

**ROLE OF GREEN INNOVATION AND GREEN ENTREPRENEURSHIP
IN SMEs DEVELOPMENT WITH MODERATING ROLE OF MARKET
TURBULENCE AND GOVERNMENT SUPPORT**



MARSAD AHMAD

MS I&E 2K19

A thesis submitted to NUST Business School for the degree of Master of
Science in Innovation and Entrepreneurship

2023

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THESIS ACCEPTANCE CERTIFICATE

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Declaration

I hereby state that no portion of work referred to in this dissertation has been submitted in support of an application for another degree or qualification in this or any other University or other institute of learning.

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Acknowledgement

I would like to take this opportunity to first and foremost thank the Almighty for being my strength and guide in the writing of this thesis. Without Him, I would not have the wisdom or the physical strength to do so.

I express my utmost gratitude to my thesis supervisor Dr. Owais Anwar Golra for devoting much of his time to guide and assist throughout the research process. His welcoming attitude and interest in my research topic enabled me to go through this challenging task seamlessly. He was always a source of inspiration for me, and his continuous feedback provided a significant support in every obstacle I faced during the duration of this research.

I would also thank my GEC members Dr. Madiha Gohar and Dr. Ayesha Abrar for their valuable insights and feedback to steer my research in the right direction.

Moreover, I would like to thank my parents and my elder brother for their unwavering support throughout my academic career, without which I would not be able to achieve this important milestone.

Abstract

Continuous environment deterioration and climate change call for practical measures to curb the factors responsible for this unfortunate situation. Reducing the production of goods detrimental to the environment and developing alternate eco-friendly and green solutions for the manufacturing industry have become more necessary than ever. Encouraging SMEs to incorporate green innovation leading towards green entrepreneurship is one of the most promising ventures due to the large network of SMEs worldwide. One of the hurdles for SMEs to move towards green innovation is the fear of its possible negative impact on their productivity and development. It is vital to empirically evaluate the impact of eco-friendly solutions on their businesses to make their transition to green innovation easier. This study analysed the impact of green innovation and green entrepreneurship on SMEs development with the moderating role of market turbulence and government support, which are two of the most vital factors affecting the adoption of eco-friendly solutions in SMEs.

The study used the theory of economic development to explain the relationship between innovation and the development of businesses in developing countries. 500 SMEs in Islamabad, Pakistan were reached out via email, and their responses were collected using Google Forms. The study confirmed the positive relationship between green innovation and SME development even in turbulent conditions in the market. However, in the context of Pakistan, this study established that government support has a negative impact on the development of SMEs striving to inculcate green innovation into their businesses.

Keywords

Green innovation, green entrepreneurship, SMEs development, market turbulence, government support

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Chapter 01

1. Introduction

1.1 Introduction and Background

In a manufacturing process, raw materials are converted into products, which are accompanied by emissions and environmental wastes formed due to the consumption of energy and materials during the process (Han, Zhao, & Yan, 2020). Since Industrial Revolution, there has been ever-increasing pressure on the environment due to the unregulated harmful emissions of the manufacturing industries. Issues related to environmental deterioration, future generations, preservation of the natural world and biodiversity, and exhaustion of natural resources caused by for-profit man-made activities have drawn the attention of environmentalists and governments. This has prompted encouraging attitudes toward sustainable development to be influenced by those who care about the environment. The people who care about the environment, in particular, have a positive attitude toward sustainability among the stakeholders in the supply chain and have realized the intention of adopting innovative green practices by having nursing attributes (Muhammad et al., 2018).

The economy has significant obstacles in fulfilling the objectives of sustainable development because of climate change, environmental deterioration, and financial limits. While businesses were perceived as the primary polluters and resource consumers, natural and the business environments at first seemed to be mismatched and impossible to merge, the recent drift is to warrant the transition towards the green economy: green entrepreneurship, green growth, and green jobs, all of which indicate a unique concern for the environment and the formation of innovative, sustainable business models. Large industrial conglomerates, small business owners, consumers, and governments all increasingly contribute to the paradigm change by realising that long-term well-being can only be accomplished via environmental protection (Muangmee et al., 2021).

In this modern era, the importance of environmental sustainability for organizational decision-making cannot be undermined (Varadarajan, 2015). Despite the countless advantages and incentives offered by public and private platforms, for some reason, the response of manufacturers to green innovation is not according to expectations (Abdullah et al., 2015). The major factors influencing the acceptance of green and sustainable innovation by the producers

are government environmental policies, pressure from stakeholders, organization scale, the industry sector, managers' capabilities, and human resources (Salem, Shawtari, Shamsudin, & Hussain, 2018).

According to Schiederig (2012), green innovation or sustainable development is defined as “the integration of conservation and development to ensure that modifications to the planet do indeed secure the survival and well-being of all people.” As per a report under United Nations' Brundtland report (1987), green innovation is meeting “the needs of the present without compromising the ability of future generations to meet their own needs. The concept of sustainable development does imply limits – not absolute limits but limitations imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activities”. There are two aspects of the research regarding green innovation at the organizational level. The first aspect deals with research that enables green and sustainable innovation and the other one deals with its implications and consequences. This helps in understanding the relationship between green innovation and business performance (Amores-Salvado et al., 2014). Although no clear conclusion can be drawn regarding the role of green innovation in organizational performance, a number of empirical studies show a positive impact of green innovation on business performance (Horvathova, 2012). Identification and classification of green innovative activities of a business and the absence of interest and understanding of green innovative measures by the stakeholders of the business continue to be a big barrier.

Nevertheless, one of the difficulties is recognizing and categorizing green innovative activities of organizations and the absence of appropriate comprehension of a few organizations of green development measures. There are some studies that have explored the variables impacting the execution of green development in organizations (Tseng, 2013; Lin et al., 2014). Green innovation can be categorized into four distinct categories: technological aspects, management performance, design of a product, and matters related to manufacturing. Any change in the processes of existing products in an effort to minimize harmful environmental impacts also comes under the umbrella of green innovation. Green innovation can significantly lower environmental pollution and its harmful effects on resource utilization to create products, hence resulting in sustainable development (Ebrahimi & Mirbargkar, 2017).

With regards to sustainable development, technology can be viewed as a two-edge sword that comes with its own problems, particularly when the rate of advancement is rapid. New working

methods and technologies can enhance competition and urge abrupt action ultimately resulting in positive environmental outcomes. On the other hand, new technologies create new business opportunities, and in some cases, may cause serious issues. As a result of the rapid pace of technological advancement, the production rate and usage of products also surge resulting in increased pollution, making it crucial to find a balance between both (Oncioiu, Ifrim, Petrescu & Bîlcan, 2018).

Green innovation is an outcome of green entrepreneurship which in turn provides competitive advantage and sustainability to an origination. Sustainability is the tactical basis for decision-making in businesses (Makower, 2013). Green entrepreneurship is associated with the green economy in which it is a priority to pay due attention to sustainable businesses and environmental problems. Green entrepreneurship urges environmental protection against the damaging impact of environmental pollutants. Among the goals of green entrepreneurship, adequate waste recycling, exploring, and implementing renewable power resources, and promoting organic farming are the prominent ones (Uslu et al., 2015).

The difference between green innovation and non-green innovation is not very distinct as the drivers for both non-green and green innovation can be identical. Green innovation possesses a “double externality effect”. Apart from the advancement in technology resulting in favourable business and economic outcomes, green innovation also produces various positive externalities having a positive impact on the environment. However, the positive externalities of green innovation must be higher than those of typical innovation (Heyes and Kapur, 2011).

SMEs are the biggest contributor of economic growth all over the world. The introduction of green practices in SMEs is enabling them to have viable businesses related to green entrepreneurship and is encouraged by environment protection bodies and governments (Krstić et al., 2016). However, the role of market turbulence needs to be considered in SMEs’ adoption of green innovative practices. Market turbulence is concerned with the rate at which the tastes and compositions of the customers change. Unpredictability and instability of the external environment are the primary drivers of these changes (Tsai and Yang, 2013).

In Pakistan, in comparison with developed nations, no practical steps have been taken to contain environmental pollution, particularly in the field of manufacturing and utilization of green products. This debate is now gaining attention in the areas of green innovations and green production. In accordance with this, green entrepreneurship is a developing spectacle that

possibly can make unique products and technologies needed to take care of environment deterioration (Ali, Hussain, Younas & Jamil, 2021).

Around 98% of all the production units in Pakistan fall under the category of SMEs and 80% of those SMEs are located in urban areas close to rivers and most of these SMEs do not have proper control over their carbon and greenhouse gas emissions. These SMEs are not opting for green innovation to fulfill the directives of environment regulation authorities to minimize their hazardous emissions. There is a need for strict environmental regulations and government monetary and non-monetary incentives to make SMEs understand the importance and true potential of green innovation and ultimately implement green solutions (Kousar et al., 2017).

In developing nations, governmental regulations and policies play a vital role in encouraging SMEs to develop and adopt environment-friendly methods of production. In South Korea and Malaysia, it has been observed that the SMEs shifted to the latest and less polluting production methods when the government made policies and offered incentives requiring SMEs to do so (Murad, 2016). Government support and interference by policy making are primary drivers of enhancing the interest and willingness of SMEs to adopt green innovation (Lin & Ho, 2011). Moreover, Veugelers (2012) found out that policy intervention is one of the most powerful tools in the implementation of cleaner and greener technologies by the SMEs.

Ecopreneurs or green entrepreneurs are individuals striving to establish sustainable companies to safeguard the environment in any capacity (Kirkwood & Walton, 2010). Investment by private sector organizations in green entrepreneurship does not only bring outstanding profits for the businesses, but also brings about a positive change in the society (Silajdzic et al., 2014). A study by Sarkar (2013) indicated that actions under the umbrella of green entrepreneurship initiate continuous growth for the businesses and enhance green development. The question here is, can green entrepreneurship resulting from green innovation influence the growth of small and medium enterprises? If so, what influence do market turbulence and governmental support have in SMEs growth in terms of growth in enterprise employment, growth in financial performance and starting new business ventures.

In this framework, entrepreneurship is viewed as a crucial component in addressing the major issues facing modern society. SMEs may support inclusive growth by making jobs available to the most vulnerable people, as well as sustainable growth by creating jobs that adhere to environmental standards. Through innovation and the acceptance of new technology,

entrepreneurship can influence the expansion of the green economy. However, innovation and technology transfer to this category of businesses are expensive, particularly in developing nations, thus governments are urged to make it easier for them to access markets and financing (Vasilescu et al., 2022).

1.2 Problem Statement

Various studies are available to understand the impact of entrepreneurship on SMEs development. Some also cater the factor of market turbulence as well. No studies are available in Pakistani context explaining what impact market turbulence and government support have on green innovation contributing to SMEs development, which is the problem statement of this study.

1.3 Research Aim

The aim of this research is to assess the role of green innovation and green entrepreneurship in the development of small and medium-level enterprises specifically considering the evolving market needs and government support programs.

1.4 Research Objectives

This research was intended

- To evaluate the effect of green innovation and green entrepreneurship on SMEs development
- To understand the role market turbulence plays in adopting green innovation for SMEs in Pakistan
- To understand the role of government support in encouraging green innovation in SMEs in Pakistan

1.5 Research Questions

This study strives to answer the following questions.

- How do green innovation and green entrepreneurship affect the development of SMEs?
- What role market turbulence plays in adopting green innovation for SMEs in Pakistan?
- What role government support plays in encouraging green innovation in SMEs in Pakistan?

1.6 Justification for the Research Topic

Global warming and climate change have affected most of the world population and the situation is expected to get worse in the coming years. Man-made products and tools have a major role in the deterioration of the situation. There is a need for practical measures to reduce the negative environmental impact of human activities along with introducing such actions which support the environment protection initiatives while producing capital. SMEs have the far-reaching impact due to their wide presence. So, there is a need for encouraging the SMEs to go towards the green innovation ultimately resulting in green entrepreneurship. This will help entrepreneurs have a sustainable business while they are contributing to the environment protection. Market turbulence and government support are two of the main factors that are responsible for the success or failure of any business venture. Studying the impact of these factors on green innovation for SME development was the gap in the literature that would be studied in this research.

1.7 Significance and Scope of the Study

The study would have practical implications in the form of priceless outcomes to understand the effect of green innovation on SMEs development. The entrepreneurs can benefit from this study by incorporating the results in their business plans related to green innovation as they would have a better understanding of how government support and market turbulence affect the innovation in SMEs. This would encourage entrepreneurs to invest in environmentally friendly business solutions which would produce a self-sustaining business while protecting the environment.

No standardized database is present in Pakistan to determine the actual number of SMEs in a particular area. This study covers over 500 SMEs in Islamabad region belonging to various manufacturing segments including pharmaceuticals, marble cutting and polishing, auto parts manufacturers, steel mills, oil and ghee, flour mills, and food processing units. The data is collected from the owner and employees of these SMEs. The questionnaires were distributed to those industries via their contact emails. The broad area of study is all SMEs in Pakistan, but SMEs in mentioned areas were the unit of analysis.

Chapter 02

2. Literature Review and Research Hypotheses

2.1 Green Innovation and Green Entrepreneurship

The idea of "green entrepreneurship" is relatively new; it was initially discussed in the early 1990s and has since attracted more and more attention. A distinct subgroup of entrepreneurship known as "green entrepreneurship" aims to develop and put into practice solutions to environmental issues while also fostering societal change to prevent the environment from being harmed. It is also argued that green entrepreneurship might evolve into a brand-new approach to doing business rather than being seen as a subset of entrepreneurship. This is due to the fact that green business owners have a broader motivation than those who target certain specialised markets with their goods and services (Skordoulis et al., 2022).

The concept of green entrepreneurship includes green innovation. Due to mounting environmental concerns, green innovation has emerged as one of the most crucial strategic strategies for attaining sustainable growth (Polas, Kabir, & Tabash, 2022). Green innovation is described as "the introduction of a new or significantly improved product, service, process, organisational change, or marketing solution that can reduce the use of natural resources and the release of harmful substances throughout its life cycle". Green innovation is essential to the survival of both businesses and nations. Since green innovation aids in the creation of novel thoughts, viewpoints, goods, and procedures, the adoption of these fresh ideas promotes the reduction of negative environmental effects (Skordoulis et al., 2022).

Green innovation is one of the primary corporate assets with a large potential to create value in the marketplace and to support businesses in achieving success in the market, according to business and environmental management experts. Green innovation demonstrates a company's readiness to use innovations in its processes or products that will help it achieve a high level of environmental sustainability. Green product innovation aims to create innovative products with minimal negative environmental impacts over their full life cycle. Environmental challenges like pollution avoidance, waste recycling, energy conservation, and eco-design are addressed via green process innovation (Chang, 2011; Huang & Li, 2017). Understanding the factors that lead companies to adopt green innovation techniques is crucial since these strategies help a company stand out from its rivals, increasing the likelihood that it will gain a competitive edge (Afshar & Gharleghi, 2020).

According to researchers, green innovation is what makes green entrepreneurship successful (Arici & Uysal, 2022). Although green innovation and green entrepreneurship are unmistakably linked, organisations that embrace green entrepreneurship techniques might not ultimately be capable of achieving green innovation (Yu, Wu, Zhang, & Zhao, 2021). Innovation that is green demands more work than innovation that is conventional. In this regard, a number of business skills are required in addition to green entrepreneurship to accomplish green innovation (Li, Tian, & Lu, 2022).

Existing research suggests that entrepreneurship can be developed by businesses directly or indirectly (Yu et al., 2021). Businesses that practice green entrepreneurship can manage the use of different resources and, as a result, lessen the environmental impact of their operations while creating and utilising green chances for innovation, development, organisation, and the wise use of primary resources. As a result, the primary strategic function of green entrepreneurship is to motivate businesses to create organisational dynamics that will allow them to manufacture the greatest number of cutting-edge green products possible (Irfan, Sharif, & Yang, 2022).

If businesses maintain a business orientation, which entails a higher level of innovation, risk taking, and initiatives (Li et al., 2022) the aforementioned orientation can become even more stable and effective. As a result, businesses that are strongly committed to green entrepreneurship might show innovative management practices and ecologically friendly products, services, processes, or business models. Consequently, these businesses will gradually and successfully generate green innovation (Irfan et al., 2022).

Even while the economic benefits are the ultimate objective of green entrepreneurship-focused businesses, this makes it simpler for them to achieve green innovation than for businesses that only concentrate on the financial advantages and profitability (Arici & Uysal, 2022). As a result, green entrepreneurship can foster green innovation even if it is built on the principles of advancing technology and cutting costs (Skordoulis et al., 2022).

Hypothesis 1 There's a positive relationship between green innovation and green entrepreneurship

2.2 Green Entrepreneurship and SMEs Development

Entrepreneurship as a concept is studied both at the individual and company level. In fact, entrepreneurship means actively pursuing new business strategies and new products. In mature organizations, it is not limited to new investments (Bouncken, 2016). Schumpeter (1934) states

that entrepreneurs are constantly trying to enhance their economic status and innovation. The most suitable description that can be provided for the term entrepreneurship is that it is an innovation process which requires huge efforts and perseverance to explore opportunities, in addition to taking financial, spiritual, and social risks to earn economic profit, accomplishment, personal fulfilment and independence (Božić and Rajh, 2016).

The entrepreneurship of a company or an individual is judged in three primary dimensions, proactiveness, innovativeness and risk-taking behaviour. Proactiveness of an individual or a company is their ability to exploit and take advantage of opportunities. Whenever there is a change in market dynamics, entrepreneurial individuals and organizations analyse those changes and forecast future trends to generate new business opportunities (Božić and Rajh, 2016). Innovativeness is the capability of an individual or an organization in creating and promoting new ideas and concepts (Kyrgidou and Spyropoulou, 2013). This equates to getting rid of conventional and old methods and solutions while trying out new, better, and improved solutions (Hong et al., 2013). Risk-taking is the behaviour of an individual or a company to take risks by pursuing uncertain opportunities. Although risk-taking increases the chances of failures for an initiative and this failure can be a learning experience for the next big thing (Li et al., 2016).

Schumpeter (1934) has defined entrepreneurship as a venture having innovation as a primary characteristic. He also proposed five behaviours which lead to entrepreneurship, namely launching new products or services, devising new processes, exploring new market segments, exploration of new supply sources, and reorganization of the business. Carland et al., (1984) established that these behaviours are identifiers of a venture entrepreneurial in nature. Intrinsically, a business can have an entrepreneurial framework, or a member of the business can possess entrepreneurial characteristics, both of which complement each other. Martin & Javalgi (2018) characterized entrepreneurship as behaviours of proactiveness, innovativeness and risk-taking targeted to creation of value in the businesses. Nasution et al., (2011) defined entrepreneurship as an organization structure of creating and boosting businesses via innovative practices and opportunity exploitation making use of risk-taking, autonomy, and proactiveness attributes of entrepreneurship.

Entrepreneurial organizations are proactive to obtain data on competitors and customers, innovate by reorganizing their resources to devise a planned response, implement that response which requires taking on some level of uncertainty and risk (Foss, Klein, & Bjørnskov, 2019).

Risk taking is the capability to take aggressive steps such as jumping into new unknown markets and pouring in huge resources in ventures with unclear results (Amankwah, Danso, & Adomako, 2019).

Various recent studies have documented and measured risk-taking as an entrepreneurial characteristic and established that it has a significant impact on innovation, technology development and its diffusion (Nasution et al., 2011). Hence, risk-taking is proposed to have an important effect on the innovation capacities and performance of entrepreneurial organizations. Amankwah et al. (2019) identify the types of risks taken by entrepreneurial businesses or entrepreneurs. He categorized them into financial risk (taking enormous loans or investing heavily to grow), business risk (jumping into untested and unknown markets or implementing untested technologies), and personal risk (taking a firm position for a strategic action plan).

Risk-taking capability is a measure of the inclination of an individual or an organization to make rational investments having both the possibilities of failure and success (Moraes, Iizuka, & Pedro, 2018). Organizations with a high risk-taking capability ought to gain better performance and growth in the long-term (Hsieh, Karmowska, Marinova, & Zhang, 2019).

Proactiveness was first identified as an entrepreneurial characteristic by Schumpeter (1934) by characterizing “taking initiatives” as an entrepreneurial trait. While documenting opportunity recognition as an entrepreneurial characteristic, Hornaday and Aboud (1971) also shed light on proactiveness. Proactiveness is a forward-looking and opportunity-seeking behaviour which involves introduction of new products or services before any of the competitors and to act in accordance with future trends to initiate a change and influence the future environment (Amankwah et al., 2019). Some researchers also listed idea generation, future orientation, anticipating obstacles, adaptability, meaningful communication, inculcation of new processes, introduction of new products or services as elements of proactiveness (Travis & Freeman, 2017; Zhao & Smallbone, 2019). A significant relationship was found between proactiveness and business development by Oni, Agbobli & Iwu (2019). Nasution et al., (2011) identified and proved the relationship between innovation and proactiveness.

Proactiveness exhibits pre-emptive actions taken by an organization considering future market trends to achieve competitive advantage and identify new opportunities (Wales et al., 2016).

As per Linton (2019), proactiveness enables organizations to gain full advantage of being a first mover and establish complete domination over market channels.

Autonomy is another entrepreneurial characteristic referring to the authority and power to implement one's decisions. Davids (1963) was one of the earliest researchers on the entrepreneurial characteristic of autonomy. Autonomy is an independent act by a team or an individual to bring forward a vision, a new business concept and seeing it being implemented. This term also involves taking actions which an individual deems necessary without caring about opinion of others (Henssen et al., 2014). Individuals with a high autonomy do self-directed tasks, inconsiderate of views of others and choose to make their decisions by themselves (Johanssen et al., 2015). However, a greater autonomy may spell a disaster making organizations rethink the idea of giving autonomy to individuals. Henssen et al., (2014) showcased that best innovative corporate venturing ideas originate from "bottom-up" approach, exhibiting that organizations empowering their employees by giving them greater autonomy tend to be more successful. It has been stressed that businesses ought to empower their workers to make entrepreneurship work, resulting in innovation and greater business performance (Nasution et al., 2011).

Autonomy gives birth to involvement and creativity, improving team cohesion and knowledge sharing, ultimately leading to a greater business performance (Kakar, 2018). Autonomy refers to self-direction and independent action by an individual in pursuit of a new opportunity. A number of researchers found that there is a significant positive relationship between autonomy and a business's performance (Yaro et. al., 2020).

Green entrepreneurship has been defined in several ways. According to Demirel (2019), ecopreneurship or green entrepreneurship is the execution of green and sustainable innovation to promote and support green economy. It has been defined by Kemp and Pearson (2007) as "...the production, assimilation or exploitation of a product, production process, service or management or business method that is novel to the organisation and which results, throughout its life cycle, in a reduction of environmental risk, pollution, and other negative impacts of resource use compared to relevant alternatives".

Green entrepreneurship is considered a subset of entrepreneurship that endeavors to build and put into practise solutions to environmental concerns as well as to promote societal change to avoid environmental damage. Furthermore, it has been anticipated that green entrepreneurship

may not only be a subgroup of entrepreneurship but pretty much a new model for business because green entrepreneurs are driven by more than just creating eco-friendly products and services for a specific market (Affolderbach & Krueger, 2017). Theoretical contexts for entrepreneurship along with environmental and welfare economics as a subgroup of sustainable entrepreneurship, can be employed to justify environmental or green entrepreneurship (Merino-Saum et al., 2020). Based on this literature, characteristics of entrepreneurship are used to determine the green entrepreneurship in a business or an individual.

This study concurs with the findings of other writers (Saari & Joensuu-Salo, 2019) and think that green entrepreneurship can become a business model because of its goals and outcomes, which include sustainable and equitable development. Additionally, the profitability of businesses and their competitive position may benefit from this form of business (Hojnik & Ruzzier, 2016). To secure the long-term survival of the firms, there is an increasing need for an approach to entrepreneurship as a system of interactions (Entrepreneurial Ecosystem) (Cavallo et al., 2019). Therefore, it is crucial to do thorough research on all topics connected to green entrepreneurship, eco-friendly behaviours, and sustainable business models, and to disseminate the findings to many stakeholders.

There is ample literature available suggesting that entrepreneurship can lead a growth and enhanced business performance. The risk-taking logic (Nasution et al., 2011; Amankwah et al., 2019; Moraes et al., 2018; Hsieh et al., 2019) proactiveness logic (Schumpeter 1934; Hornaday & Aboud 1971; Wales et al., 2016), and autonomy logic (Davids 1963; Henssen et al., 2014; Johanssen et al., 2015; Kakar, 2018; Yaro et. al., 2020) are some of those literatures supporting the argument that these entrepreneurial traits would have a direct positive impact on the performance and growth of a business.

Hypothesis 2 There is a positive relationship between green entrepreneurship and SMEs development.

2.3 Green Innovation, Green Entrepreneurship, and SMEs Development

Numerous mechanisms exist for green entrepreneurial businesses that may enable them to contribute to improved environmental performances (Das and Rangarajan, 2020). First, new products and services with a green entrepreneurial mindset are developed to help with environmental challenges (Guo et al., 2020). Second, it will enhance workers' health and safety by lowering carbon dioxide and harmful material emissions in the workplace (X. Xie et al.,

2019). Third, through health advantages and safety precautions, it will support the social welfare of the consumers. Similar to this, adopting an entrepreneurial approach that is green improves business success in three keyways. With product innovation techniques, the issue of resource costs will be addressed first (Chuang and Yang, 2014). Second, businesses who pursue green business possibilities will reap the rewards of being early adopters. Third, businesses reap extraordinary rewards for their substantial investments in green projects. The overall development of an organization's social, economic, and environmental performance is greatly aided by green entrepreneurship and green innovation (Asadi et al., 2020).

Recent literature on the relationship between entrepreneurship and innovation suggests that entrepreneurship coupled with some other factors like market-oriented thinking leads to successful innovation (Octavia, 2017). Entrepreneurial traits of risk-taking, proactiveness and autonomy along with integrated market orientation, learning orientation, and best human resources processes gives rise to innovation (Pratono, Ratih & Arshad, 2018).

Green innovation helps to lessen the harm done to the environment and improves business success. The creation of unique corporate characteristics has been connected to proactive environmental policies (Mulaessa & Lin, 2021). Environmental plans that are proactive allow businesses to align their strategies with the complex, dynamic, and uncertain business environment. They are linked to firm competitiveness, which may lead to competitive advantage for the company (Junaid et. al., 2022). According to Triguero et al. (2013), green innovation helps companies perform better environmentally and financially.

In order to protect the environment's impact, businesses must use innovative methods, such as developing eco-friendly products, which eventually improve business performance. The desire to perform well drives businesses to adopt proactive green initiatives that lead to sustainable growth (Mulaessa & Lin, 2021). Ghisetti and Rennings (2014) have made note of the beneficial relationship between profitability and competitive advantage as a result of the proactive green measures inspired by green innovation. Green initiatives have a number of advantages, including cost savings, reduced environmental impact, and improved economic returns. Numerous academics have also investigated empirically the link between proactive green initiatives and firm performance and found that there is a favourable correlation between the two (Asadi et al., 2020). The research by Klassen and Whybark (1999) likewise affirms the contribution of green innovation to the enhancement of company performance. Green initiatives enhance organisational capacities while improving business performance.

As the core of green entrepreneurship, green innovation frequently necessitates a high cost of investment, increasing the financial strain on a corporation (Cai & Li, 2018; Zhang et al., 2019). In the meanwhile, there are several obstacles to green innovation's success, such as technological ones (such as the availability of technology) and labour-related ones (such as a lack of employees to handle technology), among others (Hrabynskiy et al., 2017). The financial cost and obstacles highlight how challenging green entrepreneurship is for all businesses. Small and medium-sized enterprises (SMEs) find it particularly difficult because of their limited resources and expertise, which might limit how effectively they can implement an environmental plan (Nunes et al., 2019).

Despite these obstacles, we contend that green innovation often improves SME business performance. Green innovation can boost a SME's economic performance by utilising both tangible and intangible resources in addition to physical resources and technology. One way that green innovation helps the economy is through reducing costs, boosting productivity, or creating products that stand out and can acquire market share. Recognizing the physical resources that the company lacks and using technology to turn those resources into an advantage will help the company perform economically (Ma et al., 2018). For example, companies can restructure their products or production processes to make better use of resources, cut costs (such as materials, etc.), and increase productivity. In addition, businesses can boost their financial performance by using recyclable materials because they are less expensive than other resources (Cai & Li, 2018).

The implementation of environment friendly business procedures under the umbrella of green entrepreneurship can give birth to various new opportunities. These opportunities may come in the form of introduction of new products or services, substantial improvement in organization's efficiency, innovative marketing approaches, and reconfiguration of existing practices and models (Nordin & Hassan, 2019). Sharma and Kushwaha (2015) describe that a majority of the organizations around the world, especially in developing countries, are implementing green entrepreneurial practices due to the economic benefits and new opportunities, not just due to their environmental concerns. Companies are engaging in green entrepreneurial solutions to improve their corporate image and exhibit that they are mindful of environmental impacts of their businesses (Gupta & Dharwal, 2022).

Ebrahimi & Mirbargkar (2017) argue that product/service, process, and administrative innovation in small and medium enterprises can lead to better business growth and superior

business performance. They also argue that entrepreneurial traits of risk-taking, proactiveness and autonomy will eventually translate to business performance through innovation. Extant literature establishes that there is a significant relationship between innovation and business development, and entrepreneurship mediates their relationship (Hossain & Asheq, 2019; Pratono et. al., 2018; Ebrahimi & Mirbargkar, 2017; Octavia, 2017).

This literature review led to the following hypothesis:

Hypothesis 3 There is a positive relationship between green innovation and SMEs development with a mediating role of green entrepreneurship.

2.4 Green innovation and SMEs development

Green innovation is characterised into green process innovation, green product innovation, and administrative innovation (Li et al., 2018). The major focus here is to reduce the damaging environmental effect of the whole product life cycle, either by making the production process less hazardous to the environment, by utilising the energy efficiently or by using eco-friendly packaging material. Green innovation can give rise to green entrepreneurship and green businesses. Green innovation is concerned about reducing harmful environmental impact (Zailani et al., 2014).

Development of less energy consuming and less environment polluting manufacturing processes ensures less carbon emissions while reducing the cost of production for the companies. Key driver behind green innovation can be the cost saving strategy of the company, but it can also be a repositioning strategy for the company in the competitive market, enabling them to be more competitive and even open new and better business opportunities, along with reducing the environmental impact of the consumer products (Pacheco et al., 2017).

A study of 171 manufacturing companies using a structural equation modelling method indicated that the propensity towards entrepreneurship led to an increase in general innovation. Although when unreliability is high, this positive effect is reduced. Simultaneously, the capability to entice partners' knowledge to produce common innovative products is also increased (Bouncken et al., 2014). In another research, a framework for factors that affect SMEs development was provided. SMEs development is related to the characteristics of entrepreneurs. SMEs performance provides a framework of various parameters for assessing entrepreneurship and SMEs development. These parameters include innovation performance,

innovation capacity, administrative research, market positioning and entrepreneurial propensity (Sidik, 2012).

Environmental and business administration researchers believe green innovation to be one of the major corporate resources having the capacity to produce value in the market and to assist firms with making progress in the marketplace. Green innovation mirrors an organization's readiness to embrace those developments in processes or products that assist the organization in achieving huge environmental sustainability. Green product innovation is a way to produce new items that have less hazardous impacts on the climate all through their whole life cycle, which refers to the fact that they have an unparalleled degree of valuable life and a low degree of wastes and energy utilization during the usage of the product and are free from toxins, with the chance of reusing them (Afshar, Al- Gamrh & Gharleghi, 2020).

Green process development resolves some ecological issues, like contamination control, recycling of wastes, reducing energy consumption, and eco-plan (Huang and Li, 2017). Realizing what makes firms embrace green innovation is significant; these practices empower an SME to separate itself from its rivals, which increases the chance of accomplishing competitive advantage which would eventually result on the development of the SME (Afshar et al., 2020).

No matter the industry or discipline, it has long been believed that innovation is the primary force behind economic expansion since it boosts the competitiveness of nations, industries, and particular businesses. In his ground-breaking work, Schumpeter established the parameters for defining innovation in "The Theory of Economic Development" (1934, p. 65) narrating it is "the combination and creative destruction of existing and new elements of knowledge for the improvement of existing or the development of new products, services, production processes, organization methods, resources, markets and industries and its commercialization with the aim of creating or sustaining added value." More recent studies have focused on the "utilisation of opportunities" (Kirzner, 1973), "goal-oriented innovation" (Drucker, 1985), and "entrepreneurial and risk taking behaviour" (McGrath, 1999) in place of Schumpeter's "creative destruction," where the innovation concept is seen as a business growth opportunity. (Harrington et al., 2016).

The active role that SMEs play in green innovation should not be disregarded by scholars, especially considering their significance in developing economies. SMEs are by no means less

innovative than larger businesses. Due to their "cumulative influence," which is based on their huge number in most economies, SMEs are frequently essential to innovative solutions to environmental concerns. It should be mentioned that SMEs are not uniform entities that copy larger organisations but instead have their "own way" of operating by building distinct innovation processes and systems from those used by larger businesses (Battisti & Perry, 2011).

From an economic perspective, implementing green business practises improves a company's financial performance and market position. The effects of green strategies can be observed at the organisational level in addition to financial indices, consumers, suppliers, and the government (Asadi et al., 2020). Other researchers have come to the conclusion that green innovation directly affects operational outcomes that support the financial performance of the companies. Green innovation methods help reduce the costs associated with energy use and trash disposal, which benefits organisational costs (Muangmee et al., 2021).

In light of above literature, following hypothesis can be developed.

Hypothesis 4 There is a positive relationship between green innovation and SMEs development.

2.5 Role of Market Turbulence

Market turbulence is concerned with the speed with which customer composition and tastes change. It is related to the company's strategic choices. The main reason for these changes is the uncertainty and volatility of the external atmosphere. It reflects the changes in the priorities of customers about a product or service in a particular industry. This is one of the major contributors of market turbulence. In intense market turbulence, innovations of an organization can play a pivoting role to satisfy and meet the ever-changing needs of the customers. So, the innovation of an organization can act as a strategic tool through which the organization can respond to the evolving market in an effective way and continue working in that ecosystem. Whenever there is a possibility of severe market turbulence, organizations are required to perform extensive innovation exercises by executing their innovation strategies (Tsai and Yang, 2013).

Most organizations have been hesitant to put resources into green innovation since they see it as an expense which negatively impacts their economic performance. Nonetheless, an ever-increasing number of organizations are realizing the significance of and necessity for green

innovation because of external pressing factors. Various scholastics and experts accept that green innovation basically happens when two primary outside factors applied by governments and markets (Lee, 2020; Qiu & Wang, 2020): environmental guidelines and market turbulence.

Reviewing and analysing the moderating outcome of market turbulence on the association of overall innovation and green innovation in particular with the development of SMEs is essential. Innovation ensures that businesses are aware of changing market needs, and they act in time to accommodate those changes. It enables the decision makers of the company to focus on the change in industry and the demands of the customers. Organizations having a higher rate of innovation can respond quickly to the changing market demands and can score a competitive edge. According to the research by Devezer et al. (2014), there is another possible outcome of the market turbulence. It may hinder the growth and innovation of businesses, especially SMEs in the early stages of their growth. During an intense market turbulence, businesses will prefer to devote more of their resources to activities responsible for the stability of their business rather than in additional innovative entrepreneurial activities. So, the relationship between market turbulence and SME development should not be taken as a positive one.

Environmental context of any firm has a significant impact on its performance, and environmental elements must be considered while analysing the business performance of an organization. Various studies argue that turbulence in external environment gives rise to several types of opportunities and organizations can make use of those opportunities by utilizing their resources. Additionally, a turbulence in the market gives rise to ambiguity, which reduces the risk of imitation on capabilities of organizations. Therefore, the performance of a firm is increased in market turbulent conditions (Parnell & Brady, 2019). On the other hand, some researchers are of the view that an organization sometimes may not be respond to rapidly changing market trends caused by turbulence in external environment, or even these changes can make the firm's resources obsolete and outdated. Therefore, market turbulence reduces the business performance of an organization (Su, Peng, Shen & Xiao, 2013).

Market turbulence is concerned with the pace of change in the structure of clients and their inclinations (Senbeto & Hon, 2020). In a high market turbulent setting, firms persevere through steady changes in the arrangement of clients and their inclinations. Such changes not just lead to unclear demands on the products of an SME, yet additionally speed up the oldness of the products (Zhou, Mavondo, & Saunders, 2019).

Accordingly, market turbulence reduces life span of the products. The reduced life spans diminish the monetary return of products of an organization and further block the development of technological capabilities. Interestingly, when disturbance in the market is low, steadiness in the composition of clients and their inclinations permits a more prominent return and extended life spans for products (Zhou et al., 2019; Senbeto et al., 2020). Subsequently, the performance consequences of technical ability will be debilitated in a high market turbulent climate.

The following hypothesis are proposed for further research in light of this literature review.

Hypothesis 5 Market turbulence moderates the relationship between green innovation and SMEs development.

2.6 Role of Government Support

One of the biggest hurdles in implementing a business idea is the lack of financial support (Christian et al., 2015). This factor gains even more importance in case of SMEs. Sustainable economic progress remains one of the top priorities of governments all over the world. Entrepreneurship is considered as one of most significant drivers of sustainable economic progress in this modern era by all the governments of the world. SMEs garner the most attention here because they are responsible for over 90% of firms and account for over 60% of the employment in developing countries (Doh et al., 2014).

Before 1990s, governments started to impose heavy fines on polluters which ultimately undermined their capabilities and global competitiveness. Over the past decade, scholars have argued that government intervention in terms of environmental regulations can also promote economic performance rather than suppressing it (Li, He, & Deng, 2020). Environmental regulations, monetary or non-monetary incentives from governments can encourage SMEs to go for green innovation assisting organization to obtain sustainability (Dangelico, 2016). Government subsidies for research and development can significantly reduce research and development costs of SMEs on stimulate interest for green innovation while making environmental standards and regulation even more strict (Květoň and Horák, 2018).

Many countries have developed specialised programmes and subsidy schemes in order to encourage SMEs to implement green innovation. For instance, the Chinese government has allotted a significant number of R&D incentives to support green energy, innovative eco-

technology, environmental protection, and the improvement of industrial structure. However, it makes sense to state that most businesses require outside assistance and incentives to fund social and environmental initiatives (Monasterolo and Raberto, 2018). For sustainable development and the creation of green innovation, public support and government subsidies are essential. For instance, due to a lack of resources, company ventures in emerging economies are unable to successfully improve sustainable practises (Khattak, 2020). In this situation, public and governmental incentives encourage people to embrace and take part in eco-friendly and sustainable practises. Government subsidies also help to promote environmental activities by lowering R&D expenses and green spending (Raz and Ovchinnikov, 2015; Kveton and Horak, 2018). Government subsidies and incentives are typically offered for environmentally friendly activities, sustainable communities, and the elimination of pollution. Governments are interested in reducing emissions and pollution via funding businesses and the industrial sector (Li et al., 2018).

Regulations and government action are crucial for green innovation and green practises particularly for SMEs in developing countries. It directly reduces environmental pressure, leading to green development (Van Leeuwen and Mohnen, 2017; Dzonzi-Undi and Li, 2016). Utilizing the most advanced tools and technologies for environmental and sustainability initiatives is made possible by public financial support for businesses (Owen et al., 2018).

The governments offer incentives to the business to switch from high-pollution processes and high energy usage to eco-friendly activities and sustainable practises. Emerging economies' governments and public institutions favour investing in the industrial sector to set up green innovation and environmentally beneficial operations (Paramati et al., 2016). According to Berrone et al. (2013), regulatory pressure and government action have a major impact on green business practises and green innovation. Governments give resources and funding to advance environmentally friendly business practises and green innovation (Monasterolo and Raberto, 2018). When businesses obtain the best incentives and assistance, they create a successful management style that promotes sustainable behaviours and eco-activities (Kong et. al., 2022)

A significant aspect in encouraging SMEs to adopt green innovation is regulatory pressure, as non-compliance with government environmental standards may be extremely expensive for businesses (Berrone et al., 2013). Similar to this, Zhu et al. (2005) came to the conclusion that adopting green practises by businesses is positively influenced by strict environmental regulations and legislation. Green innovation is adopted by businesses as a result of

environmental regulatory pressure, which improves their cost effectiveness and profitability (Chan et al., 2016). The rate of adoption of green innovations in SMEs is accelerated by strict environmental protection laws and regulations and their effective enforcement.

Government policies and incentives play a vital role in motivating and convincing SMEs to let go of the old highly polluting processes and products and shift to such methods which can help save the environment. A study examined the moderating role of government support in terms of subsidies and tax exemptions in context of Cambodia and concluded that government support positively affects the adoption and acceptance of green innovation by the SMEs (Kousar et al., 2017).

Following hypothesis can be developed in the light of discussed literature.

Hypothesis 6 Government support positively moderates the relationship between green innovation and SMEs development.

2.7 Theoretical Framework

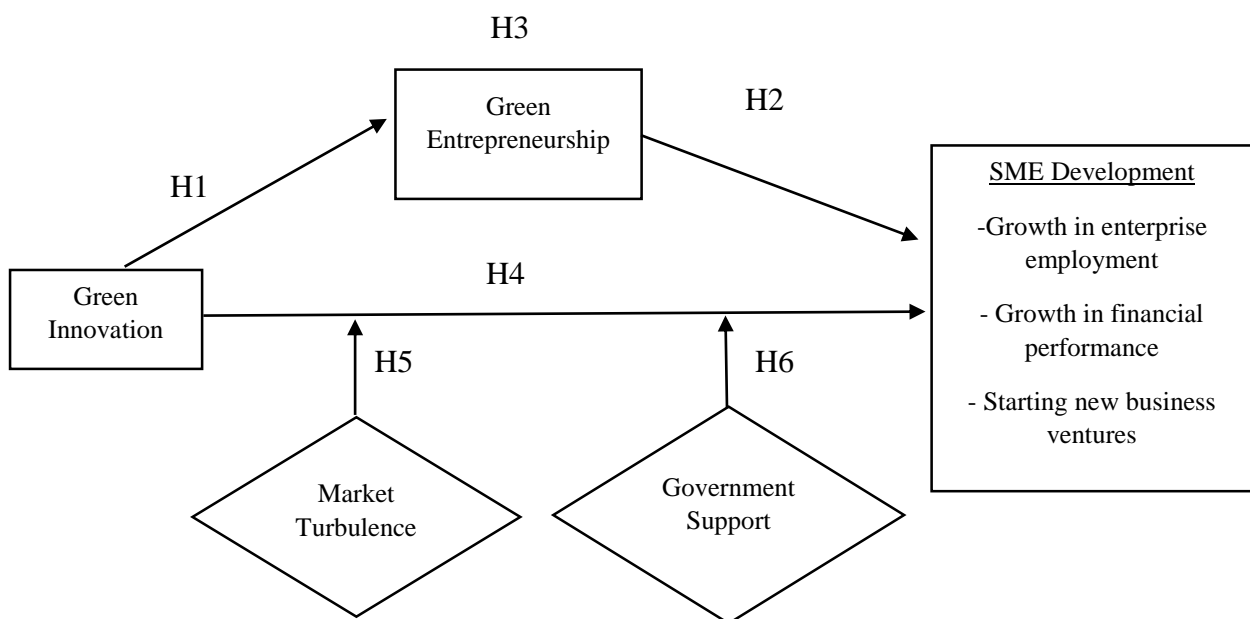


Figure 2.1: Theoretical Framework

Identifying the gap in literature, 5 variables are developed. Green innovation is the only independent variable, market turbulence and government support act as moderating variables. Green entrepreneurship is the mediating variable providing a linkage between green innovation and SME development. Lastly, SME development is the only dependent variable which has three parameters: growth in enterprise employment, growth in financial performance and

starting new business ventures. The framework follows the theory of economic development according to which in a developing economy, innovation gives birth to a new business venture (Schumpeter 1934). Innovation creates new opportunities, gives a competitive edge to businesses indulged in innovation promoting financial growth and profitability. Each product goes through a life cycle of development, innovation, growth, maturity, and ultimately moves to its decline. However, continuous innovation can lead to extended growth periods leading to better financial performance. The framework proposes that green innovation leads to SME development with mediating role of green entrepreneurship and moderating roles of market turbulence and government support.

Chapter 03

3. Methodology

3.1 Research Philosophy and Design

The research philosophy is the backdrop for exploring the assumptions and knowledge gathering processes that took place during this process. Research ontology is objective, as the strength of the relationship between various factors is measured by empirical/quantitative analysis. The data is collected from SMEs in Islamabad region through online questionnaires and there was no room for any subjectivity. Without catering any opinions, the focus of this research was to find links between external variables in other aspects of reality. According to the philosophy of research, the epistemology of research is positivist in nature, because procedural plans had been developed for research.

The research design is survey design, distributed to owners and managers of manufacturing SMEs in Islamabad area through Google Forms attached with emails.

The location of this research is Pakistan where small companies are considered as those having less than 35 people working for them, medium level companies are characterized as those having 36-250 employees. Likewise, in Pakistan, businesses with more than 250 employees are considered as large companies (SMEDA, 2020). In terms of job creation and value addition, SMEs are considered as a vital element of Pakistan's economy. Almost 90% of all businesses fall under the category of SMEs in Pakistan and their contribution to overall GDP is nearly 40%, with a contribution of 25% in the exports (SMEDA, 2020).

The main research method used in this study is the quantitative research method. Research involved producing numerical data that was tested for analysis and finding results. The methodology used involved verifying a theory comprising of variables which are assessed with numbers and studied with statistics in order to verify if the theory clarifies or forecasts phenomena under discussion (Fanelli, 2019). Therefore, this study used the deductive methodology because existing literature was used to develop hypotheses. After that, a research process was designed to assess the hypotheses that had been proposed. The study used quantitative data to define cause and effect relationship. So, we found results through deductive analysis.

3.2 Participants

3.2.1 Sample Size

Manufacturing SMEs in Islamabad make up the statistical population of this research. The definition of small and medium enterprises is adopted from the definition by Small and Medium Enterprise Development Authority (SMEDA). As per data obtained from Islamabad Chamber of Commerce and SMEDA, there are over 500 manufacturing SMEs in Islamabad region. The lists of SMEs were obtained from websites of concerned authorities and was used to identify the sample population for this statistical research. As per Morgan's table, the statistical population size of 500 would need a sample size of 217 SMEs. For the data collection purpose, the questionnaires were distributed to 1500 people (owners and senior managers of SMEs) via email. 240 responses were received, and data analysis was performed on 224 analysable questionnaires.

3.2.2 Sampling Frame

The participants of this study are the SME owners and managers within Pakistan and unit of analysis are SMEs in Islamabad. The reason behind choosing these industries is that these belong to eleven different product segments namely, pharmaceuticals, marble cutting and polishing, soap, auto body shops, steel melting furnaces, oil and ghee, flour mills, re-rolling mills, cosmetics, food, and recycling of lead-storage batteries, representing a very diverse range of businesses. The selection of area is based on the easiness of data collection from this region. Analysing these industries gave valuable insights applicable to different types of SMEs all over Pakistan.

3.3 Procedure

After the identification of research gap, I research proposal was formulated and presented to the department for approval. Once the department gave a go-ahead, the questionnaire was adapted from Wang et al. (2015) and Ebrahimi et al. (2017).

The sampling technique employed in this study is random sampling as SMEs in the areas of Islamabad are targeted randomly and questionnaires were sent to them. The questionnaires were distributed to the owners and employees of those industries via Google Forms and data was collected and analysed. The questionnaire is attached in appendix 1 and is based on a five-point Likert scale which would range from 1 for strongly disagree to 5 for strongly agree.

Pilot testing was performed on 30 responses and the reliability test was performed for the value of Cronbach's alpha on SPSS whose value came out to be 0.71, hence confirming the reliability of the adapted questionnaire. Complete data of 240 respondents was collected through Google Forms and various tests were performed on 224 valid responses to analyse the data. In light of literature, the data was interpreted, and a discussion was done followed by results of the study. Future recommendations and limitations of this study were outlined to assist future researchers.

3.4 Measures

The variables were measured by questionnaire tool and the variable named "green innovation" was measured by fifteen items. Each of the product innovation, process innovation, and administrative innovation types were measured by 5 items. The variable "green entrepreneurship" was measured by thirteen items. Each of the risk taking and pro-activeness were measured by 5 items and autonomy was measured by 3 items. The questionnaire about the variable of evaluation of "market turbulence" was adapted from the research by Wang et al. (2015) and was measured by 3 items. The dependent variable evaluated by 5 items is "SME development". The questionnaire about "government support" variable is adapted and would be evaluated by three items. Variables green innovation, green entrepreneurship, and government support are adopted from Ebrahimi et al. (2017).

Before moving towards full-scale data collection, pilot testing was performed on 30 responses and the reliability test was performed for the value of Cronbach's alpha on SPSS whose value was 0.6, which confirmed that the adapted questionnaire is reliable.

3.5 Analytical Strategy

The proposed research had multivariable data analysis including two moderating variables, one dependable variable, one mediating and one independent variables. The association and impact of these variables on one another was observed. This is a quantitative study, and "Statistical Package for Social Sciences (SPSS)" was utilised for data analysis and outcomes. Association of variables and acceptance or refusal of the hypothesis proposed was observed.

Firstly, descriptive tests were performed to evaluate the mean, standard deviation, and frequency of the data. The value of Cronbach's alpha was determined to assess the reliability of the adapted questionnaire. To understand the statistical correlation of independent variable and dependent variable, Pearson correlation coefficient was determined. As all the variables are continuous (all the data is collected on a 5-point Likert scale), Structural Equation

Modelling (SEM) was performed to understand the impact of mediator and moderators using AMOS. To test the quality of the model, the CFA test was performed using AMOS.

The outcome of this research shows the impact of green innovation on SME development with marketing turbulence and government support as moderating and green entrepreneurship as mediating variable.

Chapter 04

4. Ethical Considerations for Research

During the research process, it is imperative that researchers keep all ethical issues in mind to prevent serious consequences. Several ethical issues are also relevant to this research which were considered during data collection and evaluation. Moral issues include, for example, respondents agreeing to share information via Google Forms and the privacy of their shared data were considered. To address these problems, researchers reached out to the respondents via email communicating clearly the motive of this research, the information required and its usage, who will have the access to their shared data and how it will be stored. It was ensured to all the respondents that this research is for academic research purposes only and that the information collected, and the identity of participants would be kept extremely confidential. The conclusions and final outcomes of this research would be provided to the respondents if requested. All respondent: owners and managers of the SMEs were assured that all information collected during the research will remain personal and highly confidential for the projects and activities. Therefore, it was ensured that the researcher did not violate any policies and avoid any unethical behaviour.

Chapter 05

5. Results

The quantitative findings of this research are elaborated in this chapter. A descriptive analysis was done followed by reliability analysis. Outcomes of correlation analysis were quantified and analysed afterwards. Finally, a confirmatory factor analysis was performed using AMOS and findings were presented.

5.1 Descriptive Statistics

Table 5.1: Descriptive Statistics of Variables

	N	Minimum	Maximum	Mean	Std. Deviation
GI	224	2.53	5.00	4.1655	.37944
GEN	224	2.46	5.00	4.2150	.37806
SMEDVE	224	1.40	5.00	4.1661	.53430
MT	224	2.00	5.00	4.2009	.49292
GS	224	1.00	5.00	2.2634	1.29641
Valid N (listwise)	224				

According to the results of the descriptive statistics mean value and Standard deviation of the green innovation scale is to be measured as 4.1655 and .37944 respectively. According to the green entrepreneurship scale the mean value is 4.2150 and standard deviation value is 0.37806. While on the other hand SMEs development, market turbulence, government support, mean values are 4.1661, 4.2009, 2.2634 and standard deviation values are .53430, .49292, 1.29641 respectively.

5.2 Reliability Analysis

Table 5.2: Reliability Statistics

Variable	N of Items	Cronbach Alpha
Green Innovation	15	.784
Green Entrepreneurship	13	.763
SME Development	5	.758
Market Turbulence	3	.706

Government Support	3	.856
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The reliability analysis confirms the consistency of all items of this scale. As per Hair et al. (2010), minimum value of Cronbach Alpha for any scale item to be acceptable is 0.7. As exhibited in Table 6.10, Cronbach Alpha value for Green Innovation variable having 15 items is 0.784, for Green Entrepreneurship is 0.763 with 13 items, for SME Development is 0.758 which has 5 items, for Market Turbulence the reliability value is 0.706 with 3 items and for Government Support the value is 0.856 which has 3 items.

5.3 KMO and Barlett's Test

KMO is a test employed to assess how good the components justify one another in terms of partial correlation among those components. KMO values of 1.0 or close are considered as excellent, although those below 0.5 are considered unacceptable. Majority of scholars now insist that factor analysis should begin with a KMO value of at least 0.70. Indices of Factorial Simplicity can be determined as per the following table: Kaiser, H. F., & Rice, J. (1974)

Table 5.3: Evaluation Criteria for KMO and Barlett's Test

in the .90s	Marvelous
in the .80s	Meritorious
in the .70s	Middling
in the .60s	Mediocre
in the .50s	Miserable
below .50	Unacceptable

Results shown below indicate a KMO value of 0.781 which indicates that there is a substantial degree of data overlay or a high partial correlation among the variables. So, it makes sense to run a factor analysis.

Table 5.4: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.781
Bartlett's Test of Sphericity	Approx. Chi-Square	4079.340
	Df	780
	Sig.	.000

5.4 Correlation Analysis

Purpose of performing a correlation analysis is to quantify the strength of relationship among all the variables of a model. The relationship between 2 variables can either be negative or positive and the value of correlations coefficient ranges from +1 to -1. A value close to +1 indicates a strong positive correlation between the two variables. On the other hand, if the value is close to -1, it shows that there exists a strong negative correlation between the said variables. However, a value close to 0 exhibits no relationship between the two analysed variables (Saunders et al., 2011).

Table 5.5: Correlation Analysis of the Variables

		GI	GEN	SMEDVE	MT	GS
GI	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	224				
GEN	Pearson Correlation	.691**	1			
	Sig. (2-tailed)	.000				
	N	224	224			
SMEDVE	Pearson Correlation	.640**	.690**	1		
	Sig. (2-tailed)	.000	.000			
	N	224	224	224		
MT	Pearson Correlation	.276**	.371**	.368**	1	
	Sig. (2-tailed)	.000	.000	.000		
	N	224	224	224	224	
GS	Pearson Correlation	-.231**	-.166*	-.138*	-.200**	1
	Sig. (2-tailed)	.000	.013	.040	.003	
	N	224	224	224	224	224

According to the correlation results, Pearson correlation value of 0.691 indicates a strong positive relationship between green innovation and green entrepreneurship. Similarly, SME development has a strong positive relationship with both green innovation and green entrepreneurship as exhibited from their correlation values of 0.640 and 0.690 respectively. Market turbulence positively affects green innovation, green entrepreneurship, and SME development as evident from their correlation values of 0.276, 0.371, and 0.368. Government support, on the other hand, has negative relationships with green innovation, green entrepreneurship, SME development, and market turbulence as highlighted through the Pearson correlation values of -0.231, -0.166, -0.138 and -0.200.

5.5 Factor Analysis

To determine the link between all of the variables in a given dataset, factor analysis is most frequently performed. Less than 50% cumulative value is acceptable and as elaborated below, cumulative % for this model is 15,860% indicating model is acceptable.

Table 5.6: Total Variance

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.438	18.595	18.595	6.344	15.860	15.860
2	4.545	11.363	29.958			
3	2.270	5.675	35.633			
4	1.855	4.637	40.270			
5	1.565	3.913	44.183			
6	1.533	3.834	48.016			
7	1.319	3.297	51.313			
8	1.279	3.197	54.510			
9	1.238	3.095	57.605			
10	1.192	2.981	60.585			
11	1.102	2.755	63.340			
12	1.073	2.682	66.023			
13	.924	2.311	68.334			
14	.909	2.272	70.605			
15	.839	2.098	72.703			
16	.820	2.050	74.753			
17	.764	1.910	76.663			
18	.739	1.846	78.509			
19	.691	1.728	80.238			
20	.676	1.691	81.929			
21	.631	1.577	83.506			
22	.587	1.468	84.974			
23	.576	1.440	86.414			
24	.544	1.360	87.775			
25	.503	1.257	89.032			
26	.494	1.234	90.266			
27	.467	1.168	91.434			

28	.442	1.105	92.539			
29	.414	1.034	93.573			
30	.388	.969	94.543			
31	.368	.920	95.462			
32	.338	.846	96.309			
33	.321	.802	97.111			
34	.303	.758	97.870			
35	.273	.682	98.552			
36	.250	.626	99.178			
37	.158	.394	99.572			
38	.085	.212	99.784			
39	.048	.120	99.904			
40	.039	.096	100.000			

5.6 Confirmatory Factor Analysis

Confirmatory factor analysis of CFA is specifically employed to assess the validity of a measurement model, as highlighted by Brown and Moore (2012). It is a type of structural equation modelling and serves a range of purposes including construct validation and confirming the validity and credibility of a model.

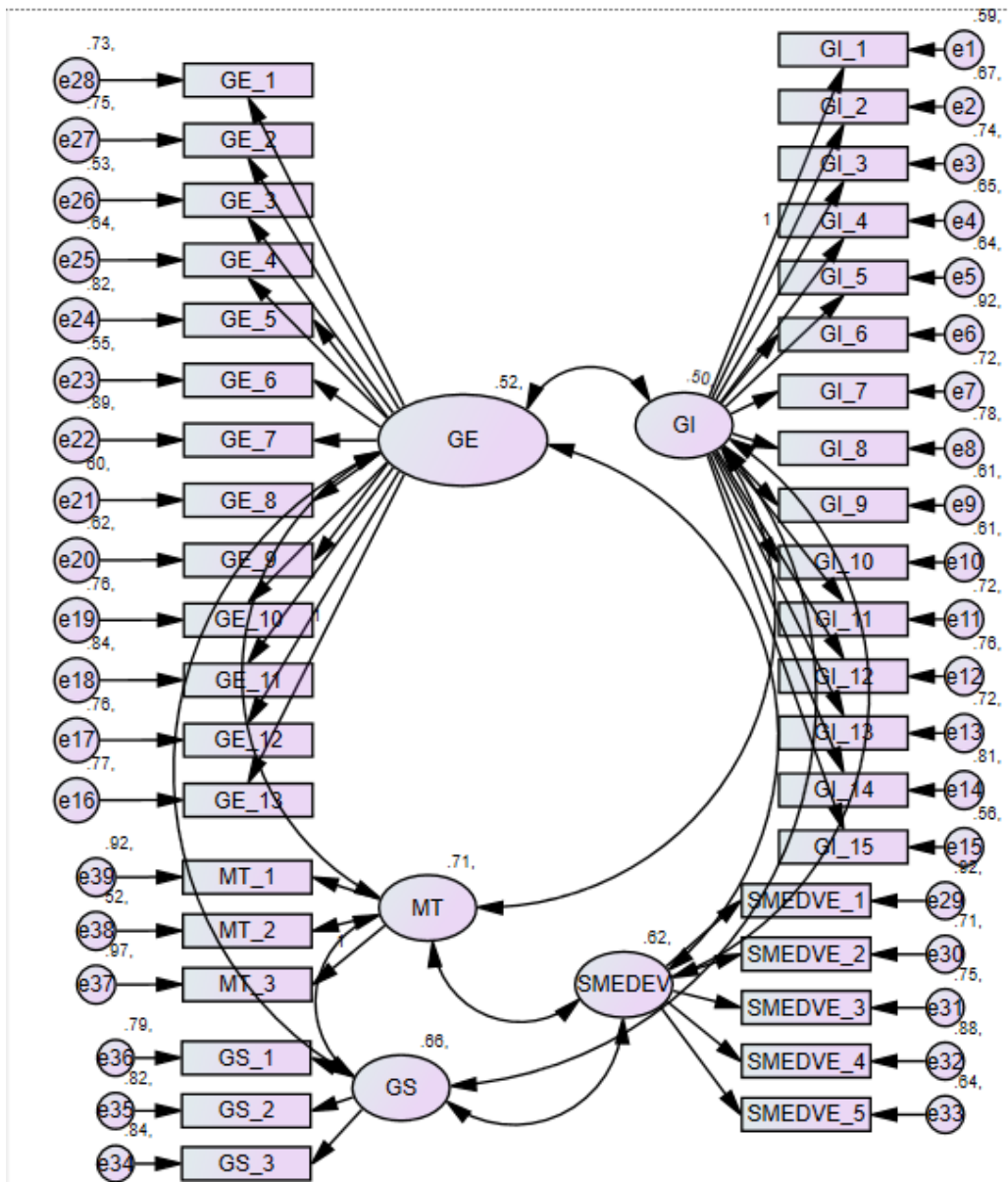


Figure 5.1: Confirmatory Factor Analysis Model on AMOS

Table 5.7: Confirmatory Factor Analysis Results

Constructs	Items	Loadings	AVE	CR
Green Innovation	GI_1	0.590	0.5068	0.938
	GI_2	0.678		
	GI_3	0.743		
	GI_4	0.658		
	GI_5	0.648		
	GI_6	0.923		
	GI_7	0.723		
	GI_8	0.782		
	GI_9	0.618		

	GI_10	0.610		
	GI_11	0.749		
	GI_12	0.768		
	GI_13	0.723		
	GI_14	0.812		
	GI_15	0.563		
Green Entrepreneurship	GE_1	0.735	0.525	0.934
	GE_2	0.751		
	GE_3	0.537		
	GE_4	0.649		
	GE_5	0.822		
	GE_6	0.564		
	GE_7	0.892		
	GE_8	0.609		
	GE_9	0.623		
	GE_10	0.762		
	GE_11	0.840		
	GE_12	0.764		
	GE_13	0.772		
SME Development	SMEDEV_1	0.927	0.628	0.892
	SMEDEV_2	0.717		
	SMEDEV_3	0.756		
	SMEDEV_4	0.881		
	SMEDEV_5	0.646		
Market Turbulence	MT_1	0.958	.715	0.867
	MT_2	0.525		
	MT_3	0.975		
Government Support	GS_1	0.795	0.669	0.858
	GS_2	0.809		
	GS_3	0.848		

According to the results of item loadings, it is observed that for the construct Green Innovation, such as for GI_1, the item loading is 0.590, for GI_2, the item loading is 0.678, for GI_3, the item loading is 0.743, for GI_4, the item loading is 0.658, for GI_5, the item loading is 0.648, for GI_6, the item loading is 0.923, for GI_7, the item loading is 0.723, for GI_8, the item loading is 0.782, for GI_9, the item loading is 0.618, for GI_10, the item loading is 0.610, for GI_11, the item loading is 0.749, for GI_12, the item loading is 0.768, for GI_13, the item loading is 0.723, for GI_14, the item loading is 0.812, for GI_15, the item loading is 0.563. The AVE (Average Variance Extracted) is 0.5068, and the composite reliability is 0.938. For the construct Green Entrepreneurship, such as for GE_1, the item loading is 0.735, for GE_2, the item loading is 0.751, for GE_3, the item loading is 0.537, for GE_4, the item loading is

0.649, for GE_5, the item loading is 0.822, for GE_6, the item loading is 0.546, for GE_7, the item loading is 0.892, for GE_8, the item loading is 0.607, for GE_9, the item loading is 0.623, for GE_10, the item loading is 0.762, for GE_11, the item loading is 0.840, for GE_12, the item loading is 0.764, for GE_13, the item loading is 0.772. The AVE (Average Variance Extracted) is 0.525, and the composite reliability is 0.934. For the construct SMEs Development, such as for SMEDEV_1, the item loading is 0.927, for SMEDEV_2, the item loading is 0.717, for SMEDEV_3, the item loading is 0.756, for SMEDEV_4, the item loading is 0.881, for SMEDEV_5, the item loading is 0.646. The AVE (Average Variance Extracted) is 0.628, and the composite reliability is 0.892. For the construct Market Turbulence, such as for MT_1, the item loading is 0.958, for MT_2, the item loading is 0.525, for MT_3, the item loading is 0.975. The AVE (Average Variance Extracted) is 0.715, and the composite reliability is 0.867. For the construct Government Support, such as for GS_1, the item loading is 0.795, for GS_2, the item loading is 0.809, for GS_3, the item loading is 0.848. The AVE (Average Variance Extracted) is 0.669, and the composite reliability is 0.858.

Table 5.8: CFA (Model Fit) Results

Goodness of Model Fit (CFA)	
GFI	0.848
NFI	0.519
TLI	0.559
CMIN/Df	3.001
RMSEA	0.095
CFI	0.908

According to the structure equation model for CFA it is observed that the ratio of chi square minimum to the degree of freedom C_{MIN} / D_f value is 3.001, which is acceptable as the values lie between 1 to 5, which are proposed values as per Hair (2009). Another index which is used, named as RMSEA, which indicates the goodness of fit as its value is less than 1 and we observed the RMSEA value from our model is 0.095. While GFI index is quite similar to the R^2 in multivariate regression and when its value nearly equals to 1, it is considered as the good model fit. According to this model, GFI value is .848, which represents a good model fit. For TLI index minimum acceptable range for goodness of model fit, according to Ghasemi (2010), value should be in between 0.5 to 0.95, while as observed from the model results TLI value is

.559. CFI index is one of the comparative indices which is considered acceptable when its value is in between .9 to .95 while if its value is greater than .95, the model is considered to be very good model. In this case, CFI index is 0.908, which validates the fitness of the model.

5.7 Hypothesis Testing via Process Macro

The social, health, and business sciences often use Process Macro to approximate direct and indirect properties in single and multiple mediator models (parallel and serial), simple slopes, two- and three-way interactions in moderation models, and sectors of importance for searching interactions, and conditional indirect effects in moderated mediation models with a single or multiple mediators or moderators. For this study, model 4 was used for mediation and Model 2 for moderation. All variables were fed into the models, i.e., green innovation as independent variable, green entrepreneurship as mediating variable, marketing turbulence and government support as moderating variable, and SMEs development as dependent variable. The results support all the hypothesis presented in this research.

The results clearly indicate that green innovation (GI) positively impacts green entrepreneurship (GEN) ($\beta=1.34$, $p<0.001$) supporting H1 hypothesis as indicated in Table 5.6. GEN also positively affect SMEs development (SMEDV) as per the analysis in said table ($\beta=0.49$, $p<0.001$). Model 2 of the Process Macro by Andrew Haze was used to check the moderation impact. Results showcased that indirect impact of GI on SMEDV is weak when attributes of GEN are low ($\beta = 0.46$, LLCI = 0.25, UCLI = 0.44) and the indirect impact is stronger when attributes of GEN are medium ($\beta = 0.32$, LLCI = 0.24, UCLI = 0.61). This fulfills the criteria for moderation as presented by Hayes (2012) supporting H3 hypothesis.

GI also has a direct positive impact on SMEDV as indicated in Table 5.6 ($\beta=0.90$, $p<0.001$) supporting H4 of the model. GI influences market turbulence (MT) ($\beta=-1.50$, $p<0.001$) and government support (GS) ($\beta=0.33$, $p<0.001$), supporting H5 and H6 of this study.

Table 5.9: Process Macro

	Moderator	Mode	Indirect Effect	Direct effect	Boot%	Results
			$\beta (SE)$	$\beta (SE)$	$[LLCI, ULCI]$	
GI→GEN				1.34(0.20)	[0.94,0.74]	H1 supported
GEN→SMDEV				0.49(0.29)	[1.07,0.97]	H2 supported
GI→GEN→ SMEDV		Low Medium	0.46(0.83) 0.32(0.60)		[0.25,0.44] [0.24,0.61]	H3 supported
GI → SMEDV				0.90(0.72)	[0.75,1.04]	H4 supported
GI→MT→SMEDV	MT			0.85(0.33)	[-1.50,-0.22]	H5 supported
GI→GS→SMDEV	GS			0.48(0.41)	[0.33,1.29]	H6 supported

Chapter 06

6. Discussion and Conclusion

The purpose of this research was to understand how green innovation gives rise to green entrepreneurship in small and medium enterprises, which in turn boosts the development of those enterprises. Not enough empirical studies have been performed in Pakistan's context to fully understand the phenomenon and how market turbulence and government support moderate green innovation hence development of SMEs mediated by green entrepreneurship.

The findings of this research present valuable insights which SMEs in Pakistan can use to promote innovation and growth. As per correlation analysis, green innovation has a strong positive relationship with green entrepreneurship and SME development. This finding is in line with the theoretical claim that innovation gives rise to entrepreneurship in small and medium enterprises and confirms H1 hypothesis of this research. SMEs must focus on devising new green solutions to set themselves on track of green entrepreneurship, which as a result, will pave way for development in their organizations.

As evident from the analysis, entrepreneurship has a positive effect on growth in enterprise employment. Subsequently, the directors of SMEs can be confident towards expanding work creation in SMEs in unfavorable conditions — given that green innovation and entrepreneurship is utilized appropriately. A few methodologies likewise stress the point that SMEs have a more prominent part in creating employment opportunities, and overall, these small and medium enterprises have a better chance of creating employment opportunities than big firms. Thus, projects to safeguard them can give the reasons for decreasing joblessness and hence minimize poverty (Manzoor, Wei, Nurunnabi & Subhan, 2019). Hence, it is proposed that the supervisors and owners of SMEs put utilizing entrepreneurship, especially green entrepreneurship, on the plan as their go-to strategy in a fierce economic situation to grow enterprise employment. The owners ought to make stride to increment employment by taking on new methodologies and tolerating reasonable risks, this as a result confirms the H2 hypothesis of the theoretical framework.

Process Macro analysis Table 5.6 proves a positive relationship between green entrepreneurship and development of small and medium enterprises. Based on findings of Merino-Saum et al. (2020), Saari & Joensuu-Salo (2019), Hojnik & Ruzzier (2016), and Cavallo et al. (2019) this study presented H2 hypothesis indicating a positive role of green

entrepreneurship on SMEs development, which is supported by the quantitative analysis of this study.

Based on the quantitative analysis, the study also highlights that there is a strong positive relationship between green innovation and growth in financial performance of a small and medium enterprise with mediating role of green entrepreneurship, confirming H3 hypothesis of the theoretical framework of this research. Consequently, green entrepreneurship can help SMEs in boosting their economic growth. In the same context, it is observed that financial stimuli play an important role in encouraging entrepreneurs and SMEs owners to invest in new businesses related to green innovation (Nikolaou et al., 2011). Hence, green entrepreneurship is regarded as an innovative and profitable phenomenon that positively impacts the society, the economy and overall financial layout of a country (Silajdzic et al., 2014).

Financial performance is one of the fundamental assets for the improvement of the organizations' future strategies. It is likewise, a significant source of freedom for administrators, since better financial performance permits directors to control their business in an effective and aggressive way. Organizations that have better financial performance will have more noteworthy and aggressive financial plans for green innovation and green entrepreneurship. For instance, capital assets will empower organizations to introduce high level hardware that forestalls contamination and meets the prerequisites better suited with the climate. Also, organizations that have higher financial growth can get higher liquidity to help green innovation. While lower financial growth restricts the decision-making powers of directors, that could slow down progression of capital in green developments (Huang, Liao & Li, 2019).

Studies conducted by Hossain & Asheq (2019), Pratono et. al. (2018), Ebrahimi & Mirbargkar (2017), and Octavia (2017) highlighted the positive role of green innovation on SMEs development while considering the mediating role of green entrepreneurship. Correlation analysis and Process Macro analysis performed in this study seconds the findings of those scholar and supported H3 hypothesis of this study. This indicates that green innovation can only lead the growth in enterprise employment, financial performance and starting of new business ventures when coupled with proactiveness, innovativeness, and risk-taking characteristics of green entrepreneurship.

Green innovation is a big influence on the development of SMEs in a developing economy. Product and process innovation tends to cut costs for these enterprises striving to find ways to stay competitive in face of rising inflation and economic instability of economies like Pakistan. From an economic perspective, implementing green business practises improves a company's financial performance and market position. The effects of green strategies can be observed at the organisational level in addition to financial indices, consumers, suppliers, and the government (Asadi et al., 2020). Other researchers have come to the conclusion that green innovation directly affects operational outcomes that support the financial performance of the companies. Green innovation methods help reduce the costs associated with energy use and trash disposal, which benefits organisational costs (Muangmee et al., 2021). In light of these studies, this research presented the H4 hypothesis describing the positive relationship between green innovation and development of SMEs. Quantitative analysis of this study via correlation analysis and Process Macro analysis supported H4 hypothesis of this study.

The research also highlighted the positive moderating role of market turbulence on adoption of green innovation and green entrepreneurship in SMEs. Therefore, it is safe to say that in turbulent conditions in Pakistani market, green innovation can prove a viable long-term strategy for SMEs, as elaborated by literature (Tseng et al., 2013). Innovation that is flexible with the external stimuli is utilized for depicting the processes and innovative items, which minimizes external influence altogether, addresses consumer issues, and gives birth business value. The term "flexible innovation" with external stimuli is frequently connected with sustainable energy. Nonetheless, the shift to a green economy relies incredibly upon innovative development versatility with the surroundings (Farinelli et al., 2011).

Market turbulence gives rise to uncertainty and minimizes the risks of imitation of capabilities of an entrepreneurial venture. This in turn boosts the financial performance of these businesses as their struggle for survival makes them take bold decisions paving the way for business growth. As evident from empirical analysis, market research has a strong positive impact on the development of SMEs confirming the H5 hypothesis of theoretical model of this research. This finding is in line with the literature put forward by Zhou, Mavondo, & Saunders (2019), Zhou et al., (2019), Senbeto et al., (2020) and Parnell & Brady (2019). However, it's contradictory to the finding of Su, Peng, Shen & Xiao (2013).

The governments, likewise, need to give the foundation to make a framework of safeguarding Research and Development (R&D) in SMEs which will in turn result in growth in enterprise

employment in these organizations. Organization for Economic Co-operation and Development (OECD) has provided vital recommendations for innovation development and green growth. It suggests that governments and local authorities should provide sufficient legal cover to encourage market players to go for green entrepreneurship. Governments should also focus on proving a legal framework to protect and safeguard intellectual property with suitable measures to encourage SMEs and other private entities to invest and promote green innovation and green entrepreneurship. It also emphasizes the governments to encourage and promote entrepreneurship in private entities and enhance government's protection for research and development to boost continuous technological advancements (OECD, 2017).

Government support, on the other hand, negatively moderates the relationship between green innovation and SMEs development, which is the H6 of this research's theoretical framework. It exhibits that SME owners can't fully rely on government support to kick off green innovation in their industries. The hypothesis proposed a positive moderating role of government support in the relationship of green innovation and SMEs development. However, in Pakistan's context where this research was conducted, government policies aren't friendly towards adoption of green innovation as underlined by Bari, Faisal, Cheema & Ali (2005) and Iftikhar, Zeeshan, & Waheed (2012). This indicates a grave situation where SME owners not only don't rely on government support for green innovation, but they consider it playing a negative role in their advancements and introduction of green practices and processes in their organizations. There's a dire need to offer tax cuts, subsidies or other reliefs to SMEs striving to implement green solutions in their organizations.

6.1 Theoretical Implications of the Study

This study has considerable theoretical implications in literature of green innovation and development of SMEs. The previous studies by Irfan et al. (2022), Arici & Uysal (2022), and Skordoulis et al. (2022) predominantly focused on the direct impact of green innovation on the development of SMEs or the direct impact of green entrepreneurship on the development of SMEs (Nasution et al., 2011; Amankwah et al., 2019; Moraes et al., 2018; Hsieh et al., 2019; Wales et al., 2016; Yaro et. al., 2020). Understanding how green innovation gives rise to green entrepreneurship which in turn results in the development of small and medium enterprises is the contribution of this study to the literature.

Moreover, this study highlighted how market turbulence affects the adoption of green innovation in SMEs which in return, promotes development of those SMEs. The findings of

this study were in line with literature presented by Lee (2020), and Qiu et al. (2020) and further strengthen the literature. This study also discussed the role government support plays specifically in context of developing countries in the adoption of green innovation and counters the finding of Berrone et al. (2013), Zhu et al. (2005), and Berrone et al. (2013).

The hypothesized model offers a thorough comprehension of relationship between green innovation and SMEs development. It underlines the mediating role of green entrepreneurship in this relationship. This study also notes the moderating role of market turbulence and government support in adoption of green innovation and green entrepreneurship in SMEs resulting in their economic and financial development.

6.2 Practical Implications of the Study

Apart from valuable theoretical implications on the literature, this study offers significant insights for businesses and SMEs owners. The core issue of any business, especially an SME, is their profitability. Businesses tend to resist implementing change especially when there is insufficient proof of being a process/product successful. This study would encourage the SMEs owners to invest in green innovation and implement green solutions for their manufacturing processes considering the fact that it will ultimately benefit them in the long term. Green innovation gives rise to increase in enterprise employment, financial performance and opens doors for new business ventures, as proven by theoretical and empirical analysis of this research. This research also gives governments in developing countries a wake-up call to reward SMEs trying to implement green innovative solutions in terms of tax breaks, subsidies, and financial grants. In face of ever-increasing drastic impacts of climate change, it's in everyone's benefit to go for innovative green processes and products while having a financial and environmental benefit.

6.3 Limitations and Future Research Directions

Although the study was specific enough to categorize the type of industries it was meant to target, i.e., small and medium enterprises, it didn't delve much deeper and analyze the phenomena on a micro scale. There is a need to do industry specific research within SMEs to better understand the relationship between green innovation and SME development for that specific industry. Analyzing this relationship at a macro level is beneficial in devising general strategies and plans applicable across all industries. However, green innovation and green entrepreneurship may hold different meanings for different types of industries. Factors that are

synonymous with market turbulence may vary from industry to industry. The comprehension and scope of government support may vary significantly if analyzed through lenses of various different types of organizations. Hence, it's suggested for future researchers to adopt a micro approach and analyze the impact of green innovation and green entrepreneurship in specific types of SMEs.

Due to constraints of time, resources and access, this study used convenience sample technique to determine the sample and collect the data. However, a sample which is chosen randomly would present more generalized findings and will be representative of a wider population. Future researchers may adopt this or any similar sampling technique to come up with more comprehensive outcomes.

Appendix I

Questionnaire

Green Innovation

Product Innovation

- Our organization has introduced new green products to the market.
- Our organization has carried out many reforms to create green products.
- Our organization is constantly searching for new and green products.
- Our organization has introduced greener products compared to our competitors.
- The green products that we have introduced have led to significant changes in the industry.

Administrative Innovation

- We are constantly introducing new methods of business management.
- Our organization has invested in updating procedures with a green focus.
- The manager is constantly seeking new ways to improve the executive systems with green attitude.
- Our organization gives employees the authority to take initiatives.
- Our competitors use our operating systems as a benchmark.

Process Innovation

- We are constantly testing our operating systems vis-a`-vis world-class standards.
- Work techniques are constantly updated to enhance efficiency.
- We use technology constantly to enhance the quality of green products.
- Our organization heavily invests in the development of new green operating systems.
- We are constantly training our employees in emerging industry technologies.

Green Entrepreneurship

Risk Taking

- In our organization, uncertainty is dealt as a challenge.
- Our employees are encouraged to engage in activities in new green industries.
- Management recognizes that specific proposals in the field of green attitudes may fail while running.

- Our organization places more emphasis on opportunities to succeed than opportunities to fail.
- In this organization, the new (green-based approach) activity that has failed is viewed as a learning experience.

Proactiveness

- We are constantly in search of new opportunities related to our ongoing operations.
- We are usually the first to introduce new green technologies in our industry.
- We usually observe business practices as justified in accordance with green social responsibility.
- We are constantly searching for green investment opportunities to improve our business performance.
- We have always tried to stay ahead of our competition in responding to the challenges of the market.

Autonomy

- Employees are encouraged to assume responsibility for their own work.
- It is assumed that employees do their work with minimal supervision.
- Employees are encouraged to prioritize their own work.

SMEs Development

Growth in enterprise employment

- Our organization saw a significant growth in number of employees after incorporating green innovative solutions.

Growth in financial performance

- Revenue growth is desirable, considering green products.
- Green products have reduced production costs.
- The profits from the sales are good.

Starting new business ventures

Incorporating green innovation has led to new venture creation at our company.

Market Turbulence

- Consumer preferences change unpredictably in the market.

- Competition in our product market is relentless.
- Technology in our industry changes rapidly

Government Support

- Governmental initiatives play a positive role on business development in context on adopting new cleaner technologies.
- A business can solely rely on government funding to implement green innovations.
- Adequate opportunities are being provided by the government to implement green technologies.

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