UNIVERSITY OF TURKU

ABSTRACT

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Supervisors	D. Sc. Birgitta Sandberg, D. Sc.Valtteri Kaartemo		

Abstract

Unlike the vast majority of prior research, which gives too much focus on the effect of sustainability-oriented innovation on financial performance of organization, this study deepens existing literature by empirically examining the effect of sustainability-oriented innovation practices on corporate environmental performance and corporate social performance simultaneously. The data was collected in 93 small and medium sized companies in Vietnamese market whereas most of existing study is conducted in developed countries in the West. Results from the regression analyses suggest that sustainability-oriented innovation has a significant and positive effect on environmental performance and social performance. These results support the school of thought that advocates the presence of sustainability-oriented innovation in organizations. Moreover, this study takes a further step compared to prior research by performing the univariate analysis variance. The result reveals that different levels of sustainability- oriented innovation practice would lead to different mean values of environmental performance. Likewise, companies that have a higher level of sustainability- oriented innovation would achieve higher level of social performance. Furthermore, practical implications are offered for managers when they design and implement sustainability-oriented innovation practices in organizations.

Key words	corporate sustainability, corporate environmental performance, corporate social performance, sustainability- oriented innovation, SME

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THE EFFECT OF SUSTAINABILITY- ORIENTED INNOVATION ON CORPORATE PERFORMANCE IN THE SME CONTEXT

Master's Thesis
in International Business

Author(s): Quynh Nhu Ngo Ngoc

Supervisor(s):
D. Sc. Birgitta Sandberg
D. Sc. Valtteri Kaartemo

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Turku

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1 INTRODUCTION

1.1 Background of the research

Sustainability is believed to have a special power in the 21st century as it represents the commitment to make our world become fairer and more prosperous. It is the world that natural resources, ecology and cultural accomplishments are conserved for our descendants. (Dyllick & Hockerts 2002, 130.) The reason that makes sustainability become more important than ever is that business activities have caused adverse effects on both the environment and the society (Lozano, 2015, 32). For example, land is a precious resource that we have as it provides human with a foundation on which we can grow in terms of ecology, economy and society. It is estimated that over half of global GDP (approximately USD 44 trillion) is products that are made out of natural resources. However, companies are exploiting and handling our valuable natural deposit relentlessly without considering about the well-being and livelihood of plants, animals and humans. (United Nations 2022). If corporates keep capitalizing on natural resources in a reckless way, the severely negative impacts they cause might jeopardize humankind (Altenburg & Pegels, 2012, 5). Therefore, there is a strong need that corporates take actions to address the mentioned-above issues to protect the ecological system and the society in which firms are operating their businesses.

To achieve a strong persistent growth, the economy needs to promote sustainable practices, which put emphasis on the pursuit of short-term profit without causing harm to long- term prosperity. Those pratices were considered as a compromise with business performance in the past. However, the perception of it has changed considerably. (Bos-Brouwers 2010, 418.) Nowadays, pursuing sustainability is seen as an essential part in corporations globally in recent years since it directs attention to enhancing environmental, societal and financial performance of firms, which is called the triple P (planet, people and profit) (Carrillo-Hermosilla et al. 2010, 1073.) Many firms have promoted sustainable ways of doing business in terms of product research and development, merchandizing and implementing business strategy (Pujari 2006, 76). Besides, firms have been adopting sustainability-oriented innovation practices in order to realizing corporation's goals of the triple P (Li et al. 2017, 41). Such innovations are practices taken by firms to improve the products, production process and organizational management to obtain financial benefits and reduce impacts on the environment and society simultaneously (Adams et al. 2016, 181). Sustainability-oriented innovation could enable firms to use resources more productively, curtail the cost of environmental treatments and finally would lead to increased competitive advantages (Porter & van de Linde 1995a, 120). Some corporations have seen sustainability as an opportunity and they can yield more profit as well as gain bigger portion of market by facilitating sustainable-oriented innovation (Hart & Milstein 2003, 56).

During 1970s and 1980s, the vast majority of people believed that industrial activities of big firms were the root cause of ecological issues. Studies also focused on big corporations and their parts in pursuing the sustainability whereas the role of small and medium sized enterprises (SMEs) was discounted. Nonetheless, the awareness of environmental impacts from business activities of SMEs has raised since 1990s (Biondi et al. 2002, 613). They are considered the dominant players in the secondary sector of the economy and their practices are crucial for a sustainable economy (Hitchens et al. 2003, 47). Legislators realised that to enhance the environmental business result globally, they should provide SMEs with encouragement, supportive policies as there is a great number of SMEs in the market but their nature is diverse and their environmental performance is challenging to manage (Biondi et al. 2002, 613). It is also worth mentioning that the innovation processes of big corporations and SMEs are different markedly. As a result, it is not likely that legislations, approaches and research suitable for big firms would produce fruitful results for SMEs. (Bos-Brouwers 2010, 418.) Therefore, it is crucial that more studies about innovation are conducted in the SME environment.

Additionally, Porter hypothesis suggests that the use of officially environmental rules would enable governments to inspire corporations to come up with more innovation, which would lead to decline in harmful discharge, increase of competitiveness and the cost would be offset in the long run (Porter & van de Linde, 1995b). Therefore, many existing studies are centered on the important role of environmental legislations in facilitating sustainable-oriented innovation (Cai et al. 2020; Fischer & Newell, 2008; You et al. 2019) whereas research about whether sustainability-oriented innovation could indeed enhance corporate performance is given scant attention regarding empirical analyses (Yan & Zhang 2021, 35870). As the need for a sustainability growth has been increasing, the benefits that companies can bring to the environment and the society are as important as the financial gains. Therefore, corporations try to boost not only their economic performance but also other dimensions of corporate performance, which are corporate environmental performance and corporate social performance (Ezzi & Jarboui, 2016, 14). However, the effect of sustainability-oriented innovation on financial performance of corporates has given a lot of attention from scholars (e.g. Wagner 2010; Bigliardi 2013; Beate et al. 2013; Caracuel & Mandojana 2013; Przychodzen et al. 2015; Osman & Peker 2016; Xuemei Xie et al. 2016; Albuquerquer et al. 2018; Azevedo et al. 2019) while empirical studies about the effect of sustainability- oriented innovation practices on corporate environmental performance and corporate social performance is still scant. In this context, this study aims to fill the research gap by empirically exploring the effect of sustainability-oriented innovation on corporate social performance and corporate environmental performance in SME context. Hopefully, findings of this study would provide managers of SMEs a clear understanding about the effect that sustainability- oriented innovation practices have on their corporate environmental performance and corporate social performance.

1.2 Research question

This study aims to explore the effect of sustainability- oriented innovation practices on corporate environmental performance and corporate social performance. Therefore, the main research question is:

- What is the effect that sustainability- oriented innovation has on corporate environmental performance and corporate social performance of SMEs?

To answer the main question, there are four sub-questions that are created to split the central research question into basic theories:

- What is sustainability- oriented innovation?
- What is corporate performance in terms of environmental performance and social performance?
- What is the effect of sustainability- oriented innovation on corporate environmental performance?
- What is the effect of sustainability- oriented innovation on corporate social performance?

As the main research question aims to reveal the effect of sustainability- oriented innovation on performances of SMEs, it is important to grasp understanding about sustainability- oriented innovation (sub-question 1) and corporate performances regarding environmental performance and social performance (sub-question 2) first. By answering the first two sub-research questions, a foundation is built to help the study further explore the effect that sustainability- oriented innovation has on corporate environmental performance (sub-question 3) and corporate social performance (sub- question 4).

2 SUSTAINABILITY-ORIENTED INNOVATION AND CORPORATE PERFORMANCE

2.1 Innovation as a path to sustainability

2.1.1 Corporate sustainability

There are numerous perceptions about sustainable developments. It is viewed as value change (Clark 1989), societal reorganization (Gore 1992) or morale development (Rolston 1994) that leads to a better future (Gladwin et al. 1995, 876). It can be said that the Brundtland report of the World Commission on Environment and Development has made the notion of sustainable development become more popular. Sustainable development is interpreted as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987). When it comes to the organizational level concept, sustainable development is defined as developments that can accommodate the needs of not only direct but also indirect stakeholders of firms (such as investors, clients, staff members, etc.) while firms can satisfy demands of stakeholders in the future (Dyllick & Hockerts 2002, 131). Therefore, efforts toward a sustainable development has been of great importance for firms to compete successfully in the markets nowadays (Goyal et al. 2015, 23).

Additionally, the universally complicated environmental and social problems (e.g. violations of human rights, environmental degradation, income inequity) are hard to be solved solely by the governments, firms also play an essential role to address those issues (Hansen et al. 2009, 684). Firms exist because they offer helpful services or products to the society. Consequently, if corporations want to keep their social role and social power, they should try to meet the needs of the society. (Davis 1973, 314.) In other words, corporates are expected to become a better citizen in the society that they are operating their businesses (Orsato 2006, 128). Moreover, firms are considered the only institution that have various capabilities, technical power, far- reaching ability and considerable incentives to pursue sustainable economic growth (Hart 1997, 67). To achieve this mission, it is essential that firms have managerial actions which aim to create the balance of environmental and societal with financial profit (Dyllick & Hockerts 2002, 132). As a result, the term "Corporate Sustainability" has become well-known in academic literature because it covers a wide and strategic approach of business, which consists of economic, societal, moral principals and operation (Das et al. 2020, 110).

Corporate sustainability is argued to have three pillars (Dyllick & Hockerts 2002). First of all, it is the harmony of the societal, environmental and financial aspects. Gladwin et al. (1995, 896) critique that modern management theories have ignored the importance of biological and moral aspects of organizational activities and it has resulted in the destruction of nature as well as the society. If firms only focus on achieving the economic goal, they might succeed in the short term, however, a success in long term would need not only economic sustainability but also environmental and societal sustainability (Dyllick & Hockerts 2002, 132). In the same vein, Elkington (1998) introduced the Triple Bottom Line concept, in which firms should take into account the essential role of economic, environmental and societal sustainability in decision making process. Besides, the three dimensions of the Triple Bottom Line have interrelationships, hence there is a high possibility that they could have a certain impact on each other in various ways (Dyllick & Hockerts 2002, 132).

The second pillar of corporate sustainability is the harmony of the short-term and long-term interest. In order to realise three dimensions of sustainability, it is important that firms have a comprehensive and unified approach about matters related to those dimensions (Wilkinson et al. 2001, 1500). However, firms usually have a tendency to focus only on short-term interest rather than building a foundation that can enable them to gain more benefit in long-term. This tendency conflicts with the sustainable approach, which lies emphasis on both short-term and long-term benefits (Dyllick & Hockerts 2002, 132). Therefore, there is a need to have more support for practices related to sustainability within firms, which involves in decisions prioritizing medium to long-term sustainable gains (Wilkinson et al. 2001, 1500).

The final pillar of corporate sustainability is managing economic, natural and societal resource. It is argued that the calculation of income usage could be defined as “[giving] people an indication of the amount which they can consume without impoverishing themselves. Following out this idea, it would seem that we ought to define a man’s income as the maximum value which he can consume during a week, and still be expect to be as well off at the end of the week as he was at the beginning”. Hicks (1946.) At a firm level, companies could not remain their businesses if they do not have any economic capital and the unsustainable situation would come long before (Dyllick & Hockerts 2002, 133). Because economic capital plays a critical role in a prosperous business, it is essential that economic capital is well managed (Dyllick & Hockerts 2002, 132). However, giving attention to only the economic aspect is not enough to achieve a sustainable growth. It is of importance that firms contemplate about the natural and societal resources that they consume during the whole business process. An environmentally friendly and fair economy can only be realised when natural and societal resources are allocated efficiently (Gladwin et al. 1995, 893).

To conclude, corporate sustainability is a concept that integrates economic profit, which is usually the only goal of firms, with societal and environmental gains. It is believed to be an imperative factor behind companies whose performance is better than the average (Maletič et al. 2016, 1172). This concept highlights the link between the economic, societal and environmental aspects in both short term and long term. Besides, the interaction between internal and external stakeholders of firms are also given attention when corporate sustainability practices are implemented. (Lozano 2015, 33.) Enterprises that embrace corporate sustainability are argued to be able to improve the sustainability of their businesses in the long run. Moreover, corporate sustainability would help to design a shared socio-economic object that firms, authority and the society can work together to achieve a multilevel sustainability. (Das et al. 2020, 111.)

2.1.2 From eco-innovation to sustainability- oriented innovation

According to a definition proposed by OECD, innovation is "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations" (OECD 2015, 46). Innovation is considered as a major factor behind the robustness of firms (Cooper 2001). Moreover, it plays a crucial role in the competitiveness and competence of organizations. (Klewitz & Hansen, 2014, 1). The success of innovation was mainly measured by economic aspect. However, the strong emergence of corporate sustainability has had a certain impact on innovation management, which makes firms give more focus on non-economic aspect, such as social and environmental aspects (Hansen et al. 2009, 684).

The debate on efforts of organizations to pursue the corporate sustainability was centered on eco-innovation in the first place (Hansen et al. 2009, 58). The term eco-innovation was first presented by the project "Innovation Impacts of Environmental Policy Instruments" (Klaus Rennings 2000, 322). Many scholars argue that environmental issues have a strategic characteristic and firms would need internally critical innovations to tackle those issues (Aragón-Correa et al. 2008, 88). The argument is illustrated by the fact that there is an increase in the number of corporations recognizing ecological problems as a driving force for strategic changes and innovation (Noci & Verganti 1999, 3). However, research on such innovations is limited (Adams et al. 2016, 182). Besides, it is difficult to understand and have a clear definition of eco-innovation because this is an interdisciplinary subject (Maletič et al. 2016, 1173). To simplify this subject, we can think about it as practices that denote modern or improved products, production processes and organizational processes that could enable firms to reduce negative effects on the environment (Klaus Rennings, 2000; OECD 2005). If we further explain these innovations regarding the environmental aspect, we can divide it into three types: process innovation, product innovation and organizational innovation.

The first type of eco-innovation that would be discussed is process innovations. This innovation would allow firms to generate the same amount of output with less input (Rennings et al. 2006, 47). This can also be understood as eco-efficiency (Côté et al. 2006, 542). Process innovation can be redivided into innovations in end-of-pipe technologies and cleaner production technologies aka innovations in integrated technologies (Rennings et al. 2006, 47). End-of-pipe technologies are improver means, which enable firms to adhere to environmental regulations by reducing harmful emissions, whereas cleaner production technologies allow firms to curtail resources needed for production and/ or pollution at origin by applying cleaner manufacturing modes (Frondel et al. 2007, 572). For instance, end-of-pipe technologies could be water discharge treatment in the factories or filters that reduce detrimental particles created during the production process. Meanwhile, the adjustment of combustion engines to make it generate less noxious discharge is an exemplar of leaner production technologies. (Rennings et al. 2006, 48.) End-of-pipe technologies are argued to play a minor role in the production process (Rennings et al. 2006, 47) since cleaner production technologies are considered better than end-of pipe technologies in terms of both ecological and financial reasons (Frondel et al. 2007, 572). Additionally, cleaner production technologies could enable firm to enhance the eco-efficiency of the operation procedure (Altham 2007, 798).

The second type of eco- innovation is organizational innovation. It consists of activities that aim to cut down environmental damages by reorganizing the production process and obligations (Rennings et al. 2006, 48). Organizational innovations could enable firms to boost their growths since such innovations curtail operational and production cost and assist innovation initiatives (Cruz et al. 2006). Thanks to organisational innovations, firms could facilitate processes related to introducing both incremental and radical innovation, which results in not only environmental but also economic benefits (Murphy & Gouldson 2000, 37). One example of organizational innovation is the environmental management system, which is a decisive factor in the decrease of ecological degradation caused by firms (Poksinska et al. 2003, 585). Firms should have an integrated management system, which includes the management system and the environmental management system (Simon et al. 2013, 295) because it could generate considerable benefits by reducing cost and/or organizational capital usage (Zutshi & Sohal 2005, 212).

Product innovation is the third and also the last type of eco- innovation. Product innovation entails the enhancement of existing goods and services or the introduction of completely new goods and services (Rennings et al. 2006, 47). Recycle materials could be an exemplar of improvement in the textile industry, whereas sustainable technologies perfectly exemplify innovations of totally new products (Adams et al. 2016, 59). Thanks to the strong developments in various fields such as information technology, renewable resources, etc., firms would be able to introduce more sustainable product innovations nowadays. During the research and development for sustainable technologies, firms would have chances to strengthen their expertise, which is important to exploit opportunities and new markets. (Hart & Milstein 2003, 62.) Furthermore, negative impacts on the environment could be reduced by product innovation because of the use of sustainable products rather than the production of such products (Cheng et al. 2014, 82).

The debate that mainly focused on eco-innovation as a means of achieving sustainable growth gradually become a more extensive concept of sustainability (Maletič et al. 2016, 1173) as sustainability embodies a wider interest in societal and ethical aspects (Charter & Clark 2007). Consequently, there are more terms used in academic literature, such as sustainable innovation, sustainability-driven innovation, corporate social responsibility-driven innovation, etc. (Maletič et al. 2016, 1173.) Therefore, there is a need for an agreed name for such innovations. Although these terms apparently sound different, they offer one common thing about innovation. They all consider innovation as a critical path that leads to sustainable development, which requires careful and thoughtful governance. The term sustainability-oriented innovation (SOI) therefore seems to provide the best suitability (Klewitz & Hansen 2014, 59) when we talk about innovations that aim to reduce negative impacts that firms cause on the environment and the society in which they run their businesses. For years, eco- innovation has evolved to sustainability- oriented innovation. Hence, the term sustainability- oriented innovation would be used in the rest of this study because we need to look at this kind of innovation from a broader perspective than from only an ecological angle.

To summarize, there are three types of sustainability- oriented innovation, they are process innovation, product innovation and organizational innovation. Process innovations have a direct relationship with production activities whereas organizational innovations involve indirectly in the manufacturing process (Cheng et al. 2014, 83). Besides, process innovations could enable firms to cut down the material and energy consumption during the production process, while product innovation would introduce improvements in current products/services or entirely new products/ services. Three types of SOI are summarized in Figure 1.

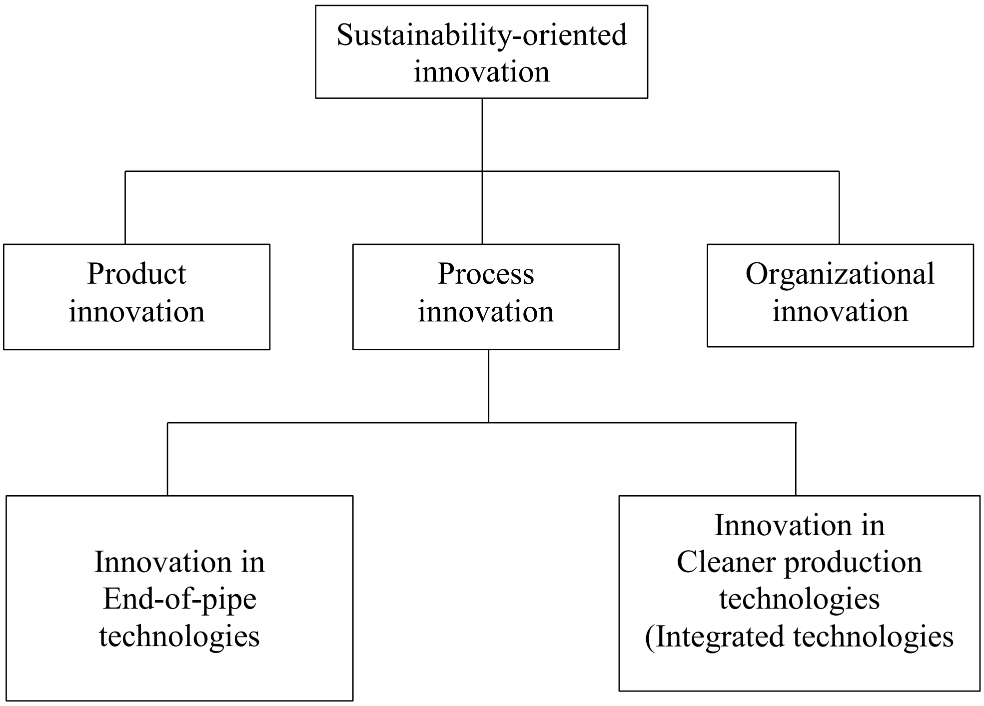

Figure 1 Types of sustainability- oriented innovation (Rennings et al. 2006, 47)

As illustrated in Figure 1, there are three types of sustainability- oriented innovation. They are: product innovation, process innovation and organizational innovation. Each type of sustainability-oriented innovation practice has a certain role in reducing environmental impact as well as the negative effect on the society. Furthermore, it is argued that those types of SOI have an interrelationship (Klewitz & Hansen 2014, 68). Hence, the way each dimension of sustainability-oriented innovation interact with each other will be discussed in the following sub-chapter.

2.1.3 Interaction between types of sustainability- oriented innovation

The previous sub-chapter offers fundamental views about three types of sustainability- oriented innovation that firms have been developing. While studying about these types of sustainability-oriented innovation, it would be valuable to acquire understanding about the interactions between them. Hence, this section will further explore the interaction between process innovation, product innovation and organizational innovation within organizations.

Noci & Verganti (1999) conducted a study on managing sustainability- oriented innovation in small firms, the result suggests that process and product innovations will interact with each other and this interaction will turn the moderate changes in manufacturing process to the eco-efficiency and the whole product life cycle will be improved in long-term. Besides, in a case study carried out by Suh et al. (2005), the authors argue that by identifying the main cost and ecological impact drivers, firms can use alternatives in the production process to reduce harmful emission and particles. This means that examining the effectiveness of eco-efficiency (process innovation) can result in changes of product's characteristics (product innovation). Additionally, thanks to the increased understanding about the importance of having sustainable attributes in products, process innovation can induce product innovation and this might also have a certain influence on the supply chain of companies (Bos-Brouwers 2010; Michelsen & Fet 2010).

Besides interaction with product innovation, process innovation could also have interactions with organizational innovation. Because those two innovations might complement each other, it is likely that their interaction would lead to a decrease in environmental impact (Gurbuz et al. 2004, 621). For example, proper managerial methods related to management innovation can assist firms to grasp understanding about and realise cleaner production (Klewitz & Hansen 2014, 68). By applying cleaner production in the production process, firms can archive advancements in both material and energy used and administration (Fresner 1998, 178–179). Moreover, environmental management systems can be connected to process innovation (Biondi et al. 2002, 618) to diminish adverse environmental impacts caused by firms, meet the demands of supply network and have better communication between contractors and suppliers (Pesonen 2001, 45). In addition, Parrish & Foxon (2009) carry out a study and find that new marketing and buying procedures are major factors behind the success in diffusing green energy. This result is an exemplar of how product innovation is linked to organizational innovation.

As three types of sustainability- oriented innovation have a certain interaction with each other, it is essential that there is a comprehensive approach toward sustainability- oriented innovation, which can also be understood as an interactive process connecting all types of SOI (Klewitz & Hansen 2014, 68). Table 1 gives examples that illustrate the interaction between process innovation, product innovation and organizational innovation.

Table 1 Interaction between three types of sustainability- oriented innovation (Adapted from Klewitz & Hansen 2014, 69)

Impact of	On…		
	Process innovation	Organizational innovation	Product innovation
Process innovation	The success of process innovation can trigger more engagements to improve production process considerably	Enhancements to production process might generate advantages of a comprehensive environmental management system	Cleaner production could result in eco-efficient products/ services (Van Berkel, 2007) By buying materials from regional suppliers, firms can collaborate with suppliers to develop products
Organizational innovation	Data provided by environmental management systems can be used to develop process innovation	Having an environmental team within organization might create more organizational changes	Environmental management system can play a key role in both life-cycle evaluation and developments, which lead to product innovation Having an environmental team would enable firm to increase cooperation among employees in developing eco-products
Product innovation	Radical developments in production process would enable firms to introduce more sustainable products (e.g., it is necessary to have inputs from organic agriculture to have verified organic products)	Developing and offering sustainable products might need a more comprehensive administration toward not only production chain but also supply chain (e.g. guidelines about purchase decisions)	Launching an (pilot) eco-product successfully might motivate firms to have a whole eco-product line or reconceive their traditional businesses

Although each kind of sustainability- oriented innovation has its own characteristics and ways of lessening environmental impacts (Christensen 2011), as can be seen from Table 1, each type of sustainability- oriented innovation has a certain impact on each other. Therefore, firms should apply organizational innovation consistently with process innovation and product innovation, this is also in line with the philosophy of total quality management (Augusto et al. 2014, 1142). Moreover, sustainability- oriented innovation should be approached comprehensively by all departments within firms rather than being the duty of only research and development department (Brunnermeier & Cohen 2003; Horbach 2008).

2.1.4 Sustainability-oriented innovation in the SME context

SMEs include companies with different sizes and sectors (Hillary 2006, 241). However, defining SMEs is a challenging task because the criteria are different among countries (e.g. number of employee, turnover, etc.) (Klewitz & Hansen 2014, 59). The number of employees is argued to be one of the most important things that differentiates SMEs from big firms (Davig & Brown, 1992). Therefore, it is commonly used as a criterion to determine an SME. Because this study is conducted in Vietnamese market, where companies with 1-249 employees are classified as SME (OECD 2021), when we discuss SMEs in this study, it can be understood that those companies have 1-249 staff in total.

The majority of existing research related to innovation and sustainable growth of organizations focus on big corporates (Bos-Brouwers 2010, 418). However, there are several reasons that make it important to get more understanding about sustainability- oriented innovation in SMEs environment. First of all, the number of SMEs accounts for a great portion of total number of corporates according to a report of the Organization for Economic Cooperation and Development (OECD). Specifically, nearly 97% of firms are SMEs (OECD, 2002). Another reason is that a big percentage of pollution is caused by SMEs (Hillary 2000). It is estimated that roughly 64% of pollution in the EU is the result of SMEs activities (ECEI, 2010). Hence, the impact of SMEs activities on the environment is considered substantial (DG ENTR 2004).

Unfortunately, numerous SMEs hold the view that effect on the ecosystem that they create is very small and there is no reason that they should improve their business activities to enhance environmental quality (Bradford & Fraser 2008; Drake et al. 2004; Pimenova & van der Vorst 2004). They also expect other institutions such as regional authority or government to tackle environmental problems (Revell & Rutherfoord 2003, 29). Consequently, the essential part of SMEs in environmental protection was discounted (Bos-Brouwers 2010, 418).

Moreover, the innovation process and innovation capacity of SMEs is dissimilar to that of big corporations (Bos-Brouwers 2010, 419–420). The differences can be explained by the attributes of SMEs and big firms, which are presented in Table 2.

Table 2 Characteristics of SME and big company (Bos-Brouwers 2010, 419)

SME	Big company
The owner plays a prominent role in the company	Owners are not the one directly controlling everything, there are managers managing the company
Needed resources (e.g. capital, human, etc.) are scarce	Needed resources are substantial
Pay more attention to short- term than long-term	Focus is given to mid to long-term
The capability is adjustable	Level of bureaucracy is high
Put local/ regional business at the center and have customer- centric approach	Focus on both international and domestic market
Level of formalization is inconsiderable	Level of formalization is significant

The main drawbacks of SMEs, such as lack of resources and limited ability to get financial support, are likely to hinder SMEs from actively making movements towards innovation (Del Brio & Junquera 2003, 941–942). For this reason, SMEs are usually considered not an active actor in addressing environmental and societal problems (Klewitz & Hansen 2014, 59). A remarkable characteristic of SMEs is that they lack the ability to incorporate all aspects of the innovation procedure (Maillat 1990). Luckily, there are some things that SMEs can do to overcome this disadvantage. For instance, by expanding networks or joining an ecosystem, SMEs can get closer to cutting- edge technologies and increase their competence. These are the hard things to get due to the shortage of resources. (Dosi 1988, 1132.) Moreover, when SMEs seek for collaboration, they would increase the possibility of mitigating risks, curtailing expenditure, acquiring more information on the market, expanding international markets and improving requirements of the industry (Wissema & Euser 1991, 35).

However, being an SME has its own advantages and disadvantages that would affect the innovation capability in some ways. The advantages and disadvantages of SMEs are summarized in Table 3 below.

Table 3 Innovation capability of SMEs and big companies (Bos-Brouwers 2010, 420)

<table>
<tr><th></th><th>Advantages</th><th>Disadvantages</th></tr>
<tr><td rowspan="3">SME</td><td rowspan="2">Organizational structure
Level of bureaucracy is low
Reactions to changes are quick and positive
Internal communication is effective</td><td>Owner/ Manager
Lack of managerial expertise
Lack of strategic planning for long-term</td></tr>
<tr><td rowspan="2">Financial resource
Challenging to receive financial support (investment) from institutions
The financial situation will be extremely bad if innovation plan is unsuccessful
Expenditure for investment in new technologies is significantly substantial</td></tr>
<tr><td rowspan="2">Owner/ Manager
Having entrepreneurial mindset
Horizontal leader
Engaging actively in innovation process</td></tr>
<tr><td></td><td>Human resource
Problematic to employ experts
Difficult to update knowledge about technology</td></tr>
<tr><td rowspan="3">Big company</td><td>Financial resource
Easier to get investment from financial institutions
A diverse portfolio of innovation schemes will enable the company to reduce risk</td><td>Management
Distance between customers and top managers is too far
Focus on reducing expenditure instead of investing in infrastructure for the long-term</td></tr>
<tr><td>Human resource
Easier to hire professionals</td><td>Human resource
No entrepreneurial mindset</td></tr>
<tr><td>Knowledge
Have more chances to build up network and acquire knowledge of new technology</td><td>Organizational structure
Level of bureaucracy is high</td></tr>
</table>

	Advantages	Disadvantages
Big company	• Have professional system to manage information **Management** • Have strategic plans for long-term	

As can be seen from the Table 3, there are values in SMEs that big corporates rarely have, they are the entrepreneurial culture and lean operation process (Darnall et al. 2010, 1073). It is argued that the horizontal structure, in which decisions can be made by low-level managers, plays an essential role in developing innovation (Rothwell 1992, 224). With the lean structure of SMEs, owners or managers are usually decision makers, which could be the important factor in progress towards innovation (Hartman et al. 1994). As a result, SMEs are likely to have a leverage that would enable them to develop radical innovations and achieve a high position in niche market if they pursue sustainability- oriented innovation (Schaltegger & Wagner 2011, 229). Overall, it can be said that firm size would bring companies not only the advantages but also disadvantages, which have certain impacts on the innovation capacity of firms.

2.2 Corporate performance

Corporate performance is a multi-dimensional system that includes different types of performance, such as financial performance, innovation performance, quality performance, corporate environmental performance, corporate social performance, etc. (Maletič et al. 2016). Because the interest of this study is in corporate environmental performance and corporate social performance, these performances will be discussed in sub-chapter 2.2.1 and 2.2.2 respectively.

2.2.1 Corporate Environmental Performance

Many stakeholders of firms, such as investors, employees, customers, partners and the society are having more interest in corporate environmental performance as environmental monitoring plays an essential role in the strategy toward a sustainable development (Bhattacharyya & Cummings, 2015, 309). However, there is a lack of a clear and consensual definition of corporate environmental performance, although there are many studies about this concept (Etzion 2007). Furthermore, it is argued that defining corporate environmental performance is not a simple job (Ilinitch et al. 1998, 386). To solve this problem partially, Trumpp et al. (2015) conduct a comprehensive literature review by searching for online academic articles that have titles, abstracts or keywords consisting of the term "environmental performance". The authors find 133 articles that meet the requirements and 16 of them provide the definition of corporate environmental performance explicitly. The astonishing results reveal that there were numerous studies related to corporate environmental performance but they could not define it clearly (Trumpp et al. 2015, 188). The authors also find that there are 5 articles providing the definition of corporate environmental performance by using the definition of corporate environmental performance in ISO 14031; the other 11 articles give the readers completely different definition of corporate environmental performance in terms of concept and features. The findings of research conducted by Trumpp et al. (2015, 189) are presented in a shorten form in Table 4.

Table 4 Explicit definition of corporate environmental performance (Adapted from Trumpp et al. 2015, 189

Author	Definition					
Judge& Douglas (1998)	efficiency	of	organization's	engagement	to achieve	ecological greatness
Klassen& Whybark (1999)	number	of	factory's			harmful substance
de Burgos Jiménez & Céspedes Lorente (2001)	contraction	of	firm's			ecological devastation
Wagner& Schalter (2003)	achievement	of	organization		regarding	environmental facet
Elsayed (2006)	outcomes	of	corporation's	positive reaction	to	the environment
Salo (2008)	economic gain	of	organization's	administration	of its	environmental aspect
Ienciu& Napoca (2009)	degree	of	corporation's	actions	regarding	environmental damage
López-Gamero et al. (2009)	result	of	managerial activities		toward	the environment
Clemens & Bakstran (2010)	level	of				ecological damage
Yang et al. (2011)	level	of	firm's	responsibilities	toward	the environment
Walls et al. (2012)	result	of	corporation's	key actions	on	environmental devastation
ISO 14031	"result	of	organization's	management	of its	environmental aspects"

As can be seen from Table 4, there is one attribute that could be noticed in 11 articles: the result of administration activities related to the environment and the activities themself are usually at the center of corporate environmental performance definition. This is similar to the definition of corporate environmental performance in ISO 14031, which defines it as “the results of an organization’s management of its environmental aspects”. It therefore can be argued that the definition provided by ISO reflects the most crucial point of the 11 definitions. (Trumpp et al. 2015, 188.) It is argued that a good definition should express the important features and aspects of the concept as pithily as possible; avoid the use of words that convey the same meaning in an unnecessary way (Suddaby 2010, 347). Because the definition of corporate environmental performance provided by ISO 14031 includes the most essential features and it is concise, it fulfils the requirements of a good definition and could be viewed as an accepted definition of corporate environmental performance (Trumpp et al. 2015, 188).

2.2.2 Corporate Social Performance

The term “corporate social performance” has appeared in academic literature for nearly 50 years. Sometimes it is understood as corporate social responsibility, corporate social responsiveness or corporate citizenship. However, corporate social performance realm itself is still vague, not solid and challenging for researchers. (Wood 2010, 50).

The concept of corporate social performance is developed from the view of Boulding (1956) about big corporations. Boulding (1956) sees corporations as open system, which have connections with the ecological surroundings. He is also one of the first scholars to point out that firms are complex and open entities (Scott 2003, 17–18). In an open entity, material is taken from the environment and emission is released to the environment. Hence, the damage and the gain that a firm could have from their activities with the environment are the main interest of corporate social performance. This concern of corporate social performance implies that firms should take actions to enhance the prosperity and reduce the pollutants caused by their business activities. If firms do not do it seriously, they could face a shortage of important materials, the authority of controlling their business operation could be questioned. Moreover, things can get even worsen as their legitimacy would be rejected and the firms could not have any chance to operate their business. (Wood 2010, 51).

Corporate social performance is formed by three dimensions: corporate societal responsibility, corporate societal responsiveness and societal problems (Carroll 1979). This model is illustrated in figure 2 below.

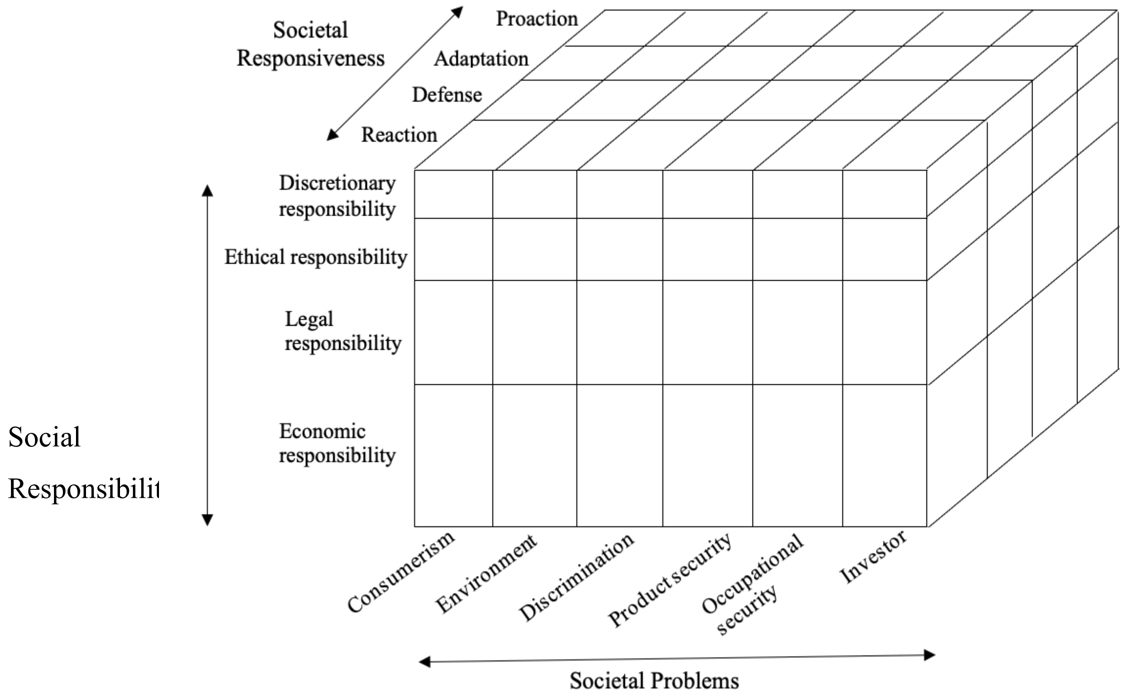

Figure 2 Corporate Social Performance (Carroll 1979, 503)

The fundamental concept of corporate social responsible is that corporates and the society are integrated, hence the public place some expectations on firms in terms of their business activities and results (Wood 1991, 695). In this corporate social performance model, societal responsibility includes responsibilities related to the economy, ethic, philanthropy and public policy rather than seeing them as separate responsibilities. Besides, the model reveals that there are interconnections among categories of societal responsibility, procedures of societal responsiveness and the legislations solving societal problems instead of considering them as disconnected business matters. (Cochran & Wartick 1985, 758).

By providing a further definition of societal responsibility and including the procedure of societal responsiveness and legislations on societal issues, the corporate social performance model proposed by Carroll (1979) illustrates the comprehensive attempt of firms to fulfil their societal commitments (Cochran & Wartick 1985, 758). Moreover, this model has an underlying dimension: the focal point is the linkage between corporates and their business environment instead of the connection between firms and the society in which they run the business (Jones 1983).

There is also another prominent model of corporate social performance. This model includes three critical elements (Wood 1991a). The first one is the corporate social responsibility. This responsibility is further divided into three sub-categories, they are: the legitimacy of the business within the society, responsibility of businesses toward the public and the managerial discretion that all employees in the organization exercise. The second element is the operation of corporate social responsiveness which consists of the ecological evaluation, stakeholder administration and problem management. The last element focuses on the result of business activities and entails impacts on the society, corporate programmes and policies for the society. It is argued that societal problems, ecological tension and stakeholder interest are likely to have certain influences on the decision making of firms and their activities in the long run. Corporate social performance therefore plays a decisive role in all corporations (Wood 1991b, 400).

2.3 The effect of sustainability- oriented innovation on corporate environmental performance

Innovation in general is a decisive factor behind the strong competitiveness and growth of corporations nowadays (Klewitz & Hansen, 2014, 1). Sustainability- oriented innovation in particular is considered one of the most critical practices to achieve corporate sustainability and improvements in products/services, production and management (Maletič et al. 2016, 1171). However, the question concerning whether sustainability- oriented innovation has a certain impact on environmental performance of corporations is paid scant attention (Yan & Zhang 2021, 35870). In addition, the debate surrounding the effect of sustainability- oriented innovation on corporate environmental performance has been lasting for a long time (Lee & Min 2015, 534).

In existing academic literature, there are two school of thoughts about this matter. The traditional one argues that investment in sustainability- oriented innovation only pushes up costs and there would not be any economic gain (Ambec & Lanoie 2008; Palmer et al. 1995). Some scholars state that sustainability- oriented innovation might enhance corporate environmental performance in the first place. However, it would lead to an increase of energy and material consumption, which results in environmental deterioration in the long term (Barbieri et al. 2016; Bergh et al. 2011). Moreover, in some cases, firms see sustainability- oriented innovation as a way to fulfil expectations of stakeholders and comply with legislations rather than a practice that can enable them to indeed enhance corporate environmental performance (Yan & Zhang 2021, 35870).

Conversely, scholars in the second school of thought point out that investing in sustainability-oriented innovation would lead to not only financial but also environmental benefits in the long run, which is a win-win situation (Aragón-Correa et al. 2008; Porter & van de Linde 1995b; Sambasivan et al. 2013). So far, most research in this field have argued that sustainability- oriented innovation has a positive effect on corporate environmental performance (Yan & Zhang 2021, 35871). For example, to investigate the effect of sustainability- oriented innovation on corporate environmental performance, Lee & Min (2015) measure R&D investment in green technology (a key proxy of sustainability- oriented innovation) and the carbon discharge (a proxy of corporate environmental performance) of Japanese firms in a period of 10 years. The result reveals a negative relationship between them, which means that sustainability- oriented innovation does have a positive effect on corporate environmental performance. This result is supported by a research carried out by Ghisetti & Quatraro (2017). The authors conduct a cross-sectoral study on Italian companies over a 5-year period and find that the effect of sustainability- oriented innovation on corporate environmental performance is significant and positive. The authors also argue that the impact of sustainability- oriented innovation on corporate environmental performance is explicit and moderated by the need for sustainability- oriented innovation. Hence, this study proposes a hypothesis that sustainability- oriented innovation has positive effect on corporate environmental performance. However, the study aims to deeply explore the effect of each type of sustainability- oriented innovation on corporate environmental performance. Therefore, the effect of product innovation, process innovation and organizational innovation on corporate environmental performance are suggested as hypotheses 1a, 1b and 1c respectively.

Hypothesis 1a: Product innovation has a positive effect on corporate environmental performance.

Hypothesis 1b: Process innovation has a positive effect on corporate environmental performance.

Hypothesis 1c: Organizational innovation has a positive effect on corporate environmental performance.

2.4 The effect of sustainability- oriented innovation on corporate social performance

To satisfy the need of customers, it is important to unify innovation and other business activities (Jean & Oltra, 2009, 579). As fulfilling customers’ expectation is consider an important element of corporate social performance, it can be argued that innovation has a positive effect on corporate social performance (Ezzi & Jarboui, 2016, 17). Another way to improve corporate social performance is to enhance green publicity. Green publicity is the share of information related to sustainability- oriented innovation through social flatforms, municipal news or corporate web page. A high level of green publicity would lead to less information unreliability and inequality. It means that public would be given more transparent information about sustainability- oriented innovation and the management of sustainability- oriented innovation could be enhanced.

Furthermore, by providing investors with green publicity, investors would gain more knowledge about sustainability- oriented innovation practices that firms are following. As a result, public and investors are pleased with business activities of firms, which certainly improves firm performance and corporate social performance. (Li et al. 2020, 6.) In addition, by addressing environmental issues, firms could gain more benefits as they can improve stakeholder satisfaction, hire good employees and enhance innovation. These things are considered key factors behind a strong corporate social performance. (Wagner 2013.) A study conducted by Beaver et al. (1996) supports this argument as the result shows that R&D investment has a significant and positive effect on stakeholder satisfaction. Results from a study carried out by Ezzi & Jarboui (2016) are also aligned with the above-mentioned argument. In that study, the authors examine the effect of expenditure in R&D, which represents the intensity of innovation, on social performance of 96 Tunisian companies. The findings reveal that there is a significant and positive relationship between innovation and corporate social performance.

However, consensus on this matter has not been reached yet as innovation could sometimes be risky, which would lead to increased cost and lower employee satisfaction (Simpson et al. 2006). It therefore could be argued that sustainability- oriented innovation has a negative effect on corporate social performance. These contrast arguments represent the complexity in this matter and more studies are needed in this field. However, the vast majority of empirical research so far have showed that the implementation of sustainability- oriented innovation has a positive effect on corporate social performance. (Ezzi & Jarboui, 2016, 17.) With reference to the existing research, this study proposes the hypotheses as below:

Hypothesis 2a: Product innovation has a positive effect on corporate social performance.

Hypothesis 2b: Process innovation has a positive effect on corporate social performance.

Hypothesis 2c: Organizational innovation has a positive effect on corporate social performance.

2.5 Preliminary Framework

The literature review in previous parts provides fundamental knowledge about sustainability-oriented innovation, corporate performance regarding corporate environmental performance and corporate social performance. Besides, it offers an overview of different perspectives about the effect sustainability- oriented innovation has on corporate environmental performance and corporate social performance. Although most of prior studies suggest that sustainability- oriented innovation positively affects corporate environmental performance and corporate social performance, there are still scholars concerning about these effects. Therefore, the purpose of this study is to investigate these effects by conducting empirical research. At this stage, a preliminary framework (Figure 3) is created based on the majority results of prior research and serves as a foundation for further exploration.

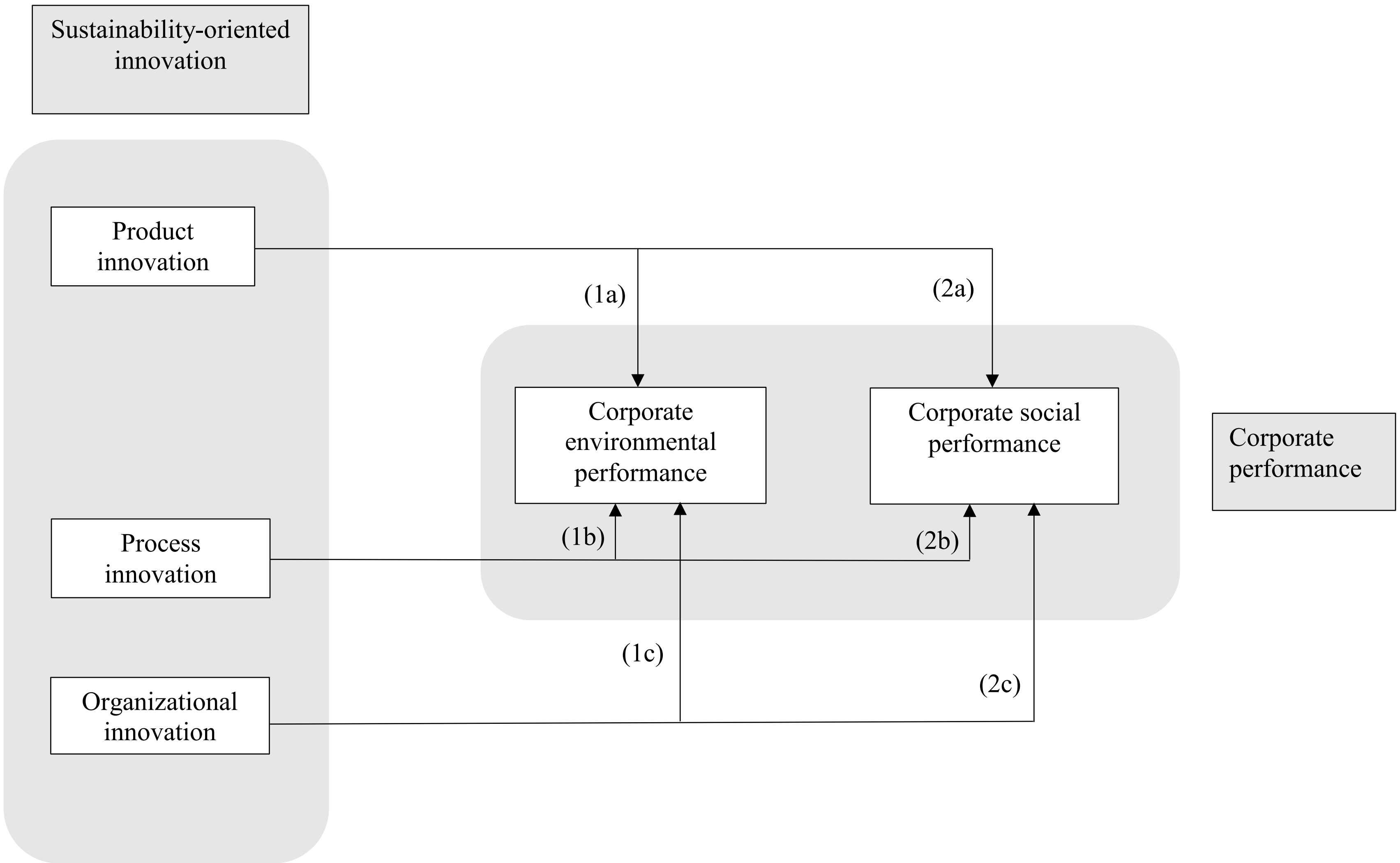

Figure 3 Preliminary framework

3 METHODOLOGY

3.1 Research approach

The choice of research methodology is affected by the quality of research question, the level of knowledge that the author obtains in a certain situation and the degree of attention to the current event (Yin 2003, 5). By considering these factors, researchers can select qualitative or quantitative or a mix of quantitative and qualitative approach (Silverman 1997, 12–25). Qualitative method aims to know perspective of people about particular topics (Myers 2013, 7–8) and provide a holistic understanding about them. In doing so, researcher has to have good interaction with people by conducting interview and observing them (Fisher 2010, 69). Data collection and data analysis are usually context-sensitive in this research approach (Eriksson & Kovalainen 2008, 5). In comparison, the goal of quantitative research is "testing objective theories by examining the relationship among variables" (Creswell 2014, 32). This approach put focus on data in form of numbers and statistical methods are an important means of analysing data. Besides, existing literature serves as a foundation for the deductions of hypotheses, which would enable researchers to assess the literature in real world (Gillham 2010, 9). By conducting quantitative research, researcher could investigate the correlations between given variables and consequences (Choy 2014, 99). The aim of this study is to explore the effect of sustainability- oriented innovation on corporate environmental performance and corporate social performance. Therefore, quantitative method is an appropriate approach.

3.2 Data collection

Most research related to this topic use survey as the data collection method. Survey is considered an effective tool when researchers aim to get to know perspectives, mindsets or causal relationship. In addition, by using survey, researchers would be able to have significant resources of data from a large population. (Saunders et al. 2003, 92.) Data collected in the survey would represent the percentage of a particular way of acting or thinking among respondents (Fisher 2010, 207).

Survey research can be divided into three types, which are confirmatory, exploratory and descriptive. The confirmatory survey would enable researchers to collect enough data to prove the truth of theories linked to a particular phenomenon. Evaluation of the links among variables and the direction of relationship are the focal points of confirmatory survey research. Exploratory survey would be useful when researchers intend to acquire basic understanding about a phenomenon so as to prepare for more comprehensive study. Descriptive survey would be an appropriate choice when researchers aim to examine attributes of a phenomenon by investigating the links among variables and its percentage in the population. (Forza 2002, 155; Williams 2007, 66). Besides, questionnaire is viewed as an effective means in descriptive research (Saunders et al. 2003, 281) and would enable researchers to evaluate whether the correlation is substantial or incidental (Fisher 2010, 69). As the purpose of this study is to explore the relationship between sustainability-oriented innovation and corporate performance, descriptive survey is chosen as a method of data collection. Hence, this study would utilize questionnaire to gather data.

3.2.1 Conducting survey

When using survey to collect data, it is crucial that questionnaire is designed carefully in order to enable respondents to understand questions easily. If questions are too complicated, it would be difficult for respondents to interpret the questions correctly and question would be answered randomly as a result. (Kumar 2005, 126). Questions in the questionnaire of this research are pre-coded and presented in the five- point Likert scale. Questions are selected from existing study related to the research questions, then checked by supervisors and a quantitative specialist. Because the targeted respondents of this study are companies in Vietnamese market, questions are translated to Vietnamese in a way that full meaning is assured. When questions are translated into a language, it is important that wording is given consideration; otherwise incident such as item nonresponse or response error might occur (Malhotra et al. 2006, 338). Another point which is also important when designing questionnaire is the length of the survey. The length is argued to have a certain impact on the response rate. More specifically, if the survey is too long, the completion rate would be lower compared to a shorter one (Ghauri & Gronhaug 2002, 97). Therefore, the questionnaire of this study includes only questions which are critical for the investigation. The survey can be completed within maximum 10 minutes. To reduce the confusion of respondents when answering questions, a 5-point Likert scale is used for most questions. An online questionnaire is created by using Webropol, then sent to respondents via emails and social media platforms.

In Vietnamese market, 47% of the labour force is working for SMEs and 36% of national value added is contributed by SMEs. Furthermore, 91% of biggest SMEs are firms working in manufacturing industry, it suggests that manufacturing firms are the essential part of the economy. (OECD 2021.) Target respondents of this study are selected based on 2 criteria. First of all, the study aims to investigate the effect of sustainability-oriented innovation on environmental performance and social performance of SMEs. Thus, only respondents working in a SME were accepted. During the data collection process, there were 9 respondents from large firms, they were excluded from the sampling size as a result. Secondly, sustainability-oriented innovation practices include three dimensions, which are product innovation, process innovation and organizational innovation. Hence, the questionnaire was sent to firms which have production process, firms working in service industries were not targeted.

It took the author nearly 5 weeks to finish the data collection process. The very first questionnaire was sent out on 07.02.2022. Until 19.3.2022, there were 102 respondents in total. However, as mentioned before, 9 of them were big firms, which were not qualified for this study. Hence, there were 93 respondents selected for further data analysis. The response rate and sample distribution are illustrated in Table 5 and Table 6 respectively.

Table 5 Response rate

Approaching method	Questionnaire sent	Questionnaire received	Response rate (%)
Email	112	37	33.04
Social media		56	

As can be seen from Table 5, the response rate of email method is quite low. There were 112 emails sent to SMEs regarding the survey but the number of responses was only 37. The author noticed that there were more responses from social media compared to email. Therefore, the questionnaire links were posted in many groups related to manufacturing industry and shared to social media accounts of people working in manufacturing companies in order to increase the number of respondents. Consequently, nearly 60% of responses was acquired from social media platforms. However, the downside of using social media for the survey is that it is impossible to determine the number of people in the sample. Hence, to calculate the response rate of this research, the number of people who answered the survey via email (37) was divided by the number of people who got the email (112), which led to a response rate of 33.04%.

Additionally, the ethical principles for research were also taken into consideration during the data collection process. First of all, in the beginning of the questionnaire, everyone would see information about the content of this study and how personal data would be processed. All information was given in Vietnamese to enable them to understand easily and correctly. Secondly, the author let everyone participate in the research voluntarily. In so doing, the author designed one part for electronic consent. To be specific, after reading information about content of the study and personal data processing, people could choose to click on the “Agree” option, which indicated that they voluntarily agreed to participate in the survey. If they did not wish to participate, they could choose the “Disagree” option. Only people who chose to voluntarily participate would be led to the next page of the questionnaire, where all questions were revealed. Thirdly, it was clearly mentioned in the invitation letter that if respondents had any questions concerning the research, they could contact the author to get their questions addressed. There were some questions regarding sustainability-oriented innovation practices and they were all replied by the author via social media platforms. Last but not least, all participants were notified that they had the right to withdraw from the research at any point if they wished, without facing any negative results.

When the data collection process was done, respondents were classified based on firm size and firm age. Table 6 below offers an overview about how respondents are distributed.

Table 6 Sample distribution

Variable	Category	Frequency	Percent	Total	Cumulative percent
Firm size	50-99 employees	12	12.9	93	12.9
	100-149 employees	18	19.4		32.3
	150-199 employees	30	32.3		64.5
	200-249 employees	33	35.5		100.0
Firm age	0-4 years	4	4.3	93	4.3
	5-9 years	37	39.8		44.1
	10-14 years	24	25.8		69.9
	15-19 years	5	5.4		75.3
	20+ years	23	24.7		100.0

As illustrated in Table 6, the vast majority of answers was collected from SMEs that have 200- 249 employees as this group accounts for 35.5% of total respondents. Besides, firms established a long time ago are dominant in the sample. The number of firms that have been running business for 10-14 years and more than 20 years are 24 (25.8%) and 23 (24.7%) respectively.

3.2.2 Measurement

There are three types of variables in this study: dependent, independent and control variables. The control variable can be divided into two constructs: firm age and firm size. To measure dependent and independent variables, a list of items is created based on previous research (see Table 7).

Table 7 Operationalization summary

Variable		Literature (Chapter)	Surveyed question	Author
Independent	Sustainability-oriented innovation	3.1.2	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	Chen et al. (2006); Chen (2008); Roper &Tapinos (2016); Maletič et al. (2016)
Dependent	Corporate environmental performance	3.2.1	12, 13,14, 15, 16, 17, 18, 19	Sambasivan et al. (2013)
	Corporate social performance	3.2.2	20, 21, 22, 23	Maletič et al. (2016) Cheah et al. (2019)
Control	Firm size, firm age		24, 25	Ezzi & Jarboui (2016)

Respondents were required to give their answers relating to dependent and independent variables by applying a five-point Likert scale. The questionnaire of this study can be found in Appendix 1. All answers of respondent were scored when the data collection process finished. Besides, all measurement instrument of both dependent variables and independent variables would be examined their scale reliability and construct validity with factor analysis. More detail of the analysis is given in the sub-chapter 4.2.1, 4.2.2 and 4.2.3.

3.2.2.1 Independent variable

Independent variable in this study is the sustainable-oriented innovation. There are two approaches usually used to measure innovation level of an organization, they are the objective and subjective approach (Archer et al. 2020, 4). In the objective approach, innovation level is represented by some proxies, such as investment in research and development (Coad & Rao 2010), amount of patents and/or the number of citations related to patents owned by company (Hottenrott et al. 2016, 1). Because R&D expenditure and patents are considered as input of an organization, the objective approach is seen as input-based. In contrast, subjective approach is output-based. (Archer et al. 2020, 4.) The reason is that this approach uses firm's report, which are relating to its innovation effort, to measure the level of innovation (Efthyvoulou & Vahter 2016). The objective approach, however, has several disadvantages that make it unfavoured. The first reason is that the number of patent or citation of patent cannot denote innovation degree because it is hard for all companies to have enough resources and capabilities to obtain patents (Archer et al. 2020, 4.) Moreover, it would be a bias if researcher uses R&D cost to represent innovation, especially in the context of small companies as they usually have no intention of spending time and money on R&D process (Archibugi & Sirilli 2000). This is also true for domestic companies in emerging markets because they are more likely to face financial restraint, which hinders them from investing in R&D activities (Gorodnichenko & Schnitzer 2013, 1117). Because data of this study is collected from SMEs in an emerging market, the subjective approach would be a suitable choice to measure the level of sustainability-oriented innovation.

However, there is a lack of an agreed scale for sustainability-oriented innovation measurement (Maletič et al. 2016, 1176). Therefore, the domains of this construct are selected based on a literature review of prior research in this field (e.g. Chen et al. 2006; Chen 2008; Roper & Tapinos 2016; Maletič et al. 2016; Wang 2019). As sustainability-oriented innovation are divided into product innovation, process innovation and organizational innovation, items used to measure them are categorized accordingly. To be specific, a five- point Liker scale represents the level of sustainability-oriented innovation practices was given to respondents. The range of the scale was from "Strongly disagree" to "Strongly agree". There were eleven items in total, three of them were designed for product innovation, three were for process innovation and the last five items were decicated for organizational innovation.

Firstly, to measure the degree of product innovation practice, the following items were used: (1) "Our company uses substances that cause less/ don't cause harmful effect to people and the environment"; (2) "Our company makes the packaging better by using eco-friendly material for both current and new products"; (3) "Our company utilizes products that are at the end of their useful lives (e.g. recycling them)". Secondly, items relating to process innovation practice were: (1) "Our company uses little amount of energy (i.e. water, electricity, gasoline) for production/ operation/ dumping process"; (2) "Our company uses recycled substances"; (3) Our company uses cleaner technology to save energy and avoid environmental degradation". Finally, these were the items for organizational innovation in the questionnaire: (1) "Our company changes the operation and production procedure to make sure that efficiency will increase"; (2) "Our company changes the designs of products/ services to fulfil environmental legislations"; (3) "Our company makes determined attempts to ensure that all employees know it is important to conserve the environment"; (4) "Our company has straightforward declaration that encourages the increase in environmental consciousness among employees"; (5) "Our company looks for innovative ideas to enhance sustainability from partners, suppliers, customers, etc."

There were two tests conducted for items related to sustainability-oriented innovation practice, they were the validity and reliability tests. The construct validity was tested with exploratory factor analysis, the rotation method was orthogonal (varimax). Cronbach's alpha was the selected method to test the scale reliability. The result of factor loading and factor analysis is showed in Table 8 and Table 9 respectively while result of Cronbach's alpha test can be found in Table 10.

Table 8 Factor loading of independent variable

	Factor 1: Organizational innovation	Factor 2: Product innovation	Factor 3: Process innovation
Our company uses substances that cause less/ don't cause harmful effect to people and the environment		.703	
Our company makes the packaging better by using eco-friendly material for both current and new products		.880	
Our company utilizes products that are at the end of their useful lives (e.g. recycling them)		.729	
Our company uses little amount of energy (i.e. water, electricity, gasoline) for production/ operation/ dumping process			.580
Our company uses recycled substances			.891
Our company uses cleaner technology to save energy and avoid environmental degradation			.672
Our company changes the operation and production procedure to make sure that efficiency will increase	.672		
Our company changes the designs of products/ services to fulfil environmental legislations	.769		
Our company makes determined attempts to make all employees know that it is important to conserve the environment	.706		
Our company has straightforward declaration that encourages the increase in environmental consciousness among employees	.721		
Our company looks for innovative ideas to enhance sustainability from partners, suppliers, customers, etc.	.683		

Table 9 Factor analysis of independent variable

	Total variance explained (%)	KMO	Bartlett's Test of Sphericity
Sustainability-oriented innovation	66.39	0.862	426.44*
Product innovation (3 items)	68.9	0.646	99.52*
Process innovation (3 items)	66.78	0.674	54.46*
Organizational innovation (5 items)	84	0.828	154.32*

*p< 0.001

Table 10 Result of reliability test of independent variable

	Cronbach's alpha
Sustainability-oriented innovation	0.879
Product innovation (3 items)	0.796
Process innovation (3 items)	0.714
Organizational innovation (5 items)	0.822

As can be seen from Table 8, the loading factors of all items exceed 0.5. In addition, Table 9 shows that the exploratory factor analysis provides satisfactory results of total variance explained (TVE), Kaiser–Meyer–Olkin test (KMO) and Bartlett's Test of Sphericity ($\chi 2$) (TVE= 66.39%, KMO= 0.862, $\chi 2$= 426.44, p= 0.000). The Cronbach's alpha in Table 10, which represents the internal consistency of 11 items of sustainability-oriented innovation is 0.879, which is greater than the suggested threshold of 0.7 (Hair et al. 2010). Therefore, it can be said that the scale used to measure sustainability-oriented innovation practice is reliable and important factors of theory are included in the questionnaire.

3.2.2.2 Dependent variable

Dependent variables in this study are two types of corporate performance: corporate social performance and corporate environmental performance.

Similar to measuring level of sustainability-oriented innovation, there is no consensus of standard items that could be used to measure the impact of sustainability-oriented innovation on corporate performance. Therefore, a review of existing study is conducted to find out suitable measuring items. The effect of sustainability-oriented innovation on corporate environmental performance and corporate social performance are investigated with 9 items and 4 items respectively. These items are operationalised in previous studies (e.g. Sambasivan et al. 2013; Maletič et al. 2016; Cheah et al. 2019; Wagner 2019). A five- point Likert scale was designed to evaluate the impact of sustainability-oriented innovation practices on corporate environmental performance and corporate social performance. Respondents had five options ranging from "A lot worse" to "A lot better".

The following items were used to assess the impact of sustainability-oriented innovation practices on corporate environmental performance: (1) "The use of raw material"; (2) "The consumption of electricity, gasoline, other energy"; (3) "The discharge from production procedure"; (4) "Carbon dioxide emission"; (5) "Water consumption"; (6) "Unexpected damages"; (7) "Other discharges"; (8) "Toxic material usage"; (9) "Overall decrease in polluting discharge". Effects of sustainability-oriented innovation on corporate social performance was evaluated with 4 items: (1) "Employee turnover rate has declined during the last three years"; (2) "Job satisfaction has raised during the last three years"; (3) "Staff encouragement has raised during the last three years"; (4) "We support more disadvantaged people or addressing environmental issues". Totally, the scale had 12 items to measure corporate performance.

The scale had to undergo exploratory factor analysis and Cronbach's alpha test to assess the level of validity and consistency. Overall, the factor analysis shows good results of total variance explained, KMO and Bartlett's Test of Sphericity (TVE=66.807, KMO= 0.885, $\chi 2$=721.218 with $p <0.001$). Besides, factor loading of all items has value greater than 0.5. These results therefore confirm the existence of two dimensions of corporate performance in this study. Furthermore, both corporate environmental performance and corporate social performance have a good score of reliability test (Cronbach's alpha) at 0.897 and 0.790 respectively. The detailed result of factor loading, exploratory factor analysis and Cronbach's alpha test are illustrated in Table 11, Table 12 and Table 13 respectively.

Table 11 Factor loading of dependent variables

	Factor 1: Environmental performance	Factor 2: Social performance
The use of raw material	0.587	
The consumption of electricity, gasoline and other energy	0.766	
The discharge from production procedure	0.824	
Carbon dioxide emission	0.827	
Unexpected damages	0.801	
Other discharges (e.g. water discharge)	0.679	
Toxic material usage	0.806	
Overall decrease in polluting discharge	0.864	
Employee turnover rate has declined during the last three years		0.657
Job satisfaction has raised during the last three years		0.858
Staff encouragement has raised during the last three years		0.759
We support more disadvantaged people or addressing environmental issues		0.621

Table 12 Result of validity test of dependent variables

	Total variance explained (%)	KMO	Bartlett's Test of Sphericity
Corporate performance	66.807	0.885	721.218*
Corporate environmental performance (8 items)	75.808	0.897	539.536*
Corporate social performance (4 items)	75.019	0.790	97.251*

*$p < 0.001$

Table 13 Result of reliability test of independent variable

	Cronbach's alpha
Corporate performance	0.928
Corporate environmental performance (8 items)	0.932
Corporate social performance (4 items)	0.781

Overall, the results from validity test and reliability test of both dependent and independent variables are positive. First of all, the factor loading of every item within each scale is above 0.5, which is considered as satisfactory for exploratory study (Hair et al. 2010). Moreover, the values of Cronbach's alpha of all instruments also have good results, with the lowest score is 0.714 (process innovation) and the highest is 0.932 (corporate environmental performance), some of them are higher than 0.800, which are much higher than the acceptable value (Taber 2017, 1278). Hence, the results suggest that data collected from these measurements has good level of reliability for further analysis. Another important point is that Kaiser Meyer Olkin (KMO) test and Bartlett's test are appropriate choice when it comes to evaluating sampling adequacy (Rasheed & Abadi 2014, 302). These too tests are the prerequisite in factor analysis (Tahtali 2019, 6). However, the standard thresholds of KMO value are not agreed yet. To be more specific, some scholars argue that a value of KMO higher than 0.7 is considered adequate sample while a value lower than 0.5 is inadequate (Rasheed & Abadi 2014, 302). Another group researchers require 0.6 as the minimum value of KMO and 0.7, 0.8, 0.9 can be considered as good, great and excellent respectively (Tahtali 2019, 4). As can be seen from Table 5 and Table 8, the KMO values of all measurements in this research ranging from 0.646 to 0.897 and most of them exceed 0.8. Therefore, it can be concluded that KMO values reach good and great level and sampling is in good state of adequacy. In addition, the result of Bartlett's Test of Sphericity of all measurements has p- value lower than 0.001. The last thing observed from the factor analysis tests is that total variance explained of every instrument is above 60%, which is the acceptable level (Obadić & Tijanić 2014, 124). The positive results from these tests confirm that the variables in this study have a good degree of correlation and are qualified for further analysis (Tahtali 2019, 6; Rasheed & Abadi 2014, 302).

3.2.2.3 Control variable

In this research, there are two control variables, they proxy firm size and firm age. These control variables are used as they might explain the degree of corporate performance.

Firm size is argued to have a considerable effect on corporate financial decisions (Hovakimian & Hovakimian, 2014, 518). It is undeniable that bigger firms usually achieve better performance and spend more capital investing in research and development compared to their SME counterparts (Booth et al. 2001). There are some values that can be used to represent firm size in a research, such as total asset, total revenue, number of employee, etc. However, it is likely to be more difficult for respondents to obtain information related to total asset or total revenue than the number of staff member. Thus, this study uses the total employee as a proxy of firm size. It is calculated by the logarithm of the number of employees.

Another control variable is firm age. The total time that a company has been operating is important for their performance (Ezzi & Jarboui, 2016), hence it should be taken into account when we evaluate corporate performance. This proxy is usually determined as the logarithm of the total of years since the first operating day (Brown & Caylor, 2004; Ben Cheikh & Zarai, 2008).

3.3 Data analysis

The collected data would undergo 6 different types of analysis, they are: construct validity, scale reliability, correlation, multiple regression, multivariate analysis of variance and univariate analysis of variance.

The construct validity was applied to assess the consistency of the measure while the reliability test aimed to evaluate whether the measurements offered reliable data or not. In addition, the exploratory factor analysis was performed to investigate the adequacy of the sample as it includes some tests, such us Kaiser–Meyer–Olkin test (KMO), Bartlett's Test of Sphericity and the percent total variance. In the next stage, to ensure that observed correlations in this research are not affected by common method variance, the Harman’s single- factor test was performed to identify the presence of common method variance. Besides, the correlation analysis was carried out to test the multicollinearity between independent variables to make sure that the analysis outcomes would not be affected by the multicollinearity between independent variables. Then the multiple regression analysis was performed to grasp an overview about the relationship between sustainability-oriented innovation practices and overall corporate performance. The regression analyses were applied again to test the effect of each dimension of sustainability-oriented innovation on corporate environmental performance and corporate social performance separately. Finally, the multivariate analysis of variance and univariate analysis of variance were conducted to assess whether different levels of sustainability-oriented innovation pratices would result in different degrees of environmental performance and social performance when we consider them separately and individually respectively.

3.4 Trustworthiness of the study

When it comes to data collection, using survey as a means has its own pros and cons. On one hand, studies using survey can be checked by other researchers, which is convenient to evaluate the testability and reliability of the research. In addition, the process of carrying out a survey is standardized and widely approved. (Meredith 1998, 443.) On the other hand, answers given in survey are usually based on individual personal opinions rather than facts. Hence, the subjectiveness might lead to errors in measuring constructs. Another drawback of survey method is that some hindrances might arise, such as question interpretation, respondents do not have enough knowledge to fully understand questions, the level of representation is not high enough for data analysis. (Boyer & Swink 2008, 340; Kumar 2005, 119, 130-131.)

Fortunately, there are several tests that researchers can use to evaluate the trustworthiness of a quantitative research. They are: reliability, validity, multicollinearity and common method variance. These tests would be conducted after the data collection process. (Giannikis et al. 2013, 3655.) The first test is the reliability one, it describes the consistency of a measure. In other words, it shows the degree to which a particular scale measures a variable consistently. (Kaya 2013, 317.) There are some tests that reseachers can conduct to calculate reliability, they are: internal consistency, test-retest method, alternate- form reliability method and split half method. The internal consistency gauges the correlation between different items in a test that are designed to measure a same construct. (Forza 2002, 177.) If researcher wants to assess this kind of reliability, they can use Spearman-Brown formula, Kuder–Richardson coefficient or Cronbach alpha (Salkind 2012, 3-4). Among these methods, Cronbach coefficient alpha is considered the most popular one measuring the degree of internal consistency reliability. (Forza 2002, 177.) The value of Cronbach alpha ranges from 0 to 1 and 0.7 is the minimum level to obtain the internal consistency (Heale & Twycross 2015, 67). However, a value of Cronbach alpha greater than 0.8 is more desirable (Nunnally 1978). With the test-retest method, respondents would have to answer questions measuring the same instrument under a same condition but at different time. The point is to assess the stability reliability of the measurement (Heale & Twycross 2015, 67). If researchers wish to use the altenate-form method, they would design a set of test items developed based on another similar one in order to create two different forms of a same test. Respondents would be given two forms of the test at separate times. Meanwhile, the split-half reliability is calculated by splitting a set test relating to a same concept into halves. The results from two divided subsets would be compared to evaluate the equivalence between them. (Forza 2002, 177). The reliability of this research is determined by the internal consistency method. Because Cronbach's alpha is the most common tool to determine the degree of internal consistency, it is applied in this study. As can be seen from Table 10 and Table 13, the value of Cronbach's alpha of every instrument is above 0.7, which confirms the reliability of data.

Another test that researchers can apply to assess the trustworthiness of a study is the validity test. It is used to measure data accuracy. To be more specific, if data of the research is valid, the measurement outcomes should be accurate (Kaya 2013, 318). Hence, the validity of a study is established when the instruments successfully measure the predetermined topics (Forza 2002, 178). Validity consists of internal validity, external validity, construct validity and conclusion validity (Kaya 2013, 318). Internal validity refers to the causal effect between variables in the research whereas external validity or population validity is the degree to which findings of the research can be generalized to different settings, circumstances or people (Kaya 2013, 318; Fisher 2010, 273). Construct or measurements validity aims to reflect the extent to which researchers can have findings of the study based on theoretical measurements (Kaya 2013, 318). This kind of validity is helpful when questionnaire of the research intends to explore an individual, a group of people or all aspects of an organization (Fisher 2010, 272). The last kind of validity is conclusion validity, which would check the degree of correlation between independent and dependent variables (Kaya 2013, 318).

4 FINDINGS

4.1 Quality of the data set

Before performing further analyses, the descriptive statistics of variables were examined to summarize characteristics of the data set. Mean and correlation between variables of this research is presented in Table 14. As can be seen from Table 14, there is a slight difference between the mean values of sub-constructs. Corporate environmental performance has the highest mean value at 4.13 while process innovation achieves the lowest mean value at 3.80. Besides, product innovation has a higher mean value (4.07) compared to its counter parts, therefore, it is likely that product innovation is the dominant practice among all types of sustainability-oriented innovation. In addition, it is argued that the degree of correlation between two independent variables should not be above 0.75 to make sure that the analysis outcomes would not be affected by the multicollinearity between independent variables (García- Cabrera & Hernańdez 2014, 455). The descriptive statistics in Table 14 shows that the correlations between independent variables range between 0.650 and 0.675, which are all below 0.75. Consequently, it can be said that the correlation between independent variables in this research fulfils the requirement.

Table 14 Descriptive statistics

	Mean	(1)	(2)	(3)	(4)	(5)
(1) Product innovation	4.07	1				
(2) Process innovation	3.80	.675**	1			
(3) Organizational innovation	3.89	.669**	.650**	1		
(4) Corporate environmental performance	4.13	.734**	.626**	.679**	1	
(5) Corporate social performance	3.90	.634**	.549**	.545**	.603**	1

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

Another thing that can be observed from Table 14 is that the correlation between dependent variable and independent variable are all positive. Moreover, correlation coefficients vary between moderate and strong value. To be specific, corporate environmental performance gains the strongest correlation coefficient with product innovation (r= 0.734) whereas the lowest correlation is between corporate social performance and organizational innovation (r= 0.545). These descriptive results are well-aligned with many existing studies (Sambasivan et al. 2013; Maletič et al. 2016; Asadi et al. 2020). For example, Maletič et al. (2016) carried out a research with 266 respondents from many countries across Europe, such as Germany, Poland, Spain, Slovakia and Serbia. The authors find that sustainability-oriented innovation practices relating to product and process innovation have a moderate correlation with corporate environmental performance ($r= 0.448$, $p< 0.001$).

Last but not least, data in this study is collected by using survey instrument, hence, the issue of common method variance (common method bias) might arise. Common method variance is defined as “variance that is attributable to the measurement method rather than to the constructs the measures represent” (Podsakoff et al. 2003, 879). This type of variance would cause variables seem to have correlation as data are from a shared source. To ensure that observed correlations in this research are not affected by common method variance, the Harman’s single- factor test was performed to identify the presence of common method variance. The principal component analysis with varimax rotation was utilised in the test. The result shows that that first factor explains 42.46% of the total variance. This value is below the recommended threshold of 50% (Eichhorn 2014, 7). This leads to the conclusion that data of this study does not have problem with common method variance and can be further analysed.

4.2 Hypothesis confirmation

A regression analysis was conducted to examine the effect of sustainability-oriented innovation practices on overall corporate performance. In so doing, a composite score for corporate performance was created by calculating the mean score of all scale items relating to corporate environmental performance and corporate environmental performance. The normality of the composite score was checked with skewness (symmetry) and kurtosis (peakedness). Result of the test shows that skewness of the composite score is -1.493 and kurtosis is 2.509. According to Hair et al. (2010) and Bryne (2010), the normality of data is confirmed if values of skewness and kurtosis range between ± 2 and ± 7 respectively. As the value of skewess and kurtosis of the composite score is within the common approved range, it can be said that the composite score is normally distributed. The composite score is later use to represent corporate performance (dependent variable). Result of the regression analysis is showed in Table 15. The symbols (*), (**) and (***) appearing right after the numbers represent the p-value of $p<0.05$, $p<0.01$ and $p< 0.001$ respectively.

Table 15 Regression analysis between sustainability-oriented innovation practices and overall corporate performance

	β	SD	VIF	R^2	Adjusted R^2	F
Product innovation	.389***	.074	2.267	.685	.663	31.104 ***
Process innovation	.132*	.058	2.212			
Organizational innovation	.192*	.073	2.118			
Firm age	-.067*	.028	1.063			
Firm size	.013	.034	1.044			

As illustrated in Table 15, there are significant relationships between product innovation, process innovation, organizational innovation and corporate performance, at .389***, .132* and .192* respectively. The test is significant with F = 31.104, $p< 0.001$ and $R^2= 0.685$, which means that sustainability-oriented innovation practices could account for nearly 69% of the variance in corporate performance regarding corporate environmental performance and corporate environmental performance. Based on the result, one can say that the relationship between sustainability-oriented innovation and corporate performance is significant and positive. However, at this stage, we have examined the relationship between sustainability-oriented innovation and the overall corporate performance. The hypotheses about a positive effect of product innovation, process innovation, organizational innovation on corporate environmental performance and corporate social performance still need to be tested. Hence, further analysis would be conducted to investigate the relationship between three dimensions of sustainability-oriented innovation on corporate environmental performance and corporate social performance in sub-chapters 4.2.1 and 4.2.2 respectively.

4.2.1 Analysis of the effect of sustainability-oriented innovation on corporate environmental performance

In this section, the effects of three dimensions of sustainability-oriented innovation on corporate environmental performance would be examined thanks to regression analyses. In so doing, three different models representing the relationship between product innovation, process innovation, organizational innovation and corporate environmental performance (1A; 1B; 1C, respectively) are applied. Results of the regression analyses are presented from Table 16 to Table 18.

Table 16 Regression analysis between product innovation and corporate environmental performance

Model 1A: CEP= β_0+ β_1*Product innovation + β_2* Firm age + β_3* Firm size + ε						
Variables	**β**	**SD**	**VIF**	**R^2**	**Adjusted R^2**	**F**
Product innovation	.769***	.074	1.029	.562	.542	28.223***
Firm age	-.087*	.040	1.031			
Firm size	.025	.050	1.052			

Table 17 Regression analysis between process innovation and corporate environmental performance

Model 1B: CEP= β_0+ β_1*Process innovation + β_2* Firm age + β_3* Firm size + ε						
Variables	**β**	**SD**	**VIF**	**R^2**	**Adjusted R^2**	**F**
Process innovation	.543***	.066	1.046	.448	.423	17.849***
Firm age	-.131**	.046	1.057			
Firm size	-.022	.056	1.031			

Table 18 Regression analysis between organizational innovation and corporate environmental performance

Model 1C: CEP= β_0+ β_1*Organizational innovation + β_2* Firm age + β_3* Firm size + ε						
Variables	**β**	**SD**	**VIF**	**R^2**	**Adjusted R^2**	**F**
Organizational innovation	.704***	.081	1.005	.477	.453	20.086 ***
Firm age	-.062	.044	1.030			
Firm size	-.027	.054	1.029			

There are five points that results of the regression analyses suggest. Firstly, model 1A, 1B and 1C are all statistically significant with F = 28.223***, F = 17.849***, F = 20.086*** respectively.

Besides, three dimensions of sustainability-oriented innovation can explain the variance in corporate environmental performance at different degrees. To be specific, 56.2% of variance in corporate environmental performance is explained by product innovation, nearly 45% is explained by process innovation while organizational innovation accounts for around 48% (R^2= 0.562; 0.448; 0.477 respectively and adjusted R^2= 0.452; 0.423; 0.453 respectively). Thirdly, product innovation, process innovation and organizational innovation have significant and positive impact on corporate environmental performance because the coefficient β value of them are 0.769***, 0.543*** and 0.704*** respectively. Last but not least, the results of model 1A and 1B indicate that firm age has a negative effect on corporate environmental performance with coefficient β value of -0.087* and -0.131**. As conclusion, hypothesis 1a, 1b and 1c are all supported with the regression results.

4.2.2 Analysis of the effect of sustainability-oriented innovation on corporate social performance

Similar to the regression analyses demonstrated above, three types of sustainability-oriented innovation, which are product innovation, process innovation and organizational innovation are put into model 2A, 2B and 2C respectively to investigate the impacts of them on corporate social performance. Outcomes of the analyses are shown from Table 19 to Table 21 below.

Table 19 Regression analysis between product innovation and corporate social performance

Model 2A: CSP= β_0+ β_1*Product innovation + β_2* Firm age + β_3* Firm size + ε						
Variables	**β**	**SD**	**VIF**	**R^2**	**Adjusted R^2**	**F**
Product innovation	.492***	.064	1.029	.413	.386	15.467***
Firm age	-.034	.035	1.031			
Firm size	.018	.043	1.052			

Table 20 Regression analysis between process innovation and corporate social performance

Model 2B: CSP= β0+ β1*Process innovation + β2* Firm age + β3* Firm size + ε						
Variables	**β**	**SD**	**VIF**	**R^2**	**Adjusted R^2**	**F**
Process innovation	.345***	.054	1.046	.325	.295	10.608***
Firm age	-.062	.038	1.057			
Firm size	-.013	.046	1.031			

Table 21 Regression analysis between organizational innovation and corporate social performance

Model 2C: CSP= β0+ β1*Organizational innovation + β2* Firm age + β3* Firm size + ε						
Variables	**β**	**SD**	**VIF**	**R^2**	**Adjusted R^2**	**F**
Organizational innovation	.421***	.069	1.005	.308	.277	9.797***
Firm age	-.018	.038	1.030			
Firm size	-.017	.046	1.029			

When it comes to model 2A, 2B and 2C, it can be said that they are all statistically significant with F = 15.457***, F = 10.608*** and F = 9.797*** respectively. Moreover, the results suggest that 41% of variance of the corporate social performance is explained by sustainability-oriented innovation practices (R^2= 0.413, adjusted R^2= 0.386), around 35% is explained by process innovation (R^2= 0.325, adjusted R^2= 0.295) and approximately 31% is predicted by organizational innovation (R^2= 0.308, adjusted R^2= 0.277). Additionally, product innovation, process innovation and organizational innovation are showed to have a significant and positive effect on corporate social performance because they have a coefficient β value of 0.492, 0.354, 0. 421 respectively and p-value = 0.001 < 0.05. Therefore, one might conclude that hypotheses 2a, 2b and 2c are totally supported.

4.2.3 Analysis of the effect of different levels of sustainability-oriented innovation on corporate performance

At this stage, all of the hypotheses have been tested and some conclusions have been drawn. However, a more detailed analysis would likely enrich findings and implications of this study. Consequently, further analysis would be carried out to investigate whether different levels of sustainability-oriented innovation practices would lead to considerable variations in the mean of corporate environmental performance and corporate social performance. The level of sustainability-oriented innovation practices would be divided into high and low levels. A score of product innovation, process innovation and organizational innovation either greater or equal to 4 is considered as high level while a value below 4 is seen as low level. A multivariate analysis of variance (MANOVA) was performed to examine whether high and low level of sustainability-oriented innovation practices would result in different mean of corporate performance when we analyse corporate environmental performance and corporate social performance collectively. Results of the multivariate analysis of variance can be found in three tables below (from Table 22 to Table 24).

Table 22 Multivariate analysis of variance between product innovation and corporate performance

Variable	Level	Mean	SD	N	F	Pillai's Trace	Wilks' Lambda
Corporate environmental performance	Low	3.5565	.74291	31	7.490 ***	.360 ***	.640 ***
	High	4.4113	.50377	62			
	Total	4.1263	.71582	93			
Corporate social performance	Low	3.5242	.53368	31			
	High	4.0847	.42451	62			
	Total	3.8978	.53191	93			

Table 23 Multivariate analysis of variance between process innovation and corporate performance

Variable	Level	Mean	SD	N	F	Pillai's Trace	Wilks' Lambda
Corporate environmental performance	Low	3.6546	.78491	38	7.643***	.325***	.675***
	High	4.4523	.43133	55			
	Total	4.1263	.71582	93			
Corporate social performance	Low	3.6118	.58036	38			
	High	4.0955	.39232	55			
	Total	3.8978	.53191	93			

Table 24 Multivariate analysis of variance between organizational innovation and corporate performance

Variable	Level	Mean	SD	N	F	Pillai's Trace	Wilks' Lambda
Corporate environmental performance	Low	3.7805	.76126	41	4.878**	.222***	.778***
	High	4.3990	.54573	52			
	Total	4.1263	.71582	93			
Corporate social performance	Low	3.6524	.59129	41			
	High	4.0913	.38676	52			
	Total	3.8978	.53191	93			

As can be seen from Table 22, Table 23 and Table 24, different levels of sustainability-oriented innovation practices would lead to different means of corporate performance when all dimensions of corporate performance are considered simultaneously. For example, in Table 22, the group with low level of product innovation practice has the mean of corporate environmental performance and corporate social performance of 3.6 and 3.5 respectively. Meanwhile, the group with high level of product innovation clearly has a higher value of mean of corporate environmental performance and corporate social performance, which are 4.4 and 4.1 respectively. The same results are also found in multivariate analysis of variance of process innovation and organizational innovation. In addition, because the sample sizes in the multivariate analysis of variance are unbalanced, Pillai's Trace and Wilks' Lambda test are applied to examine the robustness of the multivariate analysis of variance. The multivariate analysis of variance tests of product innovation, process innovation and organizational are all statistically significant with F= 7.490***; 7, 643***; 4.878** respectively; Pillai's Trace= 0.360***; 0.325***; 0.222*** respectively and Wilks' Lambda= 0.640***; 0.675***; 0.778*** respectively. All the outcomes lead to a conclusion that there is a considerable difference between the effect of low and high level of sustainability-oriented innovation on corporate performance.

Thanks to the multivariate analysis of variance, we know that the degree of sustainability-oriented innovation practices has an effect on mean of corporate environmental performance and corporate social performance when we examine these corporate performances simultaneously. As the multivariate analysis of variance is statistically significant, a univariate analysis of variance (univariate ANOVA) would be conducted to investigate whether different levels of sustainability-oriented innovation would result in different means of corporate environmental performance and corporate social performance when we analyse these two dimensions of corporate performance separately. Outcomes of the univariate analysis of variance is illustrated in Table 25 and Table 26.

Table 25 Univariate analysis of variance between sustainability- oriented innovation and corporate social performance

		Product innovation		**Process innovation**		**Organizational innovation**	
	Level	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Corporate environmental performance	Low	3.5565	.74291	3.6546	.78491	3.7805	.76126
	High	4.4113	.50377	4.4523	.43133	4.3990	.54573
F		42.895***		39.621***		20.802***	
Partial η^2		.320		.303		.186	
Levene's test		7.753**		14.601***		5.492**	
Kruskal- Wallis test		41. 072***		37.289***		26.615***	

Table 26 Univariate analysis of variance between sustainability- oriented innovation and corporate social performance

		Product innovation		Process innovation		Organizational innovation	
	Level	Mean	SD	Mean	SD	Mean	SD
Corporate social performance	Low	3.5242	.53368	3.6118	.58036	3.6524	.59129
	High	4.0847	.42451	4.0955	.39232	4.0913	.38676
F		30.239***		23.024***		18.594***	
Partial η^2		.249		.202		.170	
Levene's test		1.289		3.697		6.220*	
Kruskal- Wallis test		21.311***		19.493***		14.852***	

There are four main things that results from the univariate analysis of variance indicate. First of all, outcomes represented in Table 25 once again show that low and high level of sustainability-oriented innovation practices would bring difference in means of corporate environmental performance. For instance, the sample group with low level of process innovation has a mean of corporate environmental performance of 3.65. Meanwhile, a higher value of mean of corporate environmental performance (4.45) can be observed from the group with high degree of process innovation. The univariate analysis of variance for corporate social performance (Table 26) also shares a same result. For example, mean of corporate social performance in the group having low level of organizational innovation is 3.65, which is lower than its counterpart in the group practicing higher degree of organizational innovation (4.09). This time, the corporate environmental performance and corporate social performance are examined individually instead of collectively as in multivariate analysis of variance.

The second point that we see from Table 25 And Table 26 is that both of the analyses of variance are statistically significant since F= 42.895***; F= 39.62***; F= 20.802*** when we examine the effect of different levels of product innovation, process innovation and organizational innovation on corporate environmental performance respectively. Similarly, the analyses about the effect of different levels of product innovation, process innovation and organizational innovation on corporate social performance has F= 30.239***; F= 23.024***; F= 18.594*** respectively.

Thirdly, in the analysis of variance, partial η^2 is usually the common effect size measure. Hence, this value is showed in Table 25 and Table 26 besides other values. In the case of corporate environmental performance, partial η^2 of product innovation, process innovation and organizational innovation are .320; .303 and .186 respectively. The results can be interpreted as 32% of variance is associated with product innovation, 30% is associated with process innovation and nearly 19% of variance is accounted for by organizational innovation. Similarly, table 26 has partial η^2 = .249, partial η^2 = .202 and partial η^2 0.170 for product innovation, process innovation and organizational innovation respectively. These numbers mean that approximately 25% of variance in corporate social performance is explained by product innovation, 20% is explained by process innovation and 17% is predictable from organizational innovation. The results suggest that independent variables (sustainability-oriented innovation practices) can predict a considerable percentage of variance in the dependent variables (corporate environmental performance and corporate environmental performance).

The last things that results from univariate analysis of variance suggest is that product innovation is usually the dimension of sustainability-oriented innovation that accounts for the biggest portion of variance in corporate performance (32% in corporate environmental performance and 25% in corporate social performance). In contrast, the smallest percentage of variance in corporate performance is associated with organizational innovation (19% and 17% in corporate environmental performance and corporate social performance, respectively).

Besides univariate analysis of variance, the Levenve's test and Kruskal- Wallis test were carried out. Because the data sets used for univariate analysis of variance does not have equal sample sizes, a test to check whether variances are equal for all samples is essential. This is also an important requirements for statistical analysis like univariate analysis of variance. The equal variance test was conducted with Levene's test and results are illustrated in Table 25 and Table 26. As can be seen from table 25, value of Levene's test for product innovation, process innovation and organizational innovation are 7.753**, 14.601*** and 5.492** respectively. When it comes to Levene's test, a non- statistically significant result suggests that the assumption of equal variances is met. Conversely, a statistically significant result means the hypothesis that variances are equal is rejected. The presented results of Levene's test in Table 26 are all statistically significant, which means that the assumption of equal variances is invalid. Hence, a second test- Kruskal Wallis was conducted because it is the non- parametric alternative to univariate analysis of variance. The test shows that there is a statistically significant difference between mean ranks of corporate environmental performance in group with high and low level of sustainability-oriented innovation.

To be specific, the Kruskal- Wallis results for product innovation, process innovation and organizational innovation are 41. 072***, 37.289*** and 26.615*** respectively. Therefore, it can be said that the Kruskal – Wallis tests provide valuable data that supports the results observed from univariate analysis of variance.

Similarly, Levene's tests were applied to examine the equality of variances in univariate analyses of variance in Table 26. The non-statistically significant results indicate that the assumption of equal variances is valid in the case of product innovation and process innovation (p= 0.259 and p= 0.058 respectively). However, the result for organizational innovation is statistically significant (p= 0.014 < 0.05). Conducting the Kruskal – Wallis test is therefore a crucial step to examine whether result from univariate analyses of variance for organizational innovation is reliable or not. Outcome of the test supports the result from univariate analysis of variance as it is statistically significant (14.852, p< 0.001).

4.3 Discussion

The section will begin with discussion about control variables in this study, which are firm age and firm size. Firstly, according to regression analysis results illustrated from table 14 to table 20, firm age seems to have a negative effect on corporate environmental performance as its coefficient β values in model 1A and 1B are -0.67* and -0.131** respectively. However, a statistically significant result of firm age cannot be found in model 2A, 2B and 2C. It means that this control variable does not have any effects on corporate social performance. Because the impact of firm age on corporate performance only appears in few regression models, the result does not support arguments of previous research (e.g. Brown & Caylor, 2004; Ben Cheikh & Zarai, 2008). When it comes to the second control variable- firm size, β values of it in all regression models (from model 1A to model 2C) are not statistically significant. Therefore, firm size cannot be considered to have a substantial impact on corporate environmental performance and corporate social performance, which is not in line with assertions of some scholars (e.g. Hovakimian et al. 2004; Dufour & Molay 2010). To sum up, results of the regression analyses suggest that control variables of this study (firm age and firm size) do not have any impacts on dependent variables (corporate environmental performance and corporate social performance).

Additionally, many analyses were performed in subchapter 4.2 to explore whether three dimensions of sustainability-oriented innovation practices, which are product innovation, process innovation and organizational innovation, might have an effect on corporate environmental performance and corporate social performance. To summarize the analysis results, table 27 below is created. Information about hypothesis confirmations is also provided in the table.

Table 27 Summary of the study result

The effect of	On	Hypothesis	Statistical significance	Hypothesis confirmation
Product innovation	Corporate environmental performance	1a	✓	Supported
Process innovation		1b	✓	Supported
Organizational innovation		1c	✓	Supported
Product innovation	Corporate social performance	2a	✓	Supported
Process innovation		2b	✓	Supported
Organizational innovation		2c	✓	Supported

The regression analyses and multivariate analysis of variance (MANOVA) produce a common result that supports the presumption about a positive effect of sustainability-oriented innovation practices on corporate performance. The outcomes also indicate that product innovation, process innovation and organizational innovation all have a positive effect on each individual dimension of corporate performance (corporate environmental performance and corporate social performance). Regarding the sub-construct corporate environmental performance, the regression model 1A, 1B and 1C provide evidences about a significant and positive effect of product innovation, process innovation and organizational innovation on corporate environmental performance due to coefficient β= 0.769***, β =0.543***, β= 0.704*** respectively. These results are well- aligned with findings of previous research carried out by Kem et al. (1994) and Chen et al. (2015). These authors point out that the pursuit of sustainability-oriented innovation plays an important role in enhancing corporate environmental performance, which would result in a higher overall corporate performance.

Moreover, the analyses of variance reveal that the mean values of corporate environmental performance differ significantly between the low level and high level of the implementation of product innovation, process innovation and organizational innovation (F= 42.895***; F= 39.62***; F= 20.802*** respectively). Results of the univariate analysis of variance are in harmony with debate in a research conducted by Maletič et al. (2016). To be specific, results of the univariate analysis of variance show that companies with higher level of sustainability-oriented innovation practices achieve a higher mean of corporate environmental performance compared to firms with lower degree of sustainability-oriented innovation implementation.

Regarding corporate social performance, many scholars argue that by implementing sustainability-oriented innovation practice, firms would be able to improve their corporate social performance (e.g. Ezzi & Jarboui 2016; Wagner, 2013). By empirically investigating the effect of sustainability-oriented innovation on corporate social performance, results from the regression analyses and multivariate analysis of variance strongly support the above-mentioned premise. Product innovation, process innovation and organizational innovation are shown to have a significant and positive effect on corporate social performance due to statistically significant results from regression analyses (β= 0.492***; β= 0.354***; β= 0. 421*** respectively). This effect means that thanks to sustainability-oriented innovation practices, the employee motivation and employee satisfaction are improved considerably. Besides, firms can foster the relationship between them and the local municipality as they can help to address environmental problems. Additionally, the univariate analysis of variance provides a statistically significant outcome that different levels of product innovation, process innovation and organizational innovation would lead to different mean values of corporate social performance (F= 30.239***; F= 23.024***; F= 18.594*** respectively). In other words, the higher the level of sustainability-oriented innovation practices, the higher mean of corporate social performance the company can realize.

5 CONCLUSION

The chapter starts with sub-chapter 5.1, which highlights the theoretical implications of this study to existing literature about a multi-dimensional corporate performance system and the effect of sustainability-oriented innovation on corporate environmental performance and corporate social performance. Sub-chapter 5.2 will give discussion about the managerial implications that this study offers. Finally, sub-chapter 5.3 examines limitation of this study and propose the suggestions for research in the future.

5.1 Theoretical implications

There are four implications regarding the theoretical perspective this study carries. Firstly, research about the effect of sustainability-oriented innovation on financial performance of corporates has been given a lot of attention from scholars (e.g. Wagner, 2010; Bigliardi 2013; Beate et al. 2013; Caracuel & Mandojana 2013; Albuquerquer et al. 2018; Przychodzen et al.2015; Azevedo et al. 2019; Osman & Peker 2016; Xuemei Xie et al. 2016). Conversely, little is known when it comes to the effect of sustainability-oriented innovation practices on corporate environmental performance and corporate environmental performance. Realizing the above- mentioned research gap, this study focuses on investigating the effects of sustainability-oriented innovation on corporate environmental performance and corporate social performance to gain more understanding about it. This is a notable theoretical contribution as there is a small number of research empirically exploring the effect of sustainability-oriented innovation practice on both corporate environmental performance and corporate social performance simultaneously.

Secondly, thanks to results from regression analysis, multivariate analysis of variance and univariate analysis of variance, the final framework of the effects of the implementation of sustainability-oriented innovation on corporate environmental performance and corporate environmental performance is revealed in Figure 4 below.

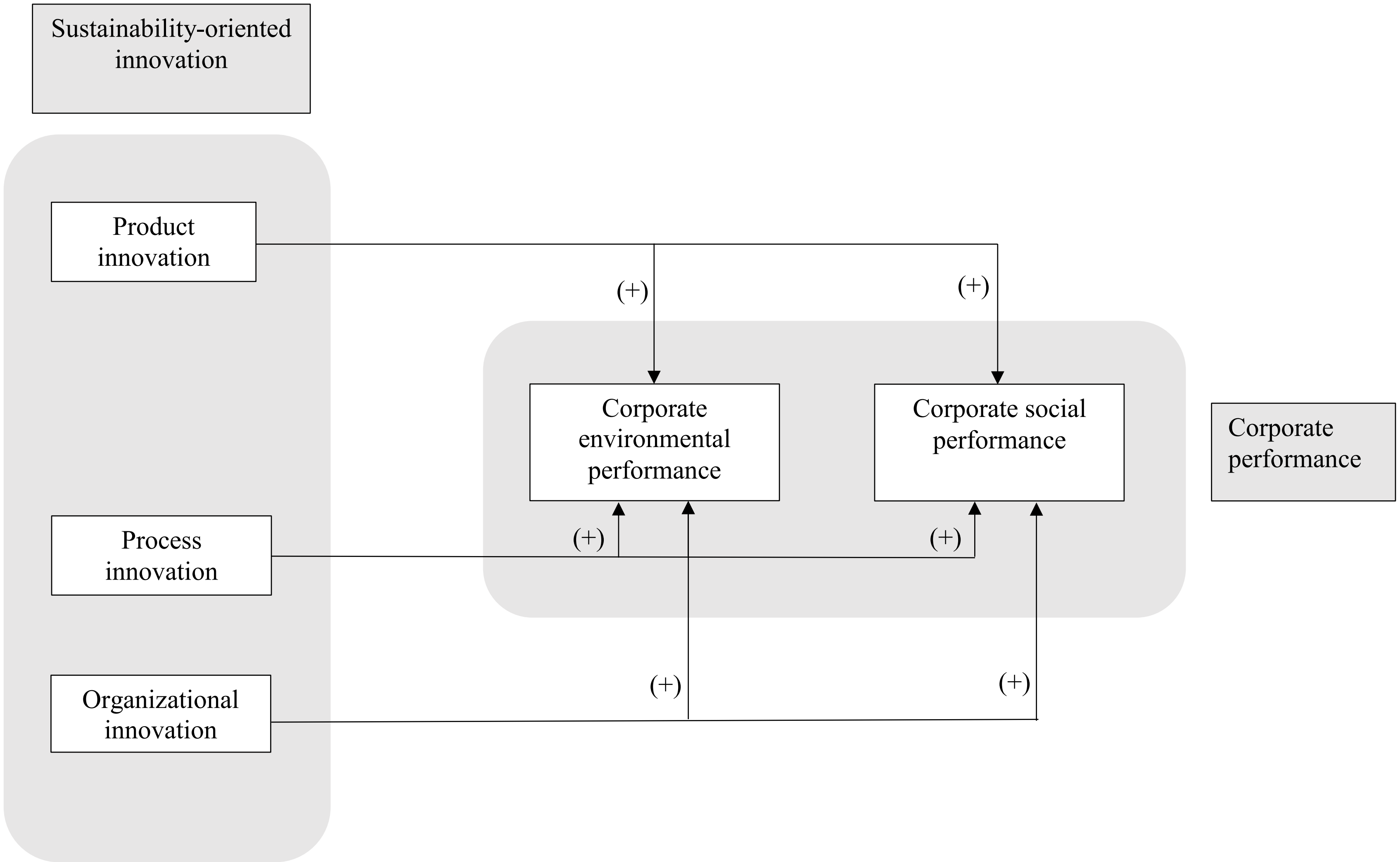

Figure 4 Final framework

As can be seen from Figure 4, all three types of sustainability-oriented innovation have a positive effect on corporate environmental performance and corporate social performance. The findings give empirical evidences for a controversial discussion about the effect of sustainability-oriented innovation on corporate performance. To be specific, regarding corporate environmental performance, the traditional school of thought argues that investment in sustainability-oriented innovation would only lead to an increase in expenditure without having any improvements in corporate performance (Palmer et al.1995; Ambec & Lanoie 2008). Moreover, it is argued that sustainability-oriented innovation would result in environmental degradation due to the increasing use of energy and input material (Bergh et al. 2011; Barbieri et al. 2016;). However, with the results from many analyses, this empirically- based study supports the argument that the implementation of sustainability-oriented innovation has a significant and positive effect on corporate environmental performance. In other words, the consumption of energy, raw material and harmful substances is reduced if firms have practices relating to sustainability-oriented innovation. Consequently, there would be a decline in detrimental discharge and pollution caused by organizations, which means that corporate environmental performance is improved. This finding is well-aligned with the view of a school of thought that advocates the presence of sustainability-oriented innovation in corporations (e.g. Aragón-Correa et al. 2008; Sambasivan et al. 2013; Lee & Min 2015; Maletič et al, 2016; Ghisetti & Quatraro 2017). Similarly, regarding corporate social performance, outcomes produced by the analyses provide support for scholars who state that sustainability-oriented innovation has a positive effect on corporate social performance (e.g.Wagner 2013; Ezzi & Jarboui, 2016; Li et al. 2020)

Thirdly, most of studies about this topic is conducted in developed markets whereas few is carried out in developing countries. Therefore, by conducting an investigation with Vietnamese companies, which are located in an emerging country in Asia, the study offers understanding about the level of sustainability-oriented innovation practices in SMEs in an emerging market and the effects of them on corporate environmental performance and corporate social performance.

The last theoretical contribution of this study is that while most of prior research put focus on investigating whether there is an effect of sustainability-oriented innovation on corporate performance, this study conducted further analyses to gain deeper insight about this effect. More specifically, it empirically explores whether different levels of sustainability-oriented innovation practices would result in different degrees of corporate environmental performance and corporate social performance that firms can achieve. Results from the univariate analysis of variance reinforce the argument from existing literature that a higher level of sustainability-oriented innovation would enable companies to realize a higher value of corporate environmental performance and corporate social performance (e.g. Maletič et al, 2016).

5.2 Managerial implications

Findings of this study provide not only theoretical implications but also implications from managerial perspective. First of all, the study suggests that if firms aim to improve their corporate performance regarding environmental performance, implementation of product innovation, process innovation and organizational innovation is a crucial step. For example, by using less toxic material (product innovation) and applying cleaner technologies (process innovation), firms could generate less harmful discharge. As a result, the negative impacts that firms cause during their production process could be reduced significantly.

Secondly, the regression analysis gives evidence that sustainability-oriented innovation practices have significant and positive effect on corporate social performance too. This means that the implementation of sustainability-oriented innovation would enable companies to enhance employee satisfaction, employee motivation and have a decreased turnover ratio. This finding might encourage organizations to offer better and diverse incentives for their employees besides the traditionally financial benefits. To realize it, it is of importance that there is cooperation across multiple departments within the company. For example, if human resource manager is seeking for a lower rate of turnover, he or she can discuss with production manager about the implementation of sustainability-oriented innovation. The cooperation can also be extended to other departments, such as marketing, research and development, etc.

Moreover, because sustainable development has become more essential than ever, many stakeholders of firms such as shareholders, customers, partners and the public are giving more focus on corporate environmental performance and corporate social performance (Hayase & Xie 2007, 148). Therefore, obtaining a high level of corporate performance in terms of corporate environmental performance and corporate social performance is a critical factor behind the satisfaction of stakeholders. The presence of active measures and follow-up actions from management team would be needed to make sure that the organization is carrying out sustainability-oriented innovation in a proper way and providing stakeholders with latest reports.

However, it is of importance that firms strengthen their innovation capability because it is believed as a decisive instrument to realize the positive effect on sustainability-oriented innovation on corporate performance (Lee & Min 2015; Maletič et al. 2016). If companies have appropriate approaches to enhance this capability, their corporate environmental performance and corporate social performance could therefore improve considerably and the overall performance could increase as a result.

5.3 Limitation of the study and suggestions for future research

There are some limitations this study entails. The first one is caused by the insufficiency of respondents. The sample size of this study includes 93 responses from 93 different SMEs in Vietnamese market. This is not an ideal number for quantitative research as the small sample size might affect the research negatively in terms of the internal and external validity. Moreover, due to the nature of the data collection method, which was conducted online entirely, there might be a lack of communication between respondents and the author. Although the author tried to design the questionnaire and each question carefully to ensure that all technical words can be interpreted easily by respondents, there might be some cases the respondents did not understand the question(s) completely. In these cases, the lack of communication and clarification would lead to incorrect answers. In other words, the answers given by respondents do not reflect accurately the situation in reality. Hence, studies in the future should have a more effective way to (1) collect a good amount of data, which meets the requirements of quantitative research; and (2) make sure that the collected responses can offer exact views about the research topic.

The second limitation is that this study aims to investigate the effect of sustainability-oriented innovation, which includes product innovation, process innovation and organizational innovation, on corporate performance. Because process innovation is an important dimension of sustainability-oriented innovation practices, the data was collected in only companies that have manufacturing process. Consequently, the findings might be applicable for manufacturing firms only. Therefore, there is a need for conducting more comparative research in both manufacturing and non-manufacturing to generalize discovered results of this study across sectors of the economy.

6 SUMMARY

Corporate sustainability is considered a critical factor behind companies whose performance is higher than the average of the market. By integrating economic profit with societal and environmental gains, corporate sustainability would enable firm to create values not only for themself but also for the ecology and the society. To realise corporate sustainability, sustainability-oriented innovation is an important means because it embodies improvements in product, production process and organizational management. However, the effect of sustainability-oriented innovation on corporate performance regarding corporate environmental performance and corporate social performance is still a debate topic as scholars see both benefits and drawbacks in it. The aim of this study is to empirically explore the mentioned-above effect, especially in the context of SMEs environment. To achieve the research aim, four sub-research questions were proposed. The first and the second one aim to grab fundamental understanding about sustainability-oriented innovation and corporate performance in terms of corporate environmental performance and corporate social performance. Meanwhile, the third and the last sub-research questions explore how existing literature sees the effect of sustainability-oriented innovation on corporate environmental performance and corporate social performance respectively.

Based on literature background, hypotheses of the study were proposed. Each hypothesis reflects the suggested relation between each type of sustainability-oriented innovation and a dimension of corporate performance. Based on it, the initial framework was built to serve further analyses. The quantitative approach is selected to investigate the effect of sustainability-oriented innovation practices on corporate environmental performance and corporate social performance in this study. To collect data, a pre-coded questionnaire was designed and sent to over one hundred of SMEs in Vietnamese market via email. Social media platforms were also utilised in the data collection process. The response rate reveals that approximately 33% of sent emails was answered and the sample size consists of 93 respondents from manufacturing firms. The collected data was then analysed with a statistical software platform- SPSS and 6 different types of analysis were applied: construct validity, scale reliability, correlation, multiple regression, multivariate analysis of variance and univariate analysis of variance.

Regarding corporate environmental performance, the analysis results indicate that all types of sustainability-oriented innovation have a significant and positive effect on it. Similarly, the same effect is found on corporate social performance. Interestingly, the outcomes of this study reveal that the higher level of sustainability-oriented innovation practices, the better corporate environmental performance and corporate social performance SMEs can attain. Thanks to the findings, some theoretical and managerial implications were suggested.

Regarding the theoretical contribution, this study carries four points. First of all, the majority of existing literature has given too much focus on the effect of sustainability-oriented innovation practices on financial performance. This study empirically investigates the effect of sustainability-oriented innovation on other dimensions of corporate performance simultaneously, which are corporate social performance and corporate social performance. Secondly, the study offers evidences concerning a positive effect of sustainability-oriented innovation on corporate environmental performance and corporate social performance. These evidences are helpful as the debate between two school of thoughts about the effect of sustainability-oriented innovation on corporate performance is still inclusive. More specifically, the conventional school of thought argues that the pursuit of sustainability-oriented innovation would only increase financial cost, energy usage and firms can enhance neither their environmental performance nor social performance. On the contrary, the second school of thought suggests that by implementing sustainability-oriented innovation practices, corporations could improve both environmental performance and social performance. Therefore, it can be said that findings of this research support argument of the latter school of thought. Thirdly, besides confirming that sustainability-oriented innovation has a positive effect on environmental performance and social performance, this study takes a further step to explore that effect extensively by performing the multivariate analysis of variance and univariate analysis of variance. Hence, the study can give insight about whether low and high level of sustainability-oriented innovation would result in different degrees of corporate environmental performance and corporate social performance that firms can realize. The analysis results reveal that a higher level of sustainability-oriented innovation practices would enable companies to achieve a higher value of environmental performance and social performance. This is a significant contribution as most of prior research only examines whether there is an effect of sustainability-oriented innovation on corporate environmental performance or corporate social performance. Finally, the study is conducted in the context of SMEs in an emerging market whereas existing literature about this topic is mainly carried out in big firms in developed western countries. This contributes to the conversation about the level of product innovation, process innovation and organizational innovation in SMEs and the effect of them on environmental performance and social performance of SMEs.

Regarding the managerial contribution, the study suggests that if managers aim to attain a high level of corporate environmental performance and corporate social performance, the implementation of product innovation, process innovation and organizational innovation is critical for success. Moreover, it is of importance that departments of firms cooperate closely to develop and facilitate such innovation. Last but not least, the innovation capability of firms should be fostered because it plays an essential role in realizing the positive effect of sustainability-oriented innovation on corporate environmental performance and corporate social performance.

Finally, we cannot have a future in which the next generations enjoy a prosperous life unless we take sustainability into consideration whenever we make a decision relating to our business or our personal life. If companies all over the world can see the great benefits that sustainability-oriented innovation might bring, it is likely that there will be more investment in product innovation, process innovation and organizational innovation. Furthermore, there is a need for support from governments regarding financial resource and legislations, especially in emerging and developing countries, to bring about a sustainable growth.

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APPENDIX

Appendix 1. Questionnaire

1. Independent variable

Please read the following statements and indicate your opinion about the extent to which you agree

(1 - Strongly disagree; 2 – Disagree; 3 – Somewhat disagree; 4 – Neutral; 5 – Somewhat agree; 6 – agree; 7 – Strongly agree)

No.	Statement	1	2	3	4	5	6	7
1.	Our company uses subtances that cause less/ don’t cause harmful effect to people and the environment							
2.	Our company makes the packaging better by using eco-friendly material for both current and new products							
3.	Our company utilizes products that are at the end of their useful lives (e.g, recycling them)							
4.	Our company uses little amount of energy (i.e., water, electricity, gasoline) for production/ operation/ dumping process							
5.	Our company uses recycled substances							
6.	Our company uses cleaner technology to save energy and avoid environmental degradation”.							
7.	Our company changes the designs of products/ services to fulfil environmental legislations							
8.	Our company changes the operation and production procedure to make sure that effeciency will increase							
9.	Our company makes determined attempts to make all employees know that it is important to conserve the environment							

10.	Our company has straightforward declaration that encourages the increase in environmental consciousness among employees							
11.	Our company looks for innovative ideas to enhance sustainability from partners, suppliers, customers, etc.							

2. Dependent variable

2.1 Corporate environmental performance

Please indicate the extent to which the sustainability-oriented innovation practices that your firm has done have improved/worsened the following using the scale provided below.

(1 –A lot worse; 2 – Fairly worse; 3 – Somewhat worse ; 4 –Uncertain/ No effect; 5 – Somewhat better; 6 – Fairly better; 7 – A lot better)

No.	Statement	1	2	3	4	5	6	7
1.	The use of raw material							
2.	The consumption of electricity, gasoline							
3.	Water consumption							
4.	The discharge from production procedure							
5.	Carbon dioxide emission							
6.	Unexpeced damages							
7.	Other discharges (e.g., water discharge)							
8.	Toxic material usage							
9.	Overall decrease in polluting discharge							

2.2 Corporate social performance

Please indicate the extent to which the sustainability-oriented innovation practices that your firm has done have improved/worsened the following using the scale provided below.

(1 – A lot worse; 2 – Fairly worse; 3 – Somewhat worse ; 4 –Uncertain/ No effect; 5 – Somewhat better; 6 – Fairly better; 7 – A lot better)

No.	Statement	1	2	3	4	5	6	7
1.	Employee turnover rate has declined during the last three years							
2.	Job satisfaction has raised during the last three years							
3.	Staff encouragement has raised during the last three years							
4.	We support more disadvantaged people or addressing environmental issues							

3. Control variables

Please answer the questions below as appropriate.

- What is the total number of employee in your firm? ....
- How long has this firm been in operation? ....