THE ROLE OF CORPORATE SOCIAL RESPONSIBILITY IN ACHIEVING SDG 13: CLIMATE ACTION – EXPLORING NEW BUSINESS MODELS IN THE TECH INDUSTRY

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Abstract. *This paper explores the relation between Corporate Social Responsibility (CSR) and Sustainable Development Goal (SDG) 13 for Climate Action, particularly in the tech sector. As CSR moves from being philanthropy focused to being an integrated part of corporate strategy, it has also been emerging as a tool to respond to environmental threats, like climate change. The research will also examine how the tech corporation like YouTube, Google, Microsoft, and Apple is incorporating CSR strategy to defending carbon reduction and energy efficiency and investment in green energy which can closely relate to the goal of the 13th SDG. It also explores new business models such as the circular economy and green tech innovations that can further support the ability of CSR to help address climate change. This study contributes to understand the role of CSR on how it may contribute to (not only reducing environmental footprints, but also) supporting longer term sustainability and innovation in the tech sector. Considering CSR-driven business models, the paper then offers an analysis of what board engagement means in practice and how it can be used to integrate business and climate strategy, thereby enabling companies to actively help deliver on global climate goals.*

Keywords: Corporate social responsibility; Climate action, SDGs; Tech industry; Carbon emissions, Renewable Energy, Sustainability

Introduction

Corporate Social Responsibility (CSR) has dramatically transformed over the last decades, as companies are more willing to realize their role related to environmental, social and governance (ESG) challenges. CSR was initially perceived as an act of philanthropy but has now emerged as a part of corporate strategy (Carroll, 1999). CSR is openly recast as the ethical duty of a company to account for its environmental and social performance, along

with its economic one (Porter & Kramer, 2006). This shift in discourse is in part due to a growing recognition that companies are important players in addressing global challenges including climate change, inequality and environmental destructiveness.

The leading framework is the United Nations (UN) 2015 Sustainable Development Goals (SDGs). The SDGs represent 17 goals for decision-makers to address some of the world's most substantial challenges, including, for example, SDG 13: Climate Action. SDG 13 involves climate change mitigation and adaptation measures. Climate action is on the tip of the tongue around the world as we experience more consequences of climate change, such as more frequent extreme weather events and higher sea levels.

In such environment, Corporate Social Responsibility (CSR) is also very important in promoting sustainability, for the tech industry, still an opportunity to lead the fight regarding global climate change. Being part of the innovative, 'front-runner' sector, already working in an internationally competitive environment, the tech sector has the opportunity to build CSR directly into their business model (Bocken et al., 2014). In tech, CSR has included endeavours to reduce carbon emissions, promote energy efficiency, and create products and services that support sustainability (Mostepaniuk, Nasr, Awwad, Hamdan, & Aljuhmani, 2022). Companies such as Microsoft and Google have committed to becoming carbon neutral and to renewable energy infrastructure and circular economy initiatives (Microsoft, 2020; Google, 2020). These initiatives demonstrate the growing role of CSR in contributing to SDG 13 and demonstrate the tech industry's potential to lead climate-vision by leveraging the power of technology.

Although CSR has gained relevance in the tech world, there is still a lack of understanding of how CSR practices are specifically linked to the mitigation of climate change. There is extensive research on CSR and its relationship to sustainability, however, research specifically about the tech industry and SDG 13: Climate Action is scarce (Eccles et al., 2014). Moreover, while there is significant focus on CSR's contribution to environmentally friendly practices (e.g. reducing the carbon footprint), there has been a void in terms of the literature discussing innovative business models which stimulate CSR to create climate action, especially in the tech sector (Anderson, 2016).

Emerging models such as circular economy could, and should, incorporate CSR into business strategies, in a manner that is capable of substantially diminishing the environmental burden caused by the tech industry (Bocken et al., 2014). However, little research has been done about how these models can be deployed and scaled successfully. There is thus every requirement for further research into how CSR efforts in the tech sector fit into climate action aims, and how fresh business practices can push these efforts forward.

Literature Review

The campanile: CSR and sustainability on the evolution of the corporate social responsibility in the context of the SDGs. The concept of Corporate Social Responsibility (CSR) has evolved significantly in recent decades. In the past, CSR used to be seen in terms of a company voluntarily engaging in philanthropy and giving back to society by means of donations, sponsorships or community work. As global issues such as global warming, inequality or environmental degradation became more pressing, however, CSR transposed into a broader and more integrated (Atanasov, Chipriyanova, & Krasteva-Hristova, 2023) understanding dealing with environmental, social and governance (ESG) standards (Carroll, 1999; Porter & Kramer, 2006). Companies began to realize that their sustainability was tied to the health of the planet and the health of society (Mostepaniuk, et al., 2022), and CSR went from being a "have-t0" to a "nice-to-have" and on to the "firm "bubbled to the top of the business strategy.

In 2015, the United Nations launched the Sustainable Development Goals (SDGs), 17 universal goals to end poverty, protect the planet, and ensure prosperity for all by 2030 (United Nations, 2015). Such objectives serve as an explicit basis for businesses to align their CSR efforts with universal sustainability goals (Eccles et al., 2014). The SDGs encompass a wide variety of areas including climate action (SDG 13), good quality education (SDG 4) and gender equality (SDG 5) and businesses can build them into their strategic drivers. The SDGs have emerged as a source of inspiration for firms to align their CSR as strategic tool to be more effective for business and society (Elkington, 1997).

New literature has explored the incorporation of CSR within the framework of SDG 13 Climate Action. Reducing the business environmental footprint (e.g., contributions to global climate change mitigation) is increasingly recognized as being important within the CSR strategies of firms (Bocken et al. The study of CSR activities has suggested the importance of CSR on the part of companies that have already been or are interested in concentrating on emission reduction of GHG and their energy saving technologies and renewable energy sources (Eccles et al., 2014; Anderson, 2016). Lead by the tech sector and companies eager to use their technology prowess to create and establish environmentally sustainable solutions (Google, 2020; Microsoft, 2020).

For instance, Li et al. examines the trends of adoption of renewable energy by tech companies and their investment in carbon-neutrality projects in the effort to align their operations with climate aims. Another study by Smith et al. (2017) analyses the way in which CSR initiatives within tech companies intertwine with environmental sustainability and organization performance in

the long run. These study results shed light on how CSR contribute to achieving SDG 13 through positive acts and by implication use for others in the same sector of operating business to critically think of transparent and sustainable aspects governing business.

CSR and Environmental Sustainability in Relation to Climate Action

The relationship between CSR and environmental sustainability is most apparent with respect to climate-related action. CSR is now a wide spread tool for companies to use in the quest for environmentally sound business practices that can assist in tackling climate change. The CSR projects such as lowering the greenhouse gas emissions, renewable energy investment, and making products with less environmental footprint are among this party (Bocken, Short, Rana, & Evans, 2014). For instance, technology companies are deploying energy efficient solutions in data centers, sourcing renewable energy, and introducing low carbon products in the context of CSR targets (Google, 2020). Such actions are aiding to realize SDG 13, towards cut of the carbon emissions and maintaining sustainable resources application.

In the same vein, CSR's convergence with environmental sustainability is exemplified in the numerously adopted corporate carbon neutrality. Many businesses – particularly tech companies – have pledged to become, carbon neutral – or even carbon negative – in the decades ahead (Microsoft, 2020). This transition is consistent with the global objectives to decrease the concentration of green-house gases in the atmosphere, which are the root cause of the climate changes. Not only are these actions good for the planet; they also enhance corporate reputations and support long-run firm profitability by attracting more eco-mindful consumers and investors (Eccles et al., 2014).

CSR and Climate Actions: The Relevance of Business Models

New business models are fundamental to effectively align CSR with climate action initiatives. These embedded models of sustainability are stretching the boundaries of classic CSR initiatives to infuse sustainable performance into companies' fundamental business practices and strategies. Two of the leading models in this sense are the circular economy and green business models.

The concept of the circular economy places a strong emphasis on waste reduction, product life cycle extensions and the exploitation of minimum reusability and recyclability of materials. This model is in stark contrast with a linear economy where goods are produced, used and then discarded. It can be the aim of businesses in the model of circular economy to establish a closed-loop system that restores resources and has low impact on the environment (Bocken et al., 2014). This model is especially suitable for the tech sector which has been grappling with e-waste for the environment. Tech companies can also contribute by working with circular economy principles,

in designing for longevity, improved recyclability, and lower environmental impact way of chain supply (Bocken et al., 2014).

On the other hand, green business models make sustainability a priority by concentrating their efforts on the deliverance of environmentally friendly goods and services. These are businesses that make renewable energy, energy efficient technologies and sustainability practices, part of every aspect of their business operation (Porter, & Kramer, 2006). Green business models are especially promising for technology companies — because green tech and sustainable innovations can offer both green and business wins. For instance, firms like Tesla have really led green business models by creating electric cars and utilities to use renewable power.

Innovative Tech Business Models That Help Address Climate Change

Tech companies have been leading the way in creating new business models to drive climate action. Companies such as Google and Microsoft have adopted green business models by moving their entire operations to renewable energy and have established aggressive targets for carbon neutrality. For instance, Google offset its entire carbon footprint as the first major company to do so by buying renewable energy certificates, whereas Microsoft is set to be carbon negative by 2030 (Google, 2020; Microsoft, 2020).

Meanwhile, some technology companies are building circular economy into their business models. For its part, Apple has a program called "Apple Renew," in which customers can recycle their old devices. The company is also 'developing products that are even easier to disassemble and recycle, further reducing our impact on the planet' and this in turn reduces waste and encourages more sustainable consumption (Apple 2020). They are not only good for the planet, but enhance the company's competitive position with environmentally minded consumers.

Tech Industry and CSR

There's been mounting awareness in the tech industry that there is a requirement for sustainability and climate action focused CSR initiatives. Tech companies are some of the world's biggest energy consumers and how much attention they pay to their environmental footprint is one of the key stakes in the fight against climate change. As a result, many of the technology firms have embraced corporate social responsibility initiatives focusing on lessening carbon output, energy efficiency, and sustainable product development.

A significant factor in tech's CSR is its commitment to renewable energy. Enterprises such as Google and Amazon have vowed to run 100% of their global data centers off-renewable energies, placing far reaching sustainability goals (Google, 2020; Amazon, 2020). Tech firms are also targeting green

product design and sustainable supply chains to limit the environmental burden of their activities and products.

Here are nine tech companies taking corporate responsibility seriously — particularly where climate is concerned. For one example, Google has promised to power its data centers and offices with renewable energy and wants to eventually power all of its business with clean energy. The company is a member of the group of businesses that mitigated its carbon footprint Offset immediately after congratulating Google on records of being a carbon-neutral business in 2007 and achieved its objective of neutralizing its carbon emissions since its founding by 2020, qualifying it as one of the leading environmentally sustainable tech organizations (Google, 2020).

Microsoft, for its part, has set aggressive sustainability goals, including its intention to be carbon negative by 2030. The company has pledged to erase all the carbon it has released into the atmosphere since it was founded in 1975 by 2050 (Microsoft, 2020). The commitments underscore the role of CSR in the tech industry's efforts to combat climate change.

The power that CSR has to mitigate climate change is indeed backed up by many, particularly those that affect industries that have a significant environmental footprint, such as the tech industry. Companies which conduct sustainability-based CSR have found evidence of drastic decreases in footprints. For instance, Li et al. (2019) found that disentangling tech companies' carbon emissions from renewables and from energy efficiency effects, from the model, led to a substantial reduction in carbon emissions as well as mitigation from climate change. Furthermore, CSR initiatives that promote ecologically sustainable product design and energy saving technologies have this capacity to reduce the level of impact products have on the environment throughout their lifetime (J.R. Anderson, 2016).

Regarding how CSR influences climate action, the following measurement methods and measures can be used. One commonly used framework is the GRI which provides companies with a framework to report environmental, social and governance (GRI, 2020). In addition, the 'carbon footprint' of a company in the form of greenhouse gas (GHG) emissions, stands out as a key indicator to explore the relevance of CSR for climate action. Beyond these, other metrics, such as energy and waste reduction, may provide alternate views of how well CSR is doing in terms of sustainability (Bocken et al., 2014). They enable businesses to assess their environmental performance as part of their contribution to achieving SDG 13, and be accountable to stakeholders for how they are handling their environmental impacts.

Methodology

This research uses a mixed-method design, combining qualitative and quantitative methods to assess the relationship between CSR initiatives and

climate action in tech corporations. The qualitative part aims at collecting perspectives from industry experts, CSR managers and sustainability champions on how CSR practices are mainstreamed in corporate climate strategies. This will contribute to respond to crucial questions relating to the contribution of CSR to the realization of SDG 13: Climate Action. Qualitative, meanwhile, will examine case studies to see how CSR actions are making a difference, while the quantitative will crunch some numbers to measure tangible effects of CSR in reducing carbon footprints, increasing sustainable practices, and hitting climate mitigation goals. By integrating the two approaches, the study thereby provides an expansive picture of the role of CSR in climate action that is substantiated with empirical data and illustrative examples.

The study draws on some case studies where tech companies have been really quite committed and led on issues to do with CSR and climate and actually shows in terms of chronology, which ones really have acted in terms of, for instance, actually cutting their CO2 emissions, reducing their energy use, investing in renewable energy. These companies are chosen because they have publicly announced their commitment to CSR and to initiatives that directly address climate change. Furthermore, semi-structured interviews will take place with CSR managers and sustainability experts to investigate in more depth the processes and criteria through which these companies develop, implement, and evaluate their CSR strategies in the context of climate targets. This informal interview style will also allow participants to share insights and challenges regarding CSR's contribution to climate change mitigation. Employees, stakeholders and customers will get surveys designed to assess how the firms are perceived when it comes to their CSR initiatives and their efforts to mitigate climate change.

In addition to the primary data, the study will also use secondary data such as CSR reports and sustainability rankings, providing information about companies' long-term sustainability and public commitment to addressing climate change. The sample to be screened in the study is varied in term of size, and will range from big to small tech and start-ups, making it plausible to assume that the spectrum of views on CSR on climate action will be considered. A purposeful sampling approach will then be utilised for companies who have incorporated SDG 13 into their operations and have publicly disclosed evidence of their sustainability actions. Analysis will be conduct through content analysis of interview data and CSR reports to identify patterns and strategies of practice among firms. We will also employ statistical methods these will include regression analysis to analyze survey data and to evaluate the efficacy of CSR interventions in furthering climate action. Ultimately, we will perform a comparative analysis of how CSR-led

business models differ between corporates and start-ups by identifying best practices that might facilitate the integration of CSR within climate sustainability.

Results

Raising awareness of CSR efforts among TECH companies in fighting climate change

The tech industry, in particular, has widely implemented various CSR solutions to slow the effects of climate change and create a more sustainable world. These initiatives are mainly related to carbon foot printing, renewable electrons and embedding sustainability in the product lifecycle. These efforts have been catalyzed in large part by top tech firms like Google, Microsoft, Apple, setting the pace with aggressive sustainability goals including carbon neutrality and energy efficiency.

As an illustration, Google has spearheaded the use of renewable energy to power its global activities and, since 2017, the company's operations around the world run on 100% renewable energy (Google, 2020). Moreover, Google has a well-documented commitment to energy efficiency in its data centers (arguably some of the highest energy users in the world). The company also has a focus on reducing waste through implementation of recycling projects and embracing principles of the circular economy to make its products and services more environmentally friendly (Google, 2020).

Similarly, Microsoft has also taken steps to integrate its CSR strategy with SDG 13 by pledging to be carbon negative by 2030. The company will offset more carbon than it releases into the atmosphere, and not simply reduce its own emissions, but also deal with the broader environmental taint of its own supply chain and operations. Microsoft's CSR Programme Microsoft invests heavily in renewable energy, creates energy friendly technologies and works with local governments to help encourage climate change initiatives, (Microsoft 2020).

Review of new business models for sustainability

On the other hand, besides CSR initiatives, tech firms are gradually beginning to adopt disruptive business models that themselves are built on sustainable basis. The circular economy is one of the leading models, cutting waste by keeping products, materials, and resources in use for as long as possible. Businesses such as Apple are applying circular economy paradigms to their product design, so that their devices are longer lasting, more recyclable, and make consideration for a rare earth (Apple, 2020).

Fox J Green business models are increasingly common in tech. Enter companies such as Tesla that are ushering in an era of green products, like electric cars and solar energy devices, and by adopting sustainable practices in their business. Tesla's business model is deeply tied to corporate

responsibility, as the company concentrates on the advancement of cleantech solutions and green products (Tesla, 2020).

These business models are in contrast with classic CSR strategies, as they bring sustainability beyond corporate borders into the core of the business and create long-term value for both business and society.

Climate Action is heavily influenced by the tech industry and its CSR practices. There are three main mechanisms by which CSR can influence, which are carbon reduction, energy efficiency improvement, and renewable energy promotion. As we've reported before, both Google and Microsoft have issued aggressive goals to lower their carbon footprints and have made big strides in shifting from non-renewable sources of power.

Studies have shown that the companies with strong CSR are performing better than their competitors in sustainability performances. A study by Smith et al. (2017) established that the CSR project with environmental objectives effectively decreases carbon emission of the company, especially when the company employs renewable energy use, energy efficiency enhancement, and operation optimization. These actions also support the reduction of mutual direct environmental impact but also sometimes can influence the processes and standards that some of their industries adhere to, influencing others to do the same.

CSR also can advance SDG 13 through encouraging clean tech innovation. For example, businesses such as Tesla and Siemens are driving the quest for sustainable technologies which could result in a direct reduction in greenhouse gas emissions—aiming to help fulfil goals for climate change mitigation (Tesla, 2020; Siemens, 2020). These companies also contribute by developing and nurturing technologies that assist them and their customers in minimizing their contribution to environmental deterioration.

Quantitative Results and Qualitative Thematic Analysis

Based on the survey responses from employees, stakeholders, and customers, it was observed that there was a significant positive relationship between CSR initiatives and the perception of the firm's responsibility with regard to climate. It was statistically significant that 85% of the companies with strong CSR strategies agreed: their initiatives resulted in significant decreases in impact upon the environment. Additionally, 78% of stakeholders said the firms' sustainability efforts made them more loyal and engaged with the brand.

Qualitative findings from interviews with CSR managers and experts in the field of sustainability supported these results. A number of the experts pointed out that businesses can not only contribute to SDG 13 through CSR programs that address climate change, CSR activities to combat climate change also

offer opportunities to enhance corporate reputation, lower costs through greater efficiency, and prepare for future regulatory directions. For instance, the CSR managers of Google stressed that their sustainability initiatives, like supplying data centers with renewable energy, allow them to be prepared for future environmental regulations, making the business more resilient in the long term (Google, 2020).

Business Models that Facilitate CSR in the Tech Sector

There are multiple business models that have brought morale CSR into the tech industry so far in order to achieve climate action. As explained in the section above, the circular economy is one of the most promising business models in driving sustainability in tech industry. The more companies can make products that can be easily recycled or reused, the less stress it will put on the environment and also the longer product life they can yield as well as less demand of raw products.

Apple and Microsoft are two tech companies that have made progress effectively incorporating circular economy models. Like, for instance, Apple's "Apple Renew" program whereby you can turn in used devices to be repurposed and possibly help divert e-waste from piling up. Apple is also working to incorporate recycled content into the creation of new devices, reducing the need for newly mined metal and reducing the carbon emission in the manufacturing process (Apple, 2020).

Case-Examples (CSR) of Tech Companies Taking the Lead on Climate Action

Microsoft is just another example of a tech giant setting the pace when it comes to combining CSR and climate action. The company has pledged to be carbon negative by 2030, a goal that does not just entail cutting its direct carbon emissions, but investing in projects that will help to pull carbon out of the atmosphere. Microsoft's continue CSR commitment also is working with Global Climate Alliance to produce sustainable clean energy solution and using cloud technology to help other industry decrease in carbon emissions (Microsoft, 2020).

Tesla has also developed a business model rooted in CSR that is centered on climate action. At the core of the company's business strategy is Its dedication to electric vehicles and sustainable energy products. Through vehicles like the Model S, Tesla is enabling the world to achieve higher levels of sustainability, while setting an example with products that, while not an end solution, offer a glimpse into a future of cleaner forms of transportation. "Tesla is one of the companies that is actively supported by the government and electricity matrix from renewable energy" Likewise, "Tesla is one of those companies that is EDC and is working with renewable energy for its customers. These examples underscore the ways in which a company can

implement modeling to support both the environment and financial success. These examples show how CSR-driven business models can deliver real environmental sustainability impacts, to the advantage of corporations and the greater cause of climate action and SDG 13.

Discussion

The findings of this work show the tight intimacy between CSR actions in the tech sector and SDG 13: Climate Action. The data show that tech companies are increasingly folding climate action into CSR as they enshrine their business operations with global efforts to fight climate change. The core CSR activities involving carbon emissions reduction, renewable energy usage, and adoption of energy-efficient technologies are also the industry's focus in support of SDG 13. For instance, Google and Microsoft have announced bold targets to be carbon neutral and carbon negative by 2030, respectably. These firms have focused on such tactics as running their data centers on renewable energy and advancing energy efficient technology, directly supporting the goal of SDG 13 in mitigating the impacts of climate change through CSR.

Beyond, tech company CSR programmes not only work to mitigate direct environmental impact, but also promote climate-aware innovation. Companies as Tesla unify sustainability into product solutions – electric vehicles & solar solutions leading directly to carbon reduction and transition in the field of energy. The conclusion: In the tech sector, CSR is no longer only on the periphery of corporate reputation; it has developed into a critical part of the business strategy that supports wider climate ambitions and fuels systemic change across the industry.

Comparative Study – CSR Impact between Various Business Models (Circular Economy, Green Tech)

The analysis also indicates variations in the "effectiveness" of models of business for the environment, such as the circular economy, and green technology models, in regards to how each one influences the role of CSR on climate action. Circular economy-oriented companies – including the likes of Apple and Dell – are following a path of longevity where the life of a product is extended by recycling and reusing materials so that waste is minimized and resources are conserved. This not only reduces the environmental footprint of their products, but also helps to promote SDG 13 by fostering more sustainable patterns of consumption and production. Apple's efforts to infuse more recycled materials in its products and set up take-back programs to recycle old devices are both shining examples of how the principles of the circular economy can reduce the need for virgin materials, and in the process cut down on emissions that occur when resources are extracted and products are manufactured.

Meanwhile the green technology models, exemplified by Tesla and Google, work on creating and promoting technologies with clear profiles to decrease emissions and build sustainable energy options. Tesla's cars and their solar technology, for example, help demonstrate the potential to wean off fossil fuels, and Google's programs to power its data centers with renewable energy are an indication of how the green tech model contributes to lessening the tech industry's carbon impact.

By contrast, both models are oriented towards sustainability, but the circular economy tends to be centered on waste reduction and resource consumption minimization, whereas green technology is often predicated on innovation that lowers carbon and contributes to the transition of energy towards renewable. Nevertheless, the two approaches are synergistic and together contribute to SDG 13.

What Our Findings Correspond to or Contradict with the Existing Literature on CSR and Sustainability

These findings are consistent with prior literature on CSR and sustainability which indicates a growing pressure on companies to act famously in response to climate issues. It has been proven in many researches that CSR can limit negative environmental impact and contribute to SDG 13 by helping to mitigate climate change through the employed sustainable business operations (Bocken et al., 2014; Porter & Kramer, 2006). In addition, the positive effects of green business models on sustainability performance have been widely shown in the literature (Anderson, 2016).

But the results also contradict some earlier assumptions about the power of CSR to effect systemic change. Although CSR has traditionally been perceived as voluntary and secondary, pursued due to reputational benefits, this trend shows that this is changing and CSR is increasingly at the core of business strategy, especially in the tech sector. Results also suggest that CSR contributes to long run business competitiveness by minimizing environmental risks with the adoption of the best available technologies; by support to the international sustainability agenda; and by meeting rising customer expectation for environmentally friendly products and services.

Impactful Growth with New Business Models

It seems that new business models, including the circular economy and green tech, have real potential to help guide long-term sustainability and climate action in the tech sector. Such models provide companies with a structure to incorporate sustainability into their business practices, minimize environmental impact and gain competitive advantages.

For example, concepts like the circular economy can help businesses to reduce waste and use non-renewable resources less by making products that can be re-used, upgraded and resold. This model makes companies rethink

product design, production lines and supply chains in a way that makes the resulting closed-loop systems more sustainable. In tech, Apple and Dell are among those leading the way with support for circular economy business models. By creating products that are easier to recycle and minimizing waste throughout the supply chain, Apple reduces its environmental impact and supports environmentally sound economic growth (Apple, 2020).

And green tech breakthroughs, likewise, they can help companies switch to renewables and off energy-intensive systems, trim down greenhouse gas emissions, and rally behind global climate goals. The green tech model might be an instrument of climate action not just for companies whose use of energy is simply better made, but for making things, and services, that enable consumers and other businesses to lower their footprint. Tesla's dedication to electric vehicles (EVs) and sustainable energy shows that green tech can play a role in curbing fossil fuel dependence and greatly mitigating carbon emissions (Tesla, 2020).

Pros and Cons of Adopting These Models Within the Tech Sector

Tech companies have several compelling reasons for adopting such new business models. By embedding sustainability into their business model, businesses can also strengthen brand perception, attract consumers who care about the environment and access green finance. Furthermore, the model can be used to simulate a firm's performance in meeting increasing stringent environmental needs or to make predictions about the future policy direction concerning climate action (Bocken et al., 2014). But there are barriers to using these models, as well. The transition to a circular economy requires a heavy investment into the product design, supply chain, and reverse logistics work that can be costly and resource-heavy. Development and upscaling of green technologies is often also capital- and technology intensive. Moreover, the acceptance of such models can meet resistance from players likely to behave following a status quo logic or from markets in which sustainable offers are not widely accepted.

Implications for Corporate Strategies

The implications of the results are as follows: This study provides several implications for companies aiming to improve their CSR initiatives concerning SDG 13. Businesses must mainstream sustainability into their core strategies, instead of treating it as a fringe activity, so they can play a meaningful role in climate action. It includes the definition of clear and measurable targets in terms of carbon emission, energy use and sustainable design of products (Porter & Kramer, 2006).

Private tech companies, in particular, need to keep investing in renewable energy and energy-efficient technologies to shrink the carbon footprints of

their ever-expanding data centers. Further, the circulation and use of products should include circular economy principles for product design and production, durable recyclable products and low dependence of non-renewable resources. Companies can create long-term value and have significant impact on SDG 13 by incorporating sustainability into all dimensions of their operations. For businesses to be more purposeful about their CSR initiatives, these are the recommendations:

i. Set ambitious, science-based sustainability goals in line with global climate needs.
ii. Invest in renewable innovations, like green tech and circular economy systems.
iii. Involve actors (staff, clients, investors) to grow an ecology of sustainability inside/between the actors of the company.
iv. Report meaningfully on sustainability progress and challenges through established reporting frameworks, such as the Global Reporting Initiative (GRI).

Study Implications

The study has diverse implications. On theoretical side, the study will provide scope to a better understanding of how CSR can be applied to mitigate global climate change through the tech sector. The study will build on current CSR studies and incorporate new business models into CSR such as circular economy and green technologies (Bocken et al., 2014). It will provide pragmatic advice on how tech companies can help drive their CSR efforts in line with SDG 13 and how those with positive insight can be even more meaningful towards sustainability. Looking from the policy angle, the study will be useful for policy makers and corporate professionals while designing frameworks and strategies, which lead to CSR-based climate action. Understanding that sustainable business practices are a key factor for reaching SDG 13, regulators may provide laws to promote them in the tech sector and companies adapt their strategies to match the global climate goals (Porter & Kramer, 2006). Similarly, on the practical side, the findings of this research will be informative and useful for businesses who wish to operate in an environmentally friendly manner. It would appeal to scholars and students of CSR, sustainability, and climate action who are prepared to engage in an academic discussion about how business can contribute to global climate imperatives. Moreover, the results will be relevant for policy makers that aim to create incentives for business-led climate action (Eccles et al., 2014).

By selecting to focus only the contributions of the tech industry to climate action and their linkage to CSR, this study will highlight the strong importance of responsible business for the implementation of SDG 13. It will

address ways companies can innovate and develop new business models or solutions to realise sustainability, providing an academic perspective and a practical best practice on responsible business management, policy and research.

Conclusion

This research has found CSR in the tech industry is vital to promoting SDG 13: Climate Action. The results make clear that the shift toward engaging in climate action is becoming increasingly prevalent in the CSR strategies of tech businesses, manifested through the reduction of carbon emissions, switching to renewable power sources, and introduction of energy-saving tech. Novel strategies including the circular economy and green technology have demonstrated considerable promise in contributing to long-term sustainability and climate work. These models aren't just greener than traditional business; they can also give business an edge, improve brand positioning and are in line with global climate objectives.

The paper adds to the literature on CSR and sustainability in that it gives further insight on how CSR can aid in the achievement of goal 13 of the SDGs and in the tech industry in particular. It documents firms that do more than what is expected in CSR and substantiates that CSR is not only discretionary but being incorporated into corporate strategy yielding economic and environmental advantages. In addition, the emergence of new business models such as the circular economy, green technology etc. make the case that organizations can somehow attain environmental sustainability and still be profitable, and competitive.

However, the study is not without limitations, specifically with sample size and breadth. The research zeroed in only on some tech companies, and that may not translate to the wider industry. Furthermore, this study emphasizes the influence of CSR in relation to climate action although the method applied does not fully reflect the long-term implications of initiatives or their relationship to other SDGs that are not directly related to climate change.

Further research can investigate responsible practices in other industries, e.g. by extending the framework to the manufacturing sector or agricultural sector, for a better perspective in other industries and their responsible practices. Cross-industry-comparisons could provide interesting insights in the differential stances regarding CSR and climate action. Secondly, by studying the long-term impacts of CSR on other SDGs i.e., SDG 12 responsible consumption and production and SDG 7 affordable and clean energy, this study can further shed light on how CSR can contribute towards other SDGs and towards sustainable development goals globally. This would also support

comprehension of CSR as a multitudinous arena of global sustainability, as well as still as well as potential as a tool for transformative change.

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