillar scores. However, the lower percentage of unique contribution to variability of the environmental pillar score on the social pillar score is worthy of further investigation. We therefore turn to the components of the environmental score to understand why the impact differs.

The components of the environmental score are grouped into three categories (Revinitiv, 2022):

- Emissions measures a company's commitment and effectiveness toward reducing harmful emissions. Therefore it would have a direct impact on the society and

societal factors such as human rights and community, both which are captured in the social score.

- Innovation measures the reduction of environmental cost by using eco-friendly technology and processes. This does not have a direct impact on the measures of social outcomes (although there are plenty of indirect and longer term impacts on society).
- Resource use is concerned with supply chain management and the reduction of the use of scarce resources. This also has no direct impact on the social outcomes score.

The last two components of the environmental pillar score does not have a direct impact on the social pillar score, while together it makes up 65% of the weight of the environmental pillar score (Revinitiv, 2022). Since more weight is given to environmental aspects that are not directly impactful on the social pillar outcomes, it would make sense that there is somewhat less of an impact of the environmental pillar score on the social pillar score of companies. Therefore, while the social pillar score is highly influenced by the environmental pillar score, it is influenced to a lesser degree than vice versa and is explained by the elements that comprise the environmental pillar score.

6.5. Additional findings: Impact of categorical variables

6.5.1. Influence of industry on the environmental pillar score

The results of this study revealed that the environmental pillar score was significantly influenced by the type of industry that the company operated in. Companies operating in the manufacturing sector had a significantly higher average environmental pillar score than companies operating in the servicing sector. At first glance, this seems surprising, as we would expect manufacturing firms to encounter more opportunities for producing harmful emissions and resource use that is less than efficient. However, it has been found that manufacturing companies, particularly in the energy sector, that are expected to have low environmental pillar scores, especially in BRICS nations where high emission energy sources still dominate, have higher environmental pillar scores than other sectors (Boffo et al., 2020; Dijkhuizen & Onderco, 2019). This may be due to how the scores are calculated and the weights attributed to various factors. As mentioned before, criticisms against the environmental pillar score, such as the lack of alignment to the current emission standards and the difficulty in the interpretation of the metrics that contribute to environmental factors

may also add to the results not being an optimal reflection of the true environmental impact of such companies (Boffo et al., 2020; Senadheera et al., 2021).

The result can also be viewed from the data inclusion point of view. Companies removed from the analysis due to not having data on the CSR components might have been those, particularly in the manufacturing sector, who would have scored poorly on the environmental pillar (Boffo et al., 2020). Of the 29 companies removed due to the lack of data on environmental and social pillar scores, 11 (38%) were classified as being in the manufacturing business. However, the number removed is not as informative as the details of those companies removed. It was found that 8 out of the 11 manufacturing firms that were removed from the data were involved in mining, energy generation, aerospace & defense and chemicals. These are all resource-intensive enterprises with high rates of emittance of harmful chemicals, that would be expected to score poorly in an environmental outcomes measure. Removing these companies from the data may have resulted in being left only with 'cleaner' manufacturing firms and therefore the environmental pillar scores are higher than it would be for the whole population of the manufacturing firms including the resource-intensive companies.

6.5.2. Influence of the governance pillar score on the social pillar score

The analysis revealed that the social pillar score is significantly influenced by the governance score of a firm and also that the correlation is positive. Although the explanatory power is 4.5%, this is a fair influence according to statistical standards (Nason & Wiklund, 2018; Pallant, 2020). The positive correlation means that a higher governance pillar score would be associated with a higher social pillar score.

It is an interesting finding that the governance pillar score has a significant influence on the social pillar score but not on the environmental pillar score. Data on corporate governance has been compiled for a much longer period, unlike environmental and social data, and the criteria for good corporate governance is more widely accepted (S&P Global, 2019). While the governance factor is primarily concerned with a firm's internal and political functions, social factors are mainly, although not exclusively, factors associated with relations between the firm and people external to it (S&P Global, 2020).

There is very little literature on the overlap or influence of these three core CSR factors on each other, other than describing its complex, interconnected nature, which makes careful interpretation critical (Lucas, 2022). Although data is increasingly available on all three of these factors, governance has been seen as a type of hygiene factor that oversees the

implementation and reporting of the factors of CSR that have a real impact, namely environmental and social factors (Battisti et al., 2022; Pandey & Hassan, 2020; Sahasranamam et al., 2020).

This study shows that the governance outcomes should be regarded as more than just a hygiene factor, as it has a direct and significant impact on the social pillar score of CSR. Companies that can improve their governance outcome will therefore bolster their social outcome. The link between these may be attributable to improved disclosures and the impact that has on highlighting to management where further social impact and improvements are needed (for example to inclusive hiring practices or supporting communities). The link could further be explained by taking into account the reputation that companies establish, both internally (with management and staff) and externally (with shareholders and other stakeholders), by improved reporting standards and governance of CSR. This in turn would improve employee motivation, company morale and the ethos of the company as an active community member and force for social upliftment, which would bolster the social outcomes measured as a result (Battisti et al., 2022; Doni et al., 2022; S&P Global, 2019).

The absence of the influence of governance scores on environmental outcomes highlights the disconnection, at least in emerging markets, between the reporting and stakeholder management aspects of CSR and the real impact of environmental outcomes – some of which are nascent and only visible and measurable over the longer term. There have been no other studies on the link between governance outcomes and environmental outcomes, and it would be useful to study this connection in other contexts and further details, both from an academic and also a business point of view (Battisti et al., 2022; Boffo et al., 2020; S&P Global, 2019).

6.5.3. Influence of the location on the environmental and social pillar scores

No significant relationship was found between the location of the companies and the environmental or social pillar scores. This means that whether a company is based in India or South Africa did not affect its CSR outcomes and both countries were equally likely to have the various scores attributable to its companies. This is indicative of the outcome of the study being generalisable across emerging markets, since India and South Africa are good representatives of these as established earlier. A previous study investigating the effectiveness of CVC programmes on CSR in developed nations found that companies

based in America have a significantly higher environmental pillar scores versus companies based in Europe, although reasons for this were not given (Battisti et al., 2022).

6.6. Discussion summary

Overall, the results point towards the fact that there is an indisputable impact that CVC programmes have at least on social pillar outcomes of the CSR outcomes of firms in the BRICS nations. From the results it is also evident the social pillar outcomes have a strong moderating effect on environmental pillar outcomes and vice versa. Further, the governance scores and type of industry a firm operates in both have impacts on the overall CSR outcomes.

Given the current and growing pressure on companies on issues related to CSR and specifically reporting in more detail on these issues, companies will urgently need to decide how to address not only the reporting, but the actual impact it has on the people and the planet as part of its short and longer term strategy (KPMG, 2020; Nguyen et al., 2018). This challenge is particularly stark for companies in the BRICS nations, as a growing player in global value chains, home to some of the most populated cities on earth as well as the major contributor to greenhouse gas emittance (Chen et al., 2021; Dijkhuizen & Onderco, 2019; Wang & Sarkis, 2017). In BRICS nations, both the need and the impact of environmental and social factors are also heightened due to the lack of development, infrastructure and the relative poverty in these nations (Gregory, 2020; Khan & Lockhart, 2022).

To address this urgent dilemma, companies need new and innovative strategies to deal with stubborn issues that make up the measures of environmental and social scores, such as emissions, resource use and community (Ceccagnoli et al., 2018; Fels et al., 2021). Start-ups firms with less regulatory and legacy business issues are arguably better positioned to nimbly contribute towards positive environmental and social pillar scores more easily than large incumbents (Battisti et al., 2022). CVC programmes that make strategic investments into these firms will therefore also reap the benefits of improved scores, both by learning from and being invested in companies that succeed in CSR outcomes. Therefore, CVC programmes of large companies in BRICS nations contribute positively and significantly to at least their social pillar scores as a key component of CSR outcomes, which in turn have a positive and significant moderating effect on their environmental pillar scores. Investing in CVC programmes would ultimately help to address the increasing expectations and build the trust of stakeholders such as the communities, government, investors and the planet at

large, and ensure sustainable growth for companies and countries, as well as and improved living conditions for those who need upliftment the most (Carroll, 2015; KPMG, 2020).

Figure 7 below sets out the updated graphic representation of the outcomes of the study. It shows that companies that invest in CVC programmes have improved social outcomes as measured by the social pillar score and also proven by the significance of the t-test. There is however, not a significant relationship between having a CVC programme and environmental outcomes. The figure further shows that environmental scores and social outcomes are highly correlated and also influence each other as found in the results. Finally, significant relationships were found to exist between the industry that the company operates in and environmental scores, as well as between governances scores and social outcomes.
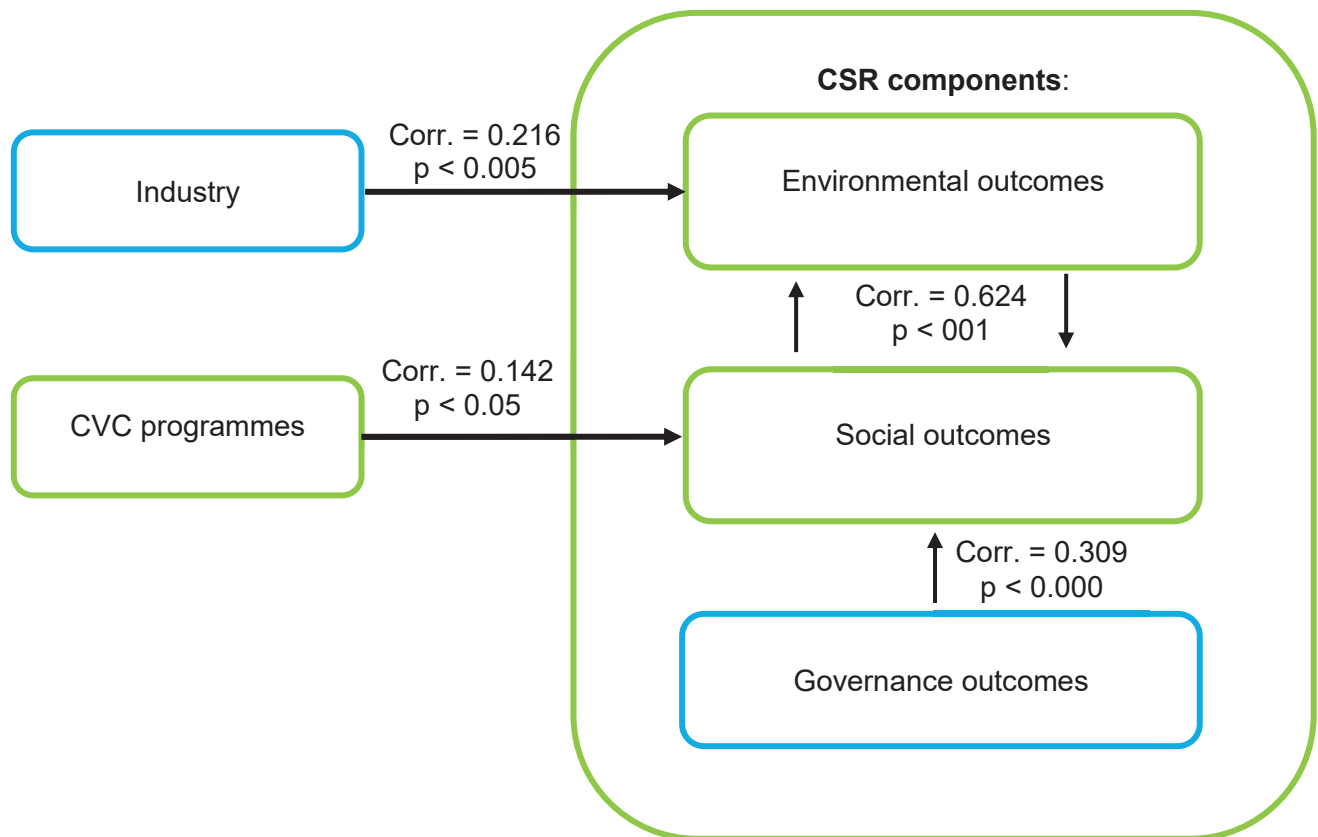

Figure 7

Updated graphic outline of this study's findings, showing the significant correlations and p-values for these correlations. Source: Author's own.

7. Conclusion

7.1. Principle theoretical conclusions

Understanding the role of the BRICS nations in national and international markets is of paramount importance, due to their size, spread and growth trajectory (Chen et al., 2021; Seniuk, 2019). BRICS nations are also responsible for an outsized amount of emissions and unsustainable energy consumption, that is in contrast with global sustainability and CSR aims (Dijkhuizen & Onderco, 2019; Sahasranamam et al., 2020; Wang & Sarkis, 2017). Together with the ever-increasing role that business plays in global markets and therefore, global sustainability, improving the CSR outcomes of firms in BRICS countries has never been more critical (Nguyen et al., 2018; Zou et al., 2019). This study examined a specific type of innovation, namely Corporate Venture Capital, that can effectively address the CSR outcomes of a company, specifically in BRICS nations (Battisti et al., 2022; Gutmann, 2019; Röhm, 2018).

A previous study has found that CVC programmes have a significant positive impact on companies' CSR outcomes in developed nations (Battisti et al., 2022). This study extended the previous research to demonstrate that the same may not hold for emerging markets, at least not for the environmental pillar score. The results of multiple regression, t-test and a Mann-Whitney U-test showed that CVC programmes influence the social pillar outcomes in a significantly positive way for companies in emerging markets. Companies investing in CVC programmes benefit from start-ups that offer the latest technology and knowledge on the latest systems and trends. This improves their outcomes on social factors such as work satisfaction, opportunities for development as well as business ethics and even health and safety aspects. However, the influence of CVC programmes on environmental pillar scores was not significant. BRICS nations are still highly dependent on energy sources that contribute negatively to environmental pillar scores. In addition, the time it takes for innovative ventures like CVC to bear fruit, complexities and problems with the measurement, as well as the choice to obtain measures of CSR scores by the worst offenders, may all be contributing factors to the lack of demonstrable impact of CVC programmes on environmental pillar scores (Battisti et al., 2022; Ceccagnoli et al., 2018; Dijkhuizen & Onderco, 2019; Fels et al., 2021; Liang & Renneboog, 2017; Zakarya et al., 2015).

It was also found that environmental pillar scores and social pillar scores influence each other to a significant degree and is positively correlated, meaning companies with higher environmental scores will also have higher social scores. The literature is silent on reasons

and size of the overlap of the outcomes but there is some evidence for the theory that management action are aimed at both scores, as well as the scores being very interconnected, both of which may contribute the its significant influence on each other (Revinitiv, 2022; S&P Global, 2020, Alareeni & Hamdan, 2020; Pham et al., 2022; Zakarya et al., 2015). The result that the social pillar score is somewhat less influenced by the environmental pillar score than vice versa, as measured by its explanatory power, is justified by the elements that comprise the social and environmental pillar scores (Revinitiv, 2022).

Finally, some additional findings were noted. Firstly it was shown that companies in the manufacturing sector had a significantly higher average environmental pillar score than those in the servicing sector. This contributes to the literature on CSR by showing that manufacturing firms based in emerging markets have higher environmental pillar scores than servicing firms, which means that servicing firms would do well to study the factors of environmental scores and align their long term strategy to achieving these as critical contribution to their nation and the world's sustainability agenda. The outcome may, however be due to issues with the measurement of factors like emissions or the data not including manufacturing firms who would have scored poorly on environmental factors, due to not having CSR scores to analyse. Further studies are required to examine this in more detail (Boffo et al., 2020; Senadheera et al., 2021).

Secondly, there was also a significant relationship between the governance pillar scores and the social pillar scores, but none between the former and environmental pillar scores. Companies with higher governance scores also have higher social scores, due to the improvement in reporting and stakeholder management that is directly linked to work satisfaction, company morale, reputation and communities upliftment, but has no direct influence on the factors of environmental scores such as emission output and resource use (Battisti et al., 2022; Doni et al., 2022; Revinitiv, 2022; S&P Global, 2019). .

Finally, the location of the firm (India or South Africa) had no impact on the either of the environmental or social pillar scores. Since it was established that India and South Africa are good representatives of emerging markets and specifically BRICS nations, the finding supports the generalisation of the study. It also means that the location of the firm does not matter as much as other factors like industry or company size may have, as found by this and previous studies (Battisti et al., 2022).

7.2. Research contribution

This study contributes to the literature on CSR and CVC by extending previous research on CVC impacts on the CSR outcomes of the firm to emerging markets, specifically BRICS nations (Battisti et al., 2022; Kim et al., 2013; Nirino et al., 2022; Wang & Sarkis, 2017). It does so by expanding the understanding of the influencing factors of the CSR outcomes of the firm by demonstrating the positive influence of CVC on the social pillar outcomes of the firm. Social pillars scores consist of measures for human rights, product responsibility, data security, job satisfaction, staff development and community, all of which can more easily and nimbly be addressed by start-up firms, who in turn require capital to develop and scale such technologies. Investing in start-up firms and technologies not only enables employment opportunities at the start-ups, but also supports the parent firms to quickly adopt and integrate such progressive elements that will positively and significantly impact the company's social pillar score (Ceccagnoli et al., 2018; Dushnitsky & Lenox, 2006; Lee et al., 2018).

Secondly, the study also investigated the moderating influences of the factors of CSR, namely environmental and social impact, on each other as a further contribution to the literature. It was found that the environmental pillar score and social pillar score not only have significant influence on each other, but also major explanatory power in understanding the variability of each variable. The literature on CSR has thus far been silent on the influence of the factors on each other, making this a major contribution to the literature (Hegeman & Sørheim, 2021; Nirino et al., 2022). The impact of management action on the scores, both distinctly and combined, as well as the interconnectedness of key elements of the scores can be seen as contributing factors to the significant influence. Therefore, improving one of the scores, will theoretically serve to boost the other score as well.

Furthermore, the environmental pillar scores are higher for manufacturing firms than for firms in the servicing sector. While this may be due to either flaws in the measurement or firms with low potential scores not being included in the study, the outcome proves that industry matters when it comes to measuring CSR outcomes in emerging markets and that this dimension of companies and its impact on their CSR scores is worth exploring further. Also, companies in different sectors should have different benchmarks for scores, to ensure fair comparison across industries and this should be made clear in the reporting of scores.

It was also found that the social pillar score is meaningfully influenced by the governance score, which is supportive of findings in a previous study (Battisti et al., 2022). This confirms that the impact also holds for emerging markets. Therefore, firms who focus on improving

their governance outcomes, will find that it simultaneously enhances its social pillar outcomes due to its influence on social outcomes such as stakeholder trust, job satisfaction and the company's reputation in the market.

7.3. Managerial implications

The study addressed the business need to improve CSR outcomes in innovative ways, giving firms insight into an effective strategy for accessing new knowledge and technology that will not only add to the financial performance, but should contribute significantly to the CSR outcomes in BRICS nations. This is especially pertinent given the scope and pace of growth of these emerging economies, the potential dire impact of climate change on emerging markets as well as the burgeoning start-up scene and radical innovation opportunities in these nations. Investing in CVC programmes can significantly bolster a company's social pillar outcomes, which has been shown to improve its environmental pillar outcomes as well. This will give a boost to its CSR impact and support the company in its enhanced disclosures, staff retention through higher job satisfaction, stakeholder relations, positioning in the capital markets for fundraising as well as having a tangible impact on the community in which it operates through downstream social and environmental impacts. (Battisti et al., 2022; Ceccagnoli et al., 2018; Han et al., 2019; Liang & Renneboog, 2017; Nguyen et al., 2018).

In terms of CSR components, the study found that environmental pillar scores and social pillar scores have a significant influence on each other. Therefore, the investment by companies into each should serve to bolster the other too. Companies focusing on CSR outcomes would reap benefits in both areas even if it just focused on one of the factors. Also, companies with improved governance scores should find that their social pillar scores improve at the same time. Finally, firms in the manufacturing industry may be able to score more highly on environmental factors, due at least in part, to how the environmental pillar scores are measured.

The business contribution to open innovation, CVC and CSR is therefore to demonstrate CVC as an important strategic tool in a company's arsenal to support and positively enhance not only its own CSR outcomes, but critically, the sustainable growth of emerging markets and therefore, due to its rapidly growing influence, all markets globally (Han et al., 2019; Kaul & Luo, 2018).

7.4. Limitations of the research

This study has some limitations despite its contribution to the literature. The study does not specify the resources created or specific reasons why CVC programmes contribute to CVC outcomes. It also narrows the scope of CSR outcomes to that of the environmental impact and social impact as described, whereas CSR can, for some companies and in different contexts, include a wider range of impacts for example black economic empowerment and business governance (Dima et al., 2022; Zou et al., 2019).

The study aimed to research companies in the BRICS nations, but was limited due to data availability, language and time constraints to two countries – India and South Africa. Given the vast differences in the nature of industries, technology, environmental aspects, geopolitical factors and economic climates, different conclusions may be drawn with data from the other BRICS nations including Brazil, Russia and China.

As with all modelling exercises, it is vital to consider if any important contextual variables may have been omitted or whether there are effects in the data that may influence the result that are not captured by the model, such as company size or liquidity, aspects that were included in other studies (Battisti et al., 2022). If the data becomes available, the heterogeneity bias may be solved with a formulation that seeks to capture the bias and codify it into further variables, thereby extending the list of variables of the model (Mundlak, 1978).

7.5. Suggestions for future research

The analysis found that the environmental pillar score was influenced by the industry, when split into broad categories of manufacturing and servicing, and that manufacturing firms have a significantly higher environmental pillar score. It might be insightful for future researchers to explore the sub-sectors of the manufacturing sector in more detail for its different impacts on the environmental pillar score and to see if the relationship holds across the various sub-sectors. The Thomson Reuters Eikon platform also offers industry and country benchmarks for the scoring, which should allow for deeper analysis on both an industry and country level (Revinitiv, 2022).

The study found that the environmental pillar scores and social pillar scores have significant influence on each other, based on data from emerging markets. Studies exploring this effect in other markets and countries would be useful. Investigating the different factors of each score to test which elements of the environmental and social pillar scores are most sensitive

to the other would also be insightful, both academically and to inform managerial attention and investment.

A previous study found various financial data points like company assets, return on equity and the size of research and development budgets have some significant effects on the CSR outcomes predicted by CVC programmes (Battisti et al., 2022). If data becomes available from a credible source, including these metrics in future studies on the impact of CVC on CSR outcomes of companies in BRICS nation would be a valuable contribution.

The analysis covers the BRICS nations as one example of an impactful group of nations in the emerging markets. Other groups of emerging markets may yield different or new insights, such as the MINT (Mexico, Indonesia, Nigeria and Turkey) group of countries, the CIVETS (Colombia, Indonesia, Vietnam, Egypt, Turkey and South Africa) and the Next Eleven (Bangladesh, Egypt, Indonesia, Iran, Mexico, Nigeria, Pakistan, the Philippines, South Korea, Turkey, and Vietnam) and is also worth investigating (Battisti et al., 2022).

Further analysing the aspects and elements of CVC programmes that contribute to the successful influence of CSR scores would be an important extension of this study, and particularly useful for business application in the aim to address real CSR impact and ensure a positive return on investment of their CVC programme.

7.6. References

African Development Bank Group. (2013). *Africa and the BRICS: a win-win partnership?* https://blogs.afdb.org/fr/afdb-championing-inclusive-growth-across-africa/post/africa-and-the-brics-a-win-win-partnership-12098

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

Amos, G. J. (2018). Researching corporate social responsibility in developing-countries context: A systematic review of the literature. *International Journal of Law and Management*, *60*(2), 284–310. https://doi.org/10.1108/IJLMA-04-2017-0093

Autio, E., & Thomas, L. D. W. (2014). *Innovation ecosystems : Implications for innovation management. January 2014*.

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*(December 2020), 1058–1066. https://doi.org/10.1016/j.jbusres.2021.10.054

Bell, E., Bryman, A., & Harley, B. (2019). *Business research methods* (5th ed.). Oxford University Press.

Bernard, M., & Darkoh, K. (2014). *An overview of environmental issues in Southern Africa. May*. https://doi.org/10.1111/j.1365-2028.2008.01054.x

Boffo, R., Marshall, C., & Patalano, R. (2020). ESG investing: Environmental pillar scoring and reporting. *OECD Paris*, 56. www.oecd.org/finance/esg-investing-environmental-pillar-scoring-and-reporting.pdf

Boulding, K. E. (1966). The economics of the coming spaceship earth. In *Environmental quality in a growing economy* (p. 12).

Bugl, B. M., Balz, F. P., & Kanbach, D. K. (2022). Leveraging smart capital through corporate venture capital: A typology of value creation for new venture firms. *Journal of Business Venturing Insights*, *17*(November 2021), e00292. https://doi.org/10.1016/j.jbvi.2021.e00292

Carroll, A. B. (2015). *A history of corporate social responsibility. February*, 1–20. https://doi.org/10.1093/oxfordhb/9780199211593.003.0002

CB Insights. (2020). The 2019 Global CVC Report . *CB Insights Research*.
   https://www.cbinsights.com/research/report/corporate-venture-capital-trends-2019/

Ceccagnoli, M., Higgins, M. J., & Kang, H. D. (2018). Corporate venture capital as a real
   option in the markets for technology. *Strategic Management Journal*, *39*(13), 3355–
   3381. https://doi.org/10.1002/smj.2950

Chemmanur, T. J., Loutskina, E., & Tian, X. (2014). Corporate venture capital, value
   creation and innovation. *Review of Financial Studies*, *27*(8), 2434–2473.
   https://doi.org/10.1093/rfs/hhu033

Chen, H., Tackie, E. A., Ahakwa, I., Musah, M., Salakpi, A., Alfred, M., & Atingabili, S.
   (2021). Does energy consumption, economic growth, urbanization, and population
   growth influence carbon emissions in the BRICS? Evidence from panel models robust
   to cross-sectional dependence and slope heterogeneity. *Environmental Science and
   Pollution Research*, *0123456789*. https://doi.org/10.1007/s11356-021-17671-4

Da Gbadj, L. A. G., Gailly, B., & Schwienbacher, A. (2014). *International analysis of
   venture capital programs of large corporations and financial institutions*.
   Entrepreneurship Theory & Practice. https://doi.org/10.2139/ssrn.1836870

Dai, W., Wang, Y., Liao, M., Shao, M., Jiang, Y., & Zhang, M. (2022). Performance
   implications of corporate venture capital investments for entrepreneurial ventures: the
   differing moderating effects of R&D intensity before and after IPO. *Journal of
   Entrepreneurship in Emerging Economies*. https://doi.org/10.1108/JEEE-05-2021-
   0195

Dijkhuizen, F., & Onderco, M. (2019). *Sponsorship behaviour of the BRICS in the United
   Nations General Assembly*. *40*(11), 2035–2051.
   https://doi.org/https://doi.org/10.1080/01436597.2019.1622411 Sponsorship

Dima, J., Karam, C., Yin, J., & Soundararajan, V. (2022). *CSR logics in developing
   countries: Translation , adaptation and stalled development*.
   https://doi.org/10.1016/j.jwb.2017.02.001

Doni, F., Corvino, A., & Martini, S. B. (2022). *Corporate governance model , stakeholder
   engagement and social issues evidence from European oil and gas industry*. *18*(3),
   636–662. https://doi.org/10.1108/SRJ-08-2020-0336

Dushnitsky, G. (2011). Riding the next wave of corporate venture captial. *Business
   Strategy Review*, *22*(3), 44–49. https://doi.org/10.1111/j.1467-8616.2011.00773.x

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., & Shapira, Z. (2010). Entrepreneurial finance meets organizational reality:
Comparing investment practices and performance of corporate and independent
venture capitalists. *Strategic Management Journal*, *1017*(February 2010), 1–43.
https://doi.org/10.1002/smj

Enkel, E., & Sagmeister, V. (2020). External corporate venturing modes as new way to
develop dynamic capabilities. *Technovation*, *97*(November 2018).
https://doi.org/10.1016/j.technovation.2020.102128

Fels, G., Kronberger, M., & Gutmann, T. (2021). Revealing the underlying drivers of CVC
performance — a literature review and research agenda. *Venture Capital*, *00*(00), 1–
43. https://doi.org/10.1080/13691066.2021.1873210

Galloway, T. L., Miller, D. R., Sahaym, A., & Arthurs, J. D. (2017). Exploring the innovation
strategies of young firms: Corporate venture capital and venture capital impact on
alliance innovation strategy. *Journal of Business Research*, *71*, 55–65.
https://doi.org/10.1016/j.jbusres.2016.10.017

Giudice, M. Del, Rosaria, M., & Peruta, D. (2016). *The impact of IT-based knowledge
management systems on internal venturing and innovation: a structural equation
modeling approach to corporate performance*. *20*(3), 484–498.
https://doi.org/10.1108/JKM-07-2015-0257

Global Corporate Venturing. (2021). *Corporates journey to South Africa*.
https://globalventuring.com/directory/?region=africa&sector=&top100=no&leader=no&
showAll=no&letter=&thePage=1&theSearchTerm=

Global Corporate Venturing. (2022). *CVC Directory*.
https://globalventuring.com/directory/?region=africa&sector=&top100=no&leader=no&
showAll=no&letter=&thePage=1&theSearchTerm=

Godfrey, P. C., Merrill, C. B., & Hansen, J. M. (2009). The relationship between corporate
social responsibility and shareholder value: an empirical test of the risk management
hypothesis. *Strategic Management Journal*, *920*(October), 1–43.
https://doi.org/10.1002/smj

Greening, D. W., & Turban, D. B. (1996). Corporate social performance and organizational

attractiveness to prospective employees. *Proceedings of the International Association for Business and Society*, *7*, 489–500. https://doi.org/10.5840/iabsproc1996746

Gregory, R. P. (2020). Political risk and financial flexibility in BRICS countries. *Quarterly Review of Economics and Finance*, *78*, 166–174. https://doi.org/10.1016/j.qref.2020.01.011

Gutmann, T. (2019). Harmonizing corporate venturing modes: An integrative review and research agenda. *Management Review Quarterly*, *69*(2), 121–157. https://doi.org/10.1007/s11301-018-0148-4

Haack, P., Martignoni, D., & Schoeneborn, D. (2021). A bait-and-switch model of corporate social responsibility. *Academy of Management Review*, *46*(3), 440–464. https://doi.org/10.5465/amr.2018.0139

Hamm, S. J. W., Jung, M. J., & Park, M. (2021). Corporate venture capital, disclosure, and financial reporting. *Corporate Governance: An International Review*, *29*(6), 541–566. https://doi.org/10.1111/corg.12379

Han, Q., Jennings, J. E., Liu, R., & Jennings, P. D. (2019). Going home and helping out? Returnees as propagators of CSR in an emerging economy. *Journal of International Business Studies*, *50*(6), 857–872. https://doi.org/10.1057/s41267-018-00210-8

Hart, S. L., & Dowell, G. (2011). *A Natural-Resource-Based View of the Firm : Fifteen Years After*. *37*(5), 1464–1479. https://doi.org/10.1177/0149206310390219

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

Hermundsdottir, F., & Aspelund, A. (2022). Competitive sustainable manufacturing - sustainability strategies, environmental and social innovations and their effects on firm performance. *Journal of Cleaner Production*, *370*(June), 133474. https://doi.org/10.1016/j.jclepro.2022.133474

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

Hill, S., Maula, M., Birkinshaw, J., & Murray, G. (2009). Transferability of the venture capital model to the corporate context: Implications for the performance of corporate

venture units. *Strategic Entrepreneurship Journal*, *306*, 285–306.
https://doi.org/10.1002/sej

Igini, M. (2022). *The five biggest environmental issues in India in 2022*.
https://earth.org/environmental-issues-in-india/#:~:text=Undoubtedly one of the
most,study also found that PM2.

Inc42. (2020). *The numbers behind India's burgeoning Corporate Venture Capital (CVC)
ecosystem*. https://inc42.com/datalab/indias-burgeoning-corporate-venture-capital-
cvc-ecosystem/

Inc42. (2021). *2021 in Indian venture capital – 62 new runds, $6 bn+ in fresh capital For
Indian startups*. https://inc42.com/features/62-new-funds-6-bn-in-fresh-capital-for-
indian-startups/

Investopedia. (n.d.). *Market capitalization*. Retrieved May 22, 2022, from
https://www.investopedia.com/terms/m/marketcapitalization.asp

Ivanov, V. I., & Xie, F. (2010). Do corporate venture capitalists add value to start-up firms?
Evidence from IPOs and acquisitions of VC-backed companies. *Financial
Management*, *39*(1), 129–152. https://doi.org/10.1111/j.1755-053X.2009.01068.x

Kaul, A., & Luo, J. (2018). *An economic case for CSR: The comparative efficiency of for-
profit firms in meeting consumer demand for social goods*. *September 2016*, 1650–
1677. https://doi.org/10.1002/smj.2705

Khan, M., & Lockhart, J. (2022). Corporate social responsibility decoupling in developing
countries: Current research and a future agenda. *Business and Society Review*,
127(1), 127–143. https://doi.org/10.1111/basr.12254

Khan, R. F., Westwood, R., & Boje, D. M. (2010). "I feel like a foreign agent": NGOS and
corporate social responsibility interventions into Third World child labor. *Human
Relations*, *63*(9), 1417–1438. https://doi.org/10.1177/0018726709359330

Khanna, T., Palepu, K. G., & Sinha, J. (2015). Strategies that fit emerging markets.
International Business Strategy: Theory and Practice, 615–631.
https://doi.org/10.2469/dig.v35.n4.1796

Kim, J., Chung, S., & Park, C. (2013). Corporate social responsibility and financial
performance: The impact of the MSCI ESG ratings on Korean firms. *Journal of the
Korea Academia-Industrial Cooperation Society*, *14*(11), 5586–5593.

https://doi.org/10.5762/kais.2013.14.11.5586

Kim, K., Kim, M., & Qian, C. (2018). *Effects of corporate social responsibility on corporate financial performance : A competitive-action perspective*. *44*(3), 1097–1118. https://doi.org/10.1177/0149206315602530

KPMG. (2020). *The Time Has Come: The KPMG Survey of Sustainability Reporting 2020*. https://assets.kpmg/content/dam/kpmg/xx/pdf/2020/12/the-time-has-come-executive-summary.pdf

Lai, O. (2022). *Record smashing heatwave in India sparks landfill fires and power outages*. https://earth.org/heatwave-in-india/

Lee, S. M., Kim, T., & Jang, S. H. (2015). 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., Park, G., & Kang, J. (2018). The double-edged effects of the corporate venture capital unit's structural autonomy on corporate investors' explorative and exploitative innovation. *Journal of Business Research*, *88*(December 2017), 141–149. https://doi.org/10.1016/j.jbusres.2018.01.049

Levin, R. (2013). *The outcomes, objectives, limitations and enablers of Corporate Venture Capital investing in South Africa. November 2013*.

Li, J. J., Xu, C., Fung, H. G., & Chan, K. C. (2021). Do venture capital firms promote corporate social responsibility? *International Review of Economics and Finance*, *71*(July 2019), 718–732. https://doi.org/10.1016/j.iref.2020.10.012

Li Sun, S., Chen, V. Z., Sunny, S. A., & Chen, J. (2019). Venture capital as an innovation ecosystem engineer in an emerging. *International Business Review*, *28*(5), 101485. https://doi.org/10.1016/j.ibusrev.2018.02.012

Liang, H., & Renneboog, L. (2017). On the foundations of corporate social responsibility. *Journal of Finance*, *72*(2), 853–910. https://doi.org/10.1111/jofi.12487

Lucas, J. (2022). *What are ESG Scores? Benefits, Limitations, and More*. Urban Footprint. https://urbanfootprint.com/blog/in-the-news/esg-scores-meaning/

Ma, S. (2019). The Life Cycle of Corporate Venture Capital. *American Historical Review*, *124*(2), 358–394. https://doi.org/10.1093/rfs/hhz042

Mundlak, Y. (1978). On the pooling of time-series and cross-section data. *Econometrica*,

46(1).

Nason, R. S., & Wiklund, J. (2018). *An Assessment of Resource-Based Theorizing on Firm Growth and Suggestions for the Future*. *44*(1), 32–60. https://doi.org/10.1177/0149206315610635

Nguyen, M., Benseman, J., & Kelly, S. (2018). Corporate social responsibility (CSR) in Vietnam: a conceptual framework. *International Ournal of Corporate Social Responsibility*, *3*(9), 1–21.

Nirino, N., Ferraris, A., Miglietta, N., & Invernizzi, A. C. (2022). 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

Nirino, N., Santoro, G., Miglietta, N., & Quaglia, R. (2021). Corporate controversies and company's financial performance: Exploring the moderating role of ESG practices. *Technological Forecasting and Social Change*, *162*(June 2020), 120341. https://doi.org/10.1016/j.techfore.2020.120341

Niu, S., Ding, Y., Niu, Y., Li, Y., & Luo, G. (2011). *Economic growth, energy conservation and emissions reduction: A comparative analysis based on panel data for 8 Asian-Pacific countries*. *39*(4), 2121–2131. https://doi.org/https://doi.org/10.1016/j.enpol.2011.02.003

Olabode, S. O., Olateju, O. I., & Bakare, A. A. (2019). An assessment of the reliability of secondary data in management science research. *International Journal of Business and Management Review*, *7*(3), 27–43. https://doi.org/10.36263/nijest.2019.01.0097

Pallant, J. (2020). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS*. Open University Press.

Pandey, J., & Hassan, Y. (2020). Effect of board- and firm-level characteristics on the product responsibility ratings of firms from emerging markets. *Benchmarking*, *27*(4), 1433–1454. https://doi.org/10.1108/BIJ-10-2019-0471

Pham, T. N., Tran, P. P., Le, M. H., Vo, H. N., Pham, C. D., & Nguyen, H. D. (2022). The effects of ESG combined score on business performance of enterprises in the transportation industry. *Sustainability*, *14*(14). https://doi.org/10.3390/su14148354

Porter, M. E., & Kramer, M. R. (2011). Creating shared value. *Harvard Business Review*,

89(1–2). https://doi.org/10.32591/coas.ojss.0201.04037b

Revinitiv. (2022). *Environmental, social, and governance scores from Refinitiv* (Issue May). https://doi.org/10.4324/9781003201182-29

RMI Holdings. (2022). *RMI Integrated Report 2022*. https://downloads.ctfassets.net/213nzreakmms/61yYg9uIbFHPQO7rRzJi4p/f3abfbf11 b5d492d6e4ece06af6dc133/RMI_IR_2022.pdf

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., Köhn, A., Kuckertz, A., & Dehnen, H. S. (2018). A world of difference? The impact of corporate venture capitalists' investment motivation on startup valuation. *Journal of Business Economics*, *88*(3–4), 531–557. https://doi.org/10.1007/s11573-017-0857-5

Röhm, P., Merz, M., & Kuckertz, A. (2020). Identifying corporate venture capital investors – A data-cleaning procedure. *Finance Research Letters*, *32*(April 2018), 1–6. https://doi.org/10.1016/j.frl.2019.01.004

S&P Global. (2019). *Exploring the G in ESG: Governance in greater detail – part I*. https://www.spglobal.com/en/research-insights/articles/exploring-the-g-in-esg-governance-in-greater-detail-part-i

S&P Global. (2020). *What is the "S" in ESG?* https://www.spglobal.com/en/research-insights/articles/what-is-the-s-in-esg

Sahasranamam, S., Arya, B., & Sud, M. (2020). *Ownership structure and corporate social responsibility in an emerging market*. 1165–1192.

Sajdak, A., & Brümmer, J. F. (2020). The implications of the structural choice of CVC units on the incumbent's innovativeness. *Copenhagen Business School*.

Sakarya, S., Eckman, M., & Hyllegard, K. H. (2007). Market selection for international expansion: Assessing opportunities in emerging markets. *International Marketing Review*, *24*(2), 208–238. https://doi.org/10.1108/02651330710741820

Saleh, M., Zulkifli, N., & Muhamad, R. (2011). Looking for evidence of the relationship between corporate social responsibility and corporate financial performance in an emerging market. *Asia-Pacific Journal of Business Administration*, *3*(2), 165–190.

https://doi.org/10.1108/17574321111169849

Santoro, G., Vrontis, D., Thrassou, A., & Dezi, L. (2018). Technological forecasting & social change The internet of things: Building a knowledge management system for open innovation and knowledge management capacity. *Technological Forecasting & Social Change*, *136*, 347–354. https://doi.org/10.1016/j.techfore.2017.02.034

Senadheera, S. S., Withana, P. A., Dissanayake, P. D., Sarkar, B., Chopra, S. S., Rhee, J. H., & Ok, Y. S. (2021). Scoring environment pillar in environmental, social, and governance (ESG) assessment. *Sustainable Environment*, *7*(1). https://doi.org/10.1080/27658511.2021.1960097

Seniuk, N. (2019). BRICS countries in global value chains. *Strategic Analysis*, *43*(6), 509–531. https://doi.org/10.1080/09700161.2019.1669900

Souitaris, V., Zerbinati, S., & Liu, G. (2012). Which iron cage? Endo- and exoisomorphism in corporate venture capital programs. *Academy of Management Journal*, *55*(2), 477–505. https://doi.org/10.5465/amj.2009.0709

Tabash, M. I., Anagreh, S., & Adeosun, O. A. (2022). Revisiting the impact of financial development on income inequality and poverty reduction: empirical evidence from selected sub-Saharan African countries. *International Journal of Organizational Analysis*. https://www.emerald.com/insight/content/doi/10.1108/IJOA-05-2022-3279/full/html?skipTracking=true

The Economist. (2022). *India is likely to be the world's fastest-growing big economy this year*. https://www.economist.com/briefing/2022/05/14/india-is-likely-to-be-the-worlds-fastest-growing-big-economy-this-year?gclid=Cj0KCQiAveebBhD_ARIsAFaAvrEHow1RbKLpgOJu6QCiiv2tx3-M8jyhZOIRRkg0H2rieMLZ00vIpcoaAms6EALw_wcB&gclsrc=aw.ds

The World Bank. (2020). *The number of poor people continues to rise in Sub-Saharan Africa, despite a slow decline in the poverty rate*. https://blogs.worldbank.org/opendata/number-poor-people-continues-rise-sub-saharan-africa-despite-slow-decline-poverty-rate

The World Bank. (2022a). *China's transition to a low-carbon economy and climate resilience needs shifts in resources and technologies*. https://www.worldbank.org/en/news/press-release/2022/10/12/china-s-transition-to-a-low-carbon-economy-and-climate-resilience-needs-shifts-in-resources-and-

technologies#:~:text=China emits 27 percent of,of the world's greenhouse gases.

The World Bank. (2022b). *New World Bank report assesses sources of inequality in five countries in Southern Africa*. https://www.worldbank.org/en/news/press-release/2022/03/09/new-world-bank-report-assesses-sources-of-inequality-in-five-countries-in-southern-africa

Thomson Reuters. (2022). *Eikon Platform*. https://emea1-apps.platform.refinitiv.com/web/apps/screenerapp

Tuzzolino, F., & Armandi, B. R. (1981). A need-hierarchy framework for assessing corporate social responsibility. *Academy of Management Review*, *6*(1), 21–28.

UN. (2020). The sustainable development goals report 2020. *UN*. https://doi.org/10.29171/azu_acku_pamphlet_k3240_s878_2016

Urip, S. (2010). *CSR strategies: Corporate social responsibility for a competitive edge in emerging markets*. John Wiley & Sons, Incorporated.

Vendanda Resources Ltd. (2022). *Vedanta Resources Limited Integrated Report and Annual Accounts 2021-22*. https://www.vedantaresources.com/InvestorReports/Vedanta Resource_AR2022.pdf

Wang, Z., & Sarkis, J. (2017). Corporate social responsibility governance, outcomes, and financial performance. *Journal of Cleaner Production*, *162*, 1607–1616. https://doi.org/10.1016/j.jclepro.2017.06.142

World Report. (2019). *South Africa: Events of 2018*. https://www.hrw.org/world-report/2019/country-chapters/south-africa

World Vision. (2020). *Global poverty: Facts, FAQs, and how to help*. https://www.worldvision.org/sponsorship-news-stories/global-poverty-facts

Zakarya, G. Y., Mostefa, B., Abbes, S. M., & Seghir, G. M. (2015). Factors Affecting CO2 Emissions in the BRICS Countries: A Panel Data Analysis. *Procedia Economics and Finance*, *26*(May), 114–125. https://doi.org/10.1016/s2212-5671(15)00890-4

Zou, P., Wang, Q., & Wang, Q. (2019). *Does doing good lead to doing better in emerging markets? Stock market responses to the SRI index announcements in Brazil, China, and South Africa*. https://doi.org/https://doi.org/10.1007/s11747-019-00651-z

Appendix A – Statistical data output

Table A

Descriptive Statistics

			Statistic	Std. Error
ENV	Mean		53.60	1.78
	95% Confidence Interval for Mean	Lower Bound	50.08	
		Upper Bound	57.12	
	5% Trimmed Mean		53.90	
	Median		53.96	
	Variance		543.22	
	Std. Deviation		23.31	
	Minimum		0.00	
	Maximum		98.00	
	Range		98.00	
	Interquartile Range		34.99	
	Skewness		-0.22	0.19
	Kurtosis		-0.70	0.37
SOC	Mean		63.98	1.40
	95% Confidence Interval for Mean	Lower Bound	61.22	
		Upper Bound	66.74	
	5% Trimmed Mean		64.59	
	Median		65.86	
	Variance		335.04	
	Std. Deviation		18.30	
	Minimum		7.78	
	Maximum		95.61	
	Range		87.83	
	Interquartile Range		23.85	
	Skewness		-0.53	0.19
	Kurtosis		-0.13	0.37

Table B

Test of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	**df**	**Sig.**	**Statistic**	**df**	**Sig.**
ENV	0.057	171	.200*	0.980	171	0.015
SOC	0.074	171	0.022	0.972	171	0.002
GOV	0.063	171	0.100	0.970	171	0.001

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Graph A

Box plot of environmental pillar scores
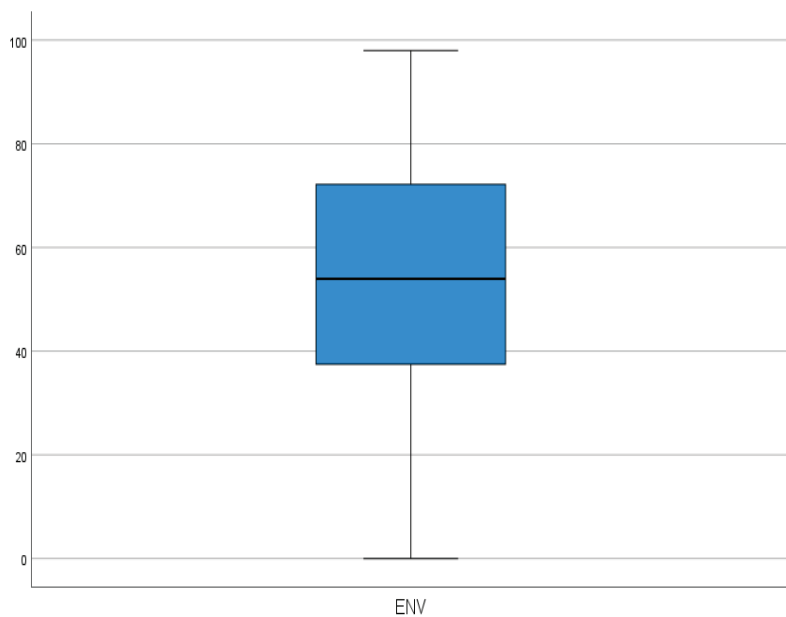
Graph B

Boxplot of social pillar scores
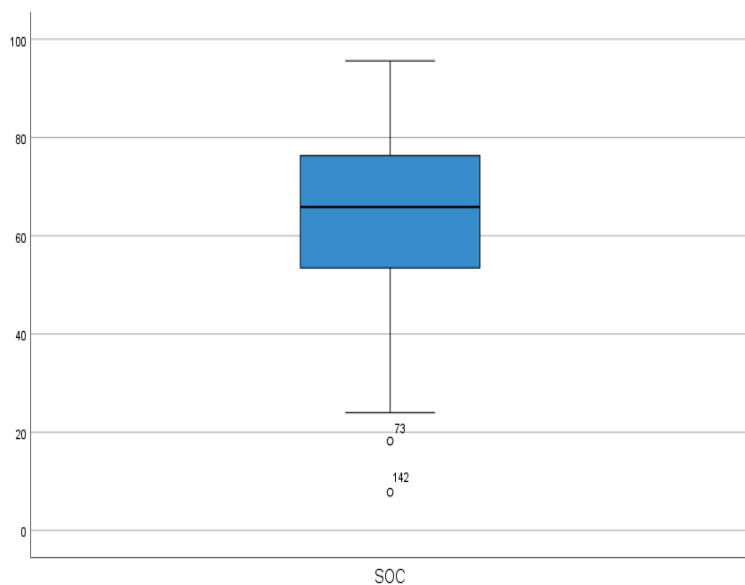
Table C

T-test results of environmental pillar scores

CVC		N	Mean	Std. Deviation	Std. Error Mean
ENV	0 None	**132**	**53.36**	**21.49**	**1.87**
	1 CVC Exists	**39**	**54.43**	**28.93**	**4.63**

Table D

Independent T-test output on environmental pillar scores

		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance				95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p	Mean Difference	Std. Error Difference		
		F	Sig.	t	df					Lower	Upper
ENV	Equal variances assumed	7.508	0.007	-0.252	169	0.401	0.802	-1.07	4.26	-9.48	7.34
	Equal variances not assumed			-0.215	51	0.415	0.831	-1.07	5.00	-11.10	8.96

Table E

Results of the Mann-Whitney U-test on social pillar scores

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of SOC is the same across categories of CVC.	Independent-Samples Mann-Whitney U Test	0.032	Reject the null hypothesis.

a. The significance level is .050.

b. Asymptotic significance is displayed.

Appendix B – Data

ID	Company Name	CVC (1 = yes, 0= no)	Environmental Pillar Score	Social Pillar Score	Governance Pillar Score	Location (1=India, 0= SA)	Industry (1 = Manufacturing, 0 = Servicing)
1	Reliance Industries Ltd	1	65.34	91.86	82.94	1	1
2	Tata Consultancy Services Ltd	0	75.14	93.41	70.17	1	0
3	HDFC Bank Ltd	0	59.91	72.32	80.11	1	0
4	Infosys Ltd	1	77.50	93.40	92.47	1	0
5	ICICI Bank Ltd	1	52.25	70.09	71.30	1	0
6	Hindustan Unilever Ltd	1	54.67	81.53	60.43	1	1
7	State Bank of India	0	74.51	63.64	16.25	1	0
8	Housing Development Finance Corporation Ltd	1	33.37	81.88	45.12	1	0
9	Bharti Airtel Ltd	0	57.38	52.20	80.46	1	0
10	Bajaj Finance Ltd	0	12.28	25.56	33.64	1	0
11	Adani Transmission Ltd	0	28.23	39.99	19.32	1	1
12	ITC Ltd	1	91.01	78.47	42.53	1	1
13	Adani Green Energy Ltd	0	83.34	59.76	33.53	1	1
14	Kotak Mahindra Bank Ltd	0	55.64	70.61	55.68	1	0
15	Adani Total Gas Ltd	0	53.47	58.84	63.28	1	1
16	Adani Enterprises Ltd	0	37.49	64.51	46.05	1	0
17	Asian Paints Ltd	0	39.51	59.95	87.85	1	1
18	Avenue Supermarts Ltd	0	25.05	29.62	41.43	1	1

19	Maruti Suzuki India Ltd	0	62.78	69.03	18.36	1	1
20	Larsen & Toubro Ltd	0	98.00	75.02	47.13	1	1
21	Bajaj Finserv Ltd	0	11.54	53.98	30.03	1	0
22	HCL Technologies Ltd	0	41.92	77.28	57.55	1	0
23	Axis Bank Ltd	0	59.91	75.34	75.53	1	0
24	Wipro Ltd	1	77.77	88.96	86.37	1	0
25	Titan Company Ltd	0	43.04	55.44	53.14	1	1
26	Sun Pharmaceutical Industries Ltd	0	30.71	70.54	29.29	1	1
27	Nestle India Ltd	0	59.64	94.26	54.99	1	1
28	UltraTech Cement Ltd	0	66.19	71.15	81.86	1	1
29	Adani Ports and Special Economic Zone Ltd	0	90.56	73.37	38.30	1	1
30	Oil and Natural Gas Corporation Ltd	0	50.37	68.26	44.41	1	1
31	Tata Motors Ltd	0	90.33	81.33	74.93	1	1
32	Power Grid Corporation of India Ltd	0	53.70	60.79	21.61	1	1
33	JSW Steel Ltd	0	60.80	71.79	34.30	1	1
34	NTPC Ltd	0	48.68	67.07	24.55	1	1
35	Mahindra and Mahindra Ltd	1	95.30	91.78	66.57	1	1
36	Coal India Ltd	0	44.54	81.39	26.55	1	1
37	Pidilite Industries Ltd	0	62.08	52.26	24.81	1	1
38	Tata Steel Ltd	1	65.43	76.77	40.30	1	1
39	SBI Life Insurance Company Ltd	0	12.94	33.97	60.86	1	0
40	HDFC Life Insurance Company Ltd	1	11.42	54.27	47.18	1	0

41	Bajaj Auto Ltd	0	19.57	27.49	25.60	1	1
42	Grasim Industries Ltd	0	55.83	58.85	29.46	1	1
43	Tech Mahindra Ltd	1	54.57	89.47	48.92	1	0
44	Dabur India Ltd	0	32.80	54.76	88.46	1	1
45	Siemens Ltd	0	75.73	74.92	36.17	1	1
46	Indian Oil Corporation Ltd	1	87.32	74.04	44.65	1	1
47	Vedanta Ltd	1	73.42	81.61	52.99	1	1
48	Hindalco Industries Ltd	0	74.51	51.75	63.21	1	1
49	Eicher Motors Ltd	0	34.94	61.51	43.90	1	1
50	Divi's Laboratories Ltd	0	50.64	59.10	64.37	1	0
51	DLF Ltd	0	67.27	80.34	57.17	1	0
52	Godrej Consumer Products Ltd	0	62.05	85.25	78.69	1	1
53	Britannia Industries Ltd	0	48.26	49.13	59.02	1	1
54	SBI Cards and Payment Services Ltd	0	13.46	46.44	25.00	1	0
55	ICICI Prudential Life Insurance Company Ltd	1	21.02	71.63	67.03	1	0
56	Indusind Bank Ltd	0	89.63	87.69	55.06	1	0
57	Cipla Ltd	0	73.94	86.01	86.03	1	1
58	Havells India Ltd	0	93.48	65.86	74.31	1	1
59	Larsen & Toubro Infotech Ltd	0	49.14	87.67	23.87	1	0
60	Ambuja Cements Ltd	0	86.66	77.82	63.05	1	1
61	Shree Cement Ltd	0	89.22	78.59	42.27	1	1
62	Interglobe Aviation Ltd	0	30.88	54.99	83.68	1	0

63	Tata Consumer Products Ltd	0	75.19	65.45	72.36	1	1
64	Tata Power Company Ltd	1	48.31	80.08	95.30	1	1
65	Bharat Electronics Ltd	1	63.01	68.02	11.13	1	1
66	Bharat Petroleum Corporation Ltd	0	75.80	54.66	24.35	1	1
67	Dr Reddy's Laboratories Ltd	0	86.19	85.51	91.24	1	1
68	Marico Ltd	0	52.96	48.49	73.70	1	1
69	Bank of Baroda Ltd	0	39.23	50.94	17.99	1	0
70	Cholamandalam Investment and Finance Company Ltd	0	5.38	32.84	61.29	1	0
71	Berger Paints India Ltd	0	49.95	49.43	60.31	1	1
72	ICICI Lombard General Insurance Company Ltd	0	35.83	64.73	80.06	1	0
73	Bajaj Holdings and Investment Ltd	1	4.50	18.21	14.22	1	0
74	Apollo Hospitals Enterprise Ltd	0	45.47	49.47	63.59	1	0
75	United Spirits Ltd	1	14.31	45.41	62.38	1	1
76	GAIL (India) Ltd	0	68.68	74.17	19.10	1	1
77	Info Edge (India) Ltd	0	11.54	58.65	71.93	1	0
78	UPL Ltd	0	67.41	40.44	66.79	1	1
79	Samvardhana Motherson International Ltd	1	34.70	62.77	68.43	1	1
80	Hero MotoCorp Ltd	0	46.59	60.01	88.08	1	1
81	Page Industries Ltd	0	62.36	81.94	68.84	1	1
82	Indus Towers Ltd	0	45.57	42.78	54.16	1	0

83	Torrent Pharmaceuticals Ltd	0	75.30	63.79	35.92	1	1
84	PI Industries Ltd	0	40.30	48.13	38.62	1	1
85	Naspers Ltd	1	45.50	62.53	18.68	0	0
86	FirstRand Ltd	0	57.59	75.81	74.06	0	0
87	Anglo American Platinum Ltd	1	83.71	78.60	67.80	0	1
88	Standard Bank Group Ltd	1	92.32	90.25	26.05	0	0
89	MTN Group Ltd	1	72.48	73.85	61.78	0	0
90	Capitec Bank Holdings Ltd	0	14.68	39.17	20.66	0	0
91	Vodacom Group Ltd	0	64.24	88.37	47.65	0	0
92	Sasol Ltd	0	66.87	89.38	63.28	0	1
93	Impala Platinum Holdings Ltd	0	82.54	74.13	51.40	0	1
94	Absa Group Ltd	1	65.29	88.18	43.39	0	0
95	Kumba Iron Ore Ltd	0	87.08	88.96	80.59	0	1
96	Shoprite Holdings Ltd	0	63.47	64.09	33.72	0	1
97	Gold Fields Ltd	0	88.36	87.95	56.72	0	1
98	Sanlam Ltd	1	23.26	64.70	33.15	0	0
99	Sibanye Stillwater Ltd	0	65.14	60.73	75.11	0	1
100	Bid Corporation Ltd	0	52.80	64.63	83.05	0	1
101	Nedbank Group Ltd	1	96.53	95.61	49.79	0	0
102	AngloGold Ashanti Ltd	0	77.49	68.16	72.05	0	1
103	Discovery Ltd	0	37.49	74.49	45.51	0	0
104	Investec Ltd	1	95.50	71.61	69.00	0	0
105	Exxaro Resources Ltd	0	77.65	80.81	26.57	0	1
106	Bidvest Group Ltd	0	24.03	35.17	65.28	0	1
107	Pepkor Holdings Ltd	0	26.25	63.32	61.26	0	0
108	Clicks Group Ltd	0	68.12	69.05	61.73	0	0

109	Remgro Ltd	1	60.51	64.22	20.04	0	0
110	Northam Platinum Holdings Ltd	0	74.58	80.35	59.25	0	1
111	Aspen Pharmacare Holdings Ltd	0	53.26	82.34	77.96	0	1
112	African Rainbow Minerals Ltd	0	75.21	69.09	61.87	0	1
113	Woolworths Holdings Ltd	0	67.64	73.95	74.25	0	0
114	Old Mutual Ltd	1	82.94	55.65	91.26	0	0
115	MultiChoice Group Ltd	0	32.86	63.38	35.90	0	0
116	Mr Price Group Ltd	0	46.83	75.53	66.23	0	0
117	Growthpoint Properties Ltd	0	68.89	56.50	41.41	0	0
118	Foschini Group Ltd	0	49.34	68.55	61.87	0	0
119	Royal Bafokeng Platinum Ltd	0	68.65	74.24	85.00	0	1
120	Rand Merchant Investment Holdings Ltd	1	6.56	30.97	39.10	0	0
121	Distell Group Holdings Ltd	1	63.36	67.65	57.04	0	1
122	Harmony Gold Mining Company Ltd	0	73.56	78.82	37.58	0	1
123	Tiger Brands Ltd	1	75.17	94.29	66.41	0	1
124	Pick N Pay Stores Ltd	0	78.69	71.32	46.02	0	0
125	SPAR Group Ltd	0	66.40	64.52	59.44	0	0
126	Life Healthcare Group Holdings Ltd	0	48.39	89.87	80.94	0	0
127	Dis-Chem Pharmacies Ltd	0	30.69	23.98	22.58	0	0
128	Sappi Ltd	0	60.17	94.07	85.35	0	1
129	Santam Ltd	0	47.35	46.90	56.42	0	0

130	Redefine Properties Ltd	0	63.92	55.79	51.45	0	0
131	Transaction Capital Ltd	1	11.20	67.61	19.85	0	0
132	Momentum Metropolitan Holdings Ltd	1	49.85	52.92	40.80	0	0
133	Avi Ltd	0	42.95	63.23	87.89	0	1
134	Truworths International Ltd	0	86.62	75.89	42.90	0	0
135	Telkom SA SOC Ltd	1	38.67	58.60	45.33	0	0
136	Netcare Ltd	1	74.85	71.73	85.58	0	0
137	Motus Holdings Ltd	0	66.15	94.64	29.95	0	0
138	Resilient Reit Ltd	0	34.37	26.08	52.36	0	0
139	PSG Group Ltd	1	0.00	24.10	37.29	0	1
140	Fortress Reit Ltd	0	59.51	29.24	45.50	0	0
141	Barloworld Ltd	0	42.87	74.15	85.49	0	1
142	Hosken Consolidated Investments Ltd	0	12.95	7.78	26.28	0	1
143	Equites Property Fund Ltd	0	29.09	59.07	14.23	0	0
144	Vukile Property Fund Ltd	0	22.69	63.27	35.53	0	0
145	Hyprop Investments Ltd	0	47.50	37.29	65.33	0	0
146	Tsogo Sun Gaming Ltd	0	47.05	58.03	15.23	0	0
147	Coronation Fund Managers Ltd	0	39.54	59.47	89.75	0	0
148	Kap Industrial Holdings Ltd	0	31.01	59.11	55.48	0	1
149	Steinhoff International Holdings NV	0	25.26	37.02	56.60	0	0

150	Omnia Holdings Ltd	0	50.63	39.53	60.43	0	1
151	RCL Foods Ltd	1	44.20	38.02	39.69	0	1
152	Super Group Ltd	0	26.88	39.62	38.51	0	0
153	Datatec Ltd	0	15.51	37.63	74.68	0	1
154	JSE Ltd	0	25.49	64.93	57.16	0	0
155	AECI Ltd	0	41.69	66.81	90.70	0	1
156	Advtech Ltd	0	46.55	46.15	60.34	0	0
157	DRDGOLD Ltd	0	53.96	66.69	61.94	0	1
158	Astral Foods Ltd	0	35.75	47.47	42.97	0	1
159	Reunert Ltd	0	54.20	66.83	75.83	0	1
160	Massmart Holdings Ltd	0	71.85	69.55	46.02	0	0
161	Grindrod Ltd	0	52.89	55.52	33.50	0	1
162	Adcock Ingram Holdings Ltd	0	27.38	72.21	79.64	0	1
163	Investec Property Fund Ltd	0	82.14	29.89	20.41	0	0
164	Sun International Ltd	0	79.52	79.11	42.53	0	0
165	Oceana Group Ltd	0	62.66	76.79	74.47	0	1
166	Blue Label Telecoms Ltd	1	15.63	30.27	15.12	0	0
167	Arcelormittal South Africa Ltd	0	64.89	52.11	24.20	0	1
168	Raubex Group Ltd	0	21.30	34.21	23.72	0	1
169	Cashbuild Ltd	0	41.54	69.04	65.72	0	0
170	Metair Investments Ltd	0	53.73	74.65	86.59	0	1
171	Famous Brands Ltd	0	65.36	50.49	48.66	0	0