ADDIS ABABA UNIVERSITY COLLEGE OF BUSINESS AND ECONOMICS (COBE)

MANAGEMENT DEPARTMENT

THE EFFECT OF GREEN INNOVATION ON SMES' COMPETITIVE ADVANTAGE: EXPLORING THE MEDIATING EFFECT OF GREEN ORGANIZATIONAL CAPABILITIES

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DECLARATION

I hereby declare that this thesis entitled "The Effect of Green Innovation on SMEs Competitive Advantage: Exploring the Mediating Effect of Green Organizational Capabilities" has been carried out by me under the guidance and supervision of Dr. Demeke Chimdessa. The thesis is original and has not been submitted for any degree or diploma award to any university or institution.

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This is to certify that the thesis prepared by Getachew Hussen, entitled The Effect of Green Innovation on SMEs Competitive Advantage; Exploring the Mediating Effect of Green Organizational Capabilities submitted for the in partial fulfilment of the Degree of Master of Science in International Business (Strategic Investment Management) complies with the regulations of the University and meets the accepted norms concerning originality and quality.

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Advisor Dr. Demeke Ch. Signature ______ Date March 04/2024

DEDICATION AND ACKNOWLEDGMENT

I want to dedicate this thesis to individuals who have been instrumental in my journey toward completing my MSc degree in International Business, with a specialization in Strategic Investment Management. Their unwavering support and belief in my abilities have been invaluable throughout these challenging yet rewarding endeavours.

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LIST OF ABBREVIATIONS

AC	Absorptive capacity
AVE	Average Variance Extracted
CRM	Customer Relationship Manager
CRGE	Climate Resilience Green Economy
EPI	Environmental Performance Index
EMDEDA	Ethiopian Micro and Small Enterprise Development Agency
GHG	Greenhouse Gass
GDP	Gross Domestic Product
GES	Green Economy Strategy
GJI	Green Jobs Initiation
GI	Green Innovation
GDC	Green Dynamic Capability
GMO	Green Market Orientation
GHC	Green Human Capital
GOC	Green Organizational Capability
ICT	Information Communication Technology
ILO	International labour Organization
IOE	International Organization of Employee
ITUC	International Trade Union Organization
MSEDA	Micro and Small Enterprise Agency
NGOs	Non-Governmental Organization
GMSL	Global Mean Sea Level
WMO	World Meteorological Organizations

ABSTRACT

Environmental damage is a crucial challenge that businesses, especially Small and Medium-sized Enterprises (SMEs) in developing countries like Ethiopia, face today. However, green innovation is emerging as a promising solution to address the public's concerns about global environmental issues. This innovation has also become a critical aspect of quality manufacturing SMEs development. Despite this, SMEs usually prioritize economic performance over environmental concerns. To enhance their competitive advantage, SMEs need to implement green innovation as a intentional move. This study aims to comprehensively identify the factors that influence the outcomes of implementing green innovation in SMEs to enhance their competitive advantage. The study also looks at the role of green organizational capabilities as a mediator between green innovation and SMEs' green competitive advantage. The research used a quantitative approach to test the hypotheses, and SmartPLS 4.4 software was utilized for data analysis. Random sampling was used for data collection, and a survey was administered to 294 manufacturing SMEs in Addis Ababa, Ethiopia. Over two months, 350 questionnaires were distributed to these SMEs' general managers, heads of departments, operational employees, and others, and 294 were returned for analysis. The findings confirm that green innovation positively contributes to SME competitive advantage, and green dynamic capability is a mediating variable between green innovation and SMEs' competitive advantage. Additionally, all organizational capabilities, including green human capital, green market orientation, green dynamic capability, and operational capability, positively and significantly contribute to green innovation. Therefore, adopting green innovation encourages entrepreneurs to not only fulfil their social and environmental responsibilities but also pursue economic benefits for their SMEs.

Keywords: *Green innovation, green organizational capabilities, green competitive advantage*

CHAPTER ONE

1. INTRODUCTION

1.1. Background of the Study

The increased progress of science and technology has brought suitability and difficulties to the human life. Alongside this progress, challenges such as global warming, environmental damage, and resource depletion have emerged. The global mean sea level (GMSL) reached its highest recorded level in 2022(Fox-Kemper, B., H.T. Hewitt.2021). Based on tide gauge observations, GMSL reconstructions indicate a rise of 21cm from 1900 - 2020, with an average yearly rate of 1.7mm. The rate of GMSL rise has accelerated significantly, with 3.3mm/year throughout 1993-2018 and 3.7mm/year throughout 2006-2018, which is more than twice as fast as the rate during the 20th century. Moreover, heatwaves, forest fires, and air pollution are becoming more prevalent. Significant greenhouse gas concentrations continue to increase, and the global mean surface temperature ranks among the highest recorded between 2017 and 2021(WMO, 2023). Worldwide, extreme weather events and climate fluctuations have become more frequent and intense. Many countries have implemented environmental regulations to address the declining state of the environment (Weng, H.-H.R.; Chen., 2015). For instance, the European Community has enforced stringent restrictions on environmental issues. In August 2022, the U.S. made notable strides in climate mitigation and sustainable energy (Cartwright, 2022). The Biden Administration introduced the Inflation Reduction Act (IRA), aiming for a $370 billion investment in energy security and climate change initiatives to reduce carbon emissions by 40% by 2030 (Vasilakos et al., 2022). This significant governmental effort underscores the increasing significance of environmental considerations in public policies, driven by stakeholder demands for green initiatives (Nassani et al., 2022).

The ongoing discussion between advocates for and opponents of sustainable initiatives (Lin et al., 2022), has led to the widespread acknowledgment that the development of a "green and socially responsible company" (Alyahya et al., 2022) is a direct response to the environmental challenges posed by traditional industrial practices (Lin et al., 2022) and external pressures to adopt sustainable approaches. Given the urgency and magnitude of present-day environmental issues, Green Innovation (GI) is recognized as a crucial solution for embedding sustainability principles throughout a company's value chain (Fahad et al., 2022).

Emerging from discussions in innovation and sustainability literature (Ha & Nguyen, 2022, Guinot et al., 2022), GI is characterized as an innovative approach aimed at safeguarding the environment and fostering sustainable progress (Feng et al., 2022; Wang et al., 2022). This approach results in the creation of new products, processes, and technologies that rely on cleaner energy sources and raw materials, thereby generating less waste (Li et al., 2022).

However, addressing environmental issues is not solely the responsibility of governments. Organizations and individuals also play a crucial role in reducing these problems (Winn, M.; Kirchgeorg, M.; Griffiths, A.; Linnenluecke, M.K.; Günther, E., 2011; Wright, C.; Nyberg, D., 2017). The enforcement of increasingly stringent environmental regulations has introduced a sense of responsibility about the environment among individuals. Many people now choose to purchase green products to minimize their environmental impact (Chang, N.-J.; Fong, C.-M., 2010). Additionally, these individuals actively support environmental protection, exhibit environmental responsibility, and seek information about green products (Kumar, P.; Ghodeswar, B.M., 2015). The rise of environmentally conscious consumers has profoundly altered the competitive landscape in the business world (Fatoki. O., 2019).

In the current business landscape, organizations are confronted with a dual challenge. Firstly, they must prioritize efficiency and market share by continuously innovating, necessitating resources, capabilities, and investments. Simultaneously, they must display ethical responsibility and align with society's values. As a result, businesses must balance competitive adjustment, such as innovation, and validity adjustment, which includes sustainability and respect for the environment. In the era of green business, companies also recognize the presence of environmentally friendly competitors (Soewarno et al., 2019). Consequently, businesses are increasingly focusing on ecologically friendly markets to cater to the demands of green consumers (Tseng and Hung, 2013).

Various researchers (e.g., (Chen, Y.S.; Lai, S.B.; Wen, C.T.,2006, Chang, C.H.,2011) have proposed innovation types that achieves the balance by dropping environmental damage while improving business efficiency. The concept that is useful for to do this is known as green innovation (GI). GI involves searching, promoting, and developing ecological products, services, and processes that incorporate novelty (Chen,2012). It revolves around innovative ideas aimed at providing products or services without harming nature while respecting the environment throughout their lifecycle (Tseng, M.L.; Tan, R.R.; Siriban-Manalang,2013). GI holds considerable relevance for organizations as consumer demand for companies to reconcile production with environmental sustainability continues to rise (Schiederig, T.;

Tietze, F.; Herstatt,2011; Govindan, K,2018; Vega-Zamora, M.; Torres-Ruiz, F.J.; Parras-Rosa, M,2019). The literature suggests that green innovation now is considered a business strategy for gaining a business competitive advantage as it expands new markets and enables the development of sustainable and responsible products and applications (Chen, 2006, Chang, C.H,2011). Its significance lies in empowering companies to compete using environmentally friendly and efficient technologies while adapting to new and sustainable consumption patterns. As environmental regulations and consumer preferences become more demanding, GI has emerged as a source of competitive advantage (Chang, C.H,2011).

GI also involves utilizing advanced technology to minimize ecological damage and pollution, as well as enhancing resource utilization (Xiao, Q. Xiao,2022). This issue has gained global attention and sparked discussions (Xiao, X.; Tian, Q.; Wang,2021). Promoting green innovation is vital for achieving harmonious coexistence between humans and nature, ensuring sustainable socio-economic development, and improving the quality of human life. As a form of innovation, green innovation aims to conserve resources and reduce environmental pollution, thereby helping companies strike a balance between profitability and environmental responsibility (Xie and Lian et al., 202).

Researchers have explored GI from various perspectives. Some scholars have focused on the institutional theory and analysed how environmental regulations, supervision, and green policies influence enterprise green innovation (Li, X.Q.; Hu, Z.Y.; Zhang,2021). Others have examined the effect of resource of knowledge, sharing of knowledge, and absorption capacity on enterprise GI from a resource-based standpoint (Song, 2020). Moreover, some researchers investigated the relationship between Chief Executive Officer:(CEO) characteristics, managerial attention to the environment, stakeholder pressure, and enterprise green innovation (Cao.,2022). Borsatto and Amui (2019), Chiou et al. (2011), and Yin et al. (2020) have investigated the impact of green innovation on business competitiveness. These studies have found that green innovation can improve business competitiveness through a variety of mechanisms, including the development of new assets, technologies, and capabilities. (Cheng et al.,2014) argue that GI adoption has become an important topic in business and innovation literature due to the growing concern of sustainability, and its impact on business performance and competitiveness.

Today, the business world faces a crucial issue of environmental damage. It is now recognized that social, economic, and environmental performance should be balanced to address this phenomenon. Businesses no longer solely focus on economic performance as their goal. As per Bombiak and Certainly's (2020) research, entrepreneurs hold a responsibility to tackle social issues in their communities and safeguard the natural environment. They are motivated to develop eco-friendly, sustainable innovations, particularly in small and medium-sized enterprises, to reduce the adverse environmental consequences stemming from their operations (Pacheco et al., 2018; Marciniuk-Kluska, 2018; Butt et al., 2022a, 2022b). Not only does green innovation benefit the environment, but it also improves the financial performance of businesses (Novitasari and Tarigan, 2022; Przychodzen et al., 2020).

The study also aims to significantly contribute to advancing propositions and practices. From a practical viewpoint, the exploration urges SMEs to borrow green invention in their product conditioning. It emphasizes the need for SME possessors to enhance hand knowledge and chops, establish environmentally friendly systems and procedures, and foster collaborations with external mates who apply green operation practices. Accordingly, SME directors should strive to maximize intellectual capital's part in fostering innovative and sustainable results.

The objective of this research was also to investigate how green innovation impacts the SMEs competitive advantage and the mediating effect of organizational capabilities. According to Scaringella and Burtschell (2017) expanded on this idea, highlighting its relevance at the organizational, individual, and inter-organizational levels. At the individual level, individuals or groups enhance their skills and learn new knowledge. At the organizational level, the entire organization benefits from the organizational capabilities, and at the inter-organizational level, firms achieve superior results and gain a competitive advantage through collaborative learning and knowledge sharing. Additionally, Kokshagina et al. (2018) emphasized the importance of effective search practices and knowledge functions in a SMEs ability to acquire new knowledge.

This research examined the effect of GI on SMEs green competitive advantage , specifically in relation to green organizational capabilities. However, SMEs face many challenges such as inadequate organizational capabilities (H. Lin et al., 2014), and to market information (Nuryakin et al., 2021), weak innovation and product advantages (Nuryakin, 2018). Only a few growth-oriented SMEs possess limited resources and competitive advantages (Pucci et al., 2017; Simpson, 2004). On the other hand, Lin and Chen (2007) pointed out that environmental-friendly innovation enhances SMEs' competitive advantage by adopting an individual and organizational perspective. The study by Dangelico and Pujari (2010) addresses the issue of environmental-friendly SME management. Consequently, future research on green innovation, organizational capabilities, jobs, absorptive capacity, and achieving green competitive advantage should prioritize addressing environmental challenges.

It is important to note that more research is needed when applying green innovation within the SME sector, particularly in developing countries. Generally, SMEs prioritize their economic performance in the short term, which means they tend to pay less attention to environmental issues (Asadi et al., 2020; Neri et al., 2018). However, to achieve long-term sustainability, SMEs also need to focus on their social and environmental performance (Neri et al., 2018). Green innovation is a great way to fill the gap between environmental protection and economic development, making it a win-win solution (Anik & Sulistyo, 2021; Marco-Lajara et al., 2022). Adopting green innovation can also help SMEs enhance their product competitiveness globally.

Additionally, SMEs must provide administrative data related to environmental, social, and corporate governance (Taherdangkoo et al., 2017). Green innovation can be crucial in reducing resource consumption and demands while establishing an effective environmental management system in developing countries (Asadi et al., 2020). Entrepreneurs are motivated to adopt environmentally friendly designs and packaging and implement systems focused on environmental management to minimize waste and pollution (Marco-Lajara et al., 2022; Song & Yu, 2018). Therefore, green innovation represents SMEs' proactive response to comply with strict government regulations (Taherdangkoo et al., 2017).

1.2. Statement of the Problem

Small and medium-sized enterprises (SMEs) in developing countries, such as Ethiopia, face numerous challenges that prevent them from growing. These challenges include outdated technology, low human resource skills, weak management systems, and a lack of timely and relevant information access. Furthermore, there is a need for more utilization of information technology, and poor product quality are also significant issues. As a result, the economic contribution of SMEs in developing countries is currently far behind that of developed countries (Altenburg & Eckhardt, 2006; Emine, 2012; Panday, 2012). SMEs in developing countries need to catch up with those in developed countries economically. They are expected to play a critical role in their economies, and it has become an even more pressing issue in today's globalized competitive environment. In recent years, there has been a growing interest in the role of green innovation in sustainable development. Green innovation involves developing and implementing environmentally friendly technologies, practices, and products. By embracing green innovation, SMEs can reduce their negative effect on the environment and gain a competitive advantage in the marketplace.

There is a growing interest in understanding how green innovation initiatives impact the competitive advantage of small and medium-sized enterprises (SMEs). Green innovation can help SMEs stand out from their competitors by offering environmentally friendly products or services, which can attract customers and investors who prioritize sustainability. This differentiation can lead to a sustainable competitive advantage in the market. Green innovations typically lead to more efficient use of resources, reduced waste, and lower energy consumption, resulting in cost savings for SMEs in the long run. By implementing green practices and innovations, SMEs can comply with environmental regulations and standards while enhancing their reputation as environmentally responsible businesses. This can attract customers who prioritize sustainability in their purchasing decisions.

Additionally, incorporating green innovation can help SMEs reduce their exposure to environmental damage, resource scarcity, and climate change risks. Proactively addressing these sustainability challenges can help SMEs build resilience and long-term viability. The mediating effect of green organizational capabilities refers to the role of organizational structures, processes, and cultures in enabling SMEs to implement green innovation initiatives effectively. These capabilities help SMEs develop, implement, and integrate green practices into their core operations, enhancing their capacity to achieve a sustainable competitive advantage through green innovation.

This study aims to investigate the relationship between green innovation and SMEs' competitive advantage while exploring the role of green organizational capabilities as a potential mediator. By addressing these research gaps, this research seeks to shed light on the mechanisms through which green innovation practices can enhance the competitive position of SMEs in today's environmentally conscious business landscape.

The study also contributed to the literature on green innovation and SMEs' competitive advantage by providing empirical evidence on the role of Green organizational capabilities in this relationship. The study also provided policy recommendations for policymakers and practitioners in Ethiopia and other countries with similar economic and environmental conditions.

1.3. Research Question

The study answered the following key research questions:

- What is the direct effect of green innovation on SME competitive advantage in Addis Ababa, Ethiopia?
- Do sustainable organizational capabilities mediate the relationship between green innovation adoption and SME competitive advantage in Addis Ababa, Ethiopia?

1.4. Objectives of the Study

General Objective: The main objective of this research was to examine the relationship between green innovation, sustainable organizational capabilities, and SME competitive advantage in Addis Ababa, Ethiopia.

The specific objectives of the study

- To examine the direct effect of green innovation on SME competitive advantage in Addis Ababa, Ethiopia.
- To examine the mediating effect of sustainable organizational capabilities on the relationship between green innovation adoption and SME competitive advantage in Addis Ababa, Ethiopia.

1.5. Significance of the Study

SMEs play a vital role in the Ethiopian economy, contributing to employment, innovation, and economic growth. However, SMEs face many challenges, including limited access to resources, weak infrastructure, and a lack of competitiveness. Green innovation can help SMEs overcome these challenges and improve their competitive advantage. Green innovation is used as the development and implementation of new products, processes, or services that reduce environmental impact while maintaining or improving economic performance. Green innovation can help SMEs reduce costs, improve efficiency, and gain a competitive advantage in the market.

The current study has multifaced novelty, significance, and theoretical & practical benefactions. For this case, it provided a modified new abstract framework, which evaluates the impact of green invention on SMEs' competitive advantage. The modified conceptual framework further evaluates the organizational capabilities between green invention and SMEs' competitive advantage. The current exploration also offers modified, unique dimension scales for new studies. Future researchers can replicate the modified conceptual framework in diverse industries in different geographical regions. It also investigates the extent to which small and medium-sized enterprises (SMEs) in Ethiopia are adopting environmentally friendly practices and integrating green innovations.

1.6. Organization of the Paper

The paper was organized in five chapters, the first chapter deals with the introduction, Chapter two is Literature review concerned with the theoretical review and empirical review. Chapter three deals with the methodology of the study ,Chapter four focuses on the presentation of result and discussion of findings, and the Final chapter, chapter five deals with conclusion and recommendation.

CHAPTER TWO

2. LITERATURE REVIEW

The previous chapter discussed various aspects of the background of the research, which included research questions, objective of the study, hypotheses, and the importance of the research. This chapter discussed and examined the relevant empirical studies and theoretical frameworks that support the research being conducted.

2. Theoretical Framework

2.1. The concept & Forms of Innovation

2.1.1. Concept of Innovation

Organizational competitiveness and success have long relied on innovation, a topic extensively explored in literature (Edwards, Munday, M.,2005, López-Nicolás, C, Á.,2011, McAdam, R.; Keogh, W.,2004). According to the Oslo Manual (OECD ,1997), innovation encompasses significant changes or the conception of new ideas in product, process, marketing, and organization to enhance performance. Innovation is seen as a complex and creative process that involves creating new products, processes, or introducing improved methods of organizational management (Schumpeter, J.A.,2010). Scholars like Kahn (2018) view innovation as a process that combines creativity and development to meet consumer demands by offering something new or improved. Similarly, Varadarajan (2018) compares innovation to a transformative force that breaks economic monotony, fosters continuous growth, and aligns with technological advancements.

The literature differentiated two types of innovation: incremental and radical innovations. The former enhances existing products or processes by integrating new improvements (Sheng, M.L.; Chien, I.2016; Souto, J.E.,2015). Gradual changes distinguish this form of innovation and yield results in relatively short periods (Bouncken, R.B.; Fredrich, V.; Ritala, P.; Kraus, S.,2018). Incremental innovation meets market demands for specific product attributes or production requirements. Businesses adopt this strategy to remain competitive and increase profitability (Souto, J.E.,2015; Rubin, G.D.; Abramson, R.G,2018). On the other hand, radical or disruptive innovation involves introducing new products or services that did not previously exist in the market (Sheng, M.L.; Chien, I.2016; Dewar, R.D.; Dutton, J.E.1986). Pursuing radical innovation necessitates substantial investments, dedication, time, extensive research, and development (Souto, J.E.,2015). Consequently, companies often opt for incremental innovation over radical innovation. Table 1 summarizes the fundamental conceptual differences between these two types of innovation.

Table 1:Differentiation between radical and incremental innovation

Radical innovation	***Incremental innovation***
New product or services proposed	*Improvement of an existing Proposal*
Risk and uncertainty are its high level	*Risk and uncertainty are at its low level*
New technologies Application	*Change to existing technologies are its minimal*
Generate drastic changes in a market, industry or company	*Adaptable to an existing market is very easy*

2.1.2. Forms of Innovation

The Oslo Manual Prepared by the Organization for Economic Cooperation and Development (OECD) in 2005, is a widely used framework for measuring innovation. According to this primer, there are four types of invention product invention, process invention, marketing invention, and organizational invention. These groups apply to both assiduity and services, including public services.

Product invention refers to the creation of new products or services or the enhancement of being bones (Wang et al, 2021). It involves making perceptible changes to the design that ameliorate how the product operates or is used. Product invention is achieved through knowledge or technology to apply advancements in accoutrements and factors (Visnjic,I.; 2016).

Marketing invention involves applying marketing styles the association has not used before (Edwards,T., 2005). This includes significant changes in design, packaging, positioning, creation, and other factors that aim to increase deals (Naidoo, V, 2010). According to the Oslo Manual (OCDE, 2006.), invention in marketing frequently requires initiating new requests and changing the price, product, communication, and distribution strategies. The Manual also considered the 4Ps to be inventions, products must have a substantial change in its design and packaging, the price, where it must have an inversely important change grounded on demand and options offered, and in the distribution. For illustration, changes in the image or enforcing Client Relationship Management (CRM) can be considered marketing inventions.

Process invention occurs when there are significant changes in ways or software to reduce unit product and distribution costs and it also enhance the product, quality and distribution of advanced products (Bloch,C., 2007; Edwards-Schachter,M., 2018). The Increasement of technology and information are exemplifications of process inventions as they ameliorate effectiveness and quality. The ultimate goal of process invention is to decrease cost of production and productivity increment (Bloch,C., 2007).

Organizational invention encompasses significant metamorphoses in a company's operation, practices, and procedures (Damanpour, F.; Evan,W.M., 1984). These changes may involve variations in divisions of labour, strategies, and structures (Alves, M.F.R.; Galina, S.V.R., 2018), as well as the perpetration of operation systems for product, and quality control operations (Azar,G.; Ciabuschi, F., 2017). Likewise, organizational invention includes advancements in client and supplier connections to reshape how a company operates (Alves, M.F.R., 2018).

Understanding and conceptualizing these colourful forms of invention is essential for companies to become eco innovators through different organizational opinions, practices, and procedures. GI can involve all the four forms of invention depending on how it's enforced. GI aims to contribute to sustainable development by achieving an environmental balance while pursuing profitable growth. It directly relates to the ecological dimension of sustainability.

2.1.3. The importance and Conceptual Framework of sustainable Development

2.1.3.1. The concept of Sustainability

Sustainability and sustainable development are frequently used, particularly in the business sector. It is defined by the 1987 Brundtland Report, sustainable development is about meeting today's needs without compromising future generations' ability (Portney, K.E.,2015). Sustainable development is a process that improves the quality of life and the natural environment while also ensuring that future generations can thrive (Thiele, L.P.,2016; Hameed, I.; Waris, I.; ul Haq, M.A.,2019).

"Regarding sustainability, Elkington (1999) suggests that it is a demanding objective that demands adherence to certain fundamental principles. These principles include a commitment to human rights, equity, justice, diversity, the rights of future generations, democracy, citizen participation, and economic vitality. Seeing that you have a solid understanding and appreciation for these important values."When defining sustainability, Elkington (1999) suggests that it is a challenging goal that requires adherence to certain fundamental principles.

Sustainability encompasses three dimensions that must be balanced: economic, environmental, and social (Kristensen, A.Mosgaard,2022; Cavagnaro, E.; Curiel, G.,2017) (See the figure below). Economic sustainability involves economically profitable practices and activities while also being socially and environmentally responsible (Anand, S.; Sen, A.,2017; Halme, M.; Jasch, C.; Scharp, M,2004). This means seeking growth and profitability while considering social welfare and environmental conservation. Environmental sustainability focuses on the efficient and rational use of natural resources to improve societal well-being without compromising the quality of life for future generations (Cavagnaro, E.; Curiel, G.,2017; Morelli, J.,2011). Social sustainability balances economic and environmental dimensions, avoiding poverty, exclusion, and inequality. It promotes equity and social justice by involving societies in generating wealth (Scoones, I.,2016).

Therefore, sustainability is the pursuit of balance between the economic, social, and environmental dimensions (Strezov, V.; Evans, A.; Evans, T.J.,2017). When applied to business, sustainability aims to balance wealth creation and the responsible utilization of various human, material, natural, and economic resources (Huang, L.; Wu, J.; Yan,2015). Businesses prioritizing sustainability seek to improve socio-economic conditions for all stakeholders while caring for the environment (Parris, T.M.; Kates, R.W.,2003). Essentially, a sustainable organization can ensure its continuity and long-term positioning while contributing to the progress of present and future generations (Steurer, R.; Langer, M.E.; Konrad, A.; Martinuzzi, A,2005). Sustainable companies are characterized by their commitment to multiple orientations (environmental, social, administrative, and financial) and responsible partnerships with all stakeholders and the natural environment (Eccles, R.G.; Perkins, K.M.; Serafeim, G.,2012; Galpin, T.; Whitttington, J.L.; Bell, G.,2015).

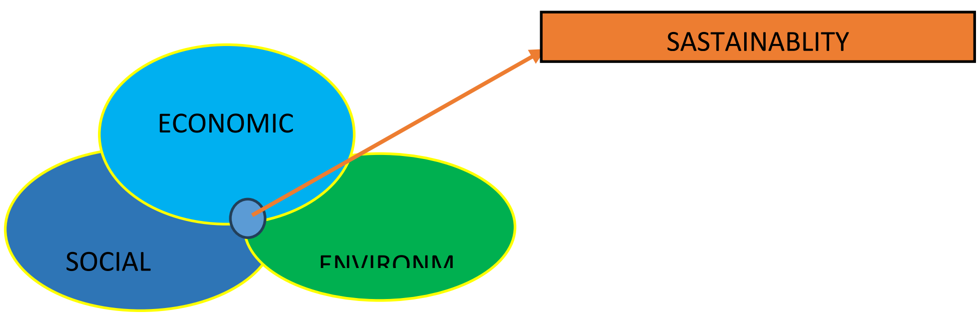

Figure 1:Dimensions of Sustainability

Sustainability is a significant challenge facing humanity today. It goes beyond just tackling environmental issues and involves addressing social and economic problems. These include ending poverty and hunger, improving healthcare and well-being, ensuring quality education, achieving gender equality, reducing inequalities, promoting economic growth, and fostering peace and social justice. Sustainable Development Goal(SDG) of Agenda2030, created by the United Nations (UN), emphasizes these goals and urges immediate action to address sustainability issues. Achieving sustainability requires a global commitment from governments, ensuring leadership and necessary resources for action. Local governments and authorities also play a crucial role in implementing policies, budgets, and regulations that support this transition. Additionally, individuals and organizations must actively promote sustainability, including professionals, businesses, academics, civil society, media, trade unions, and other stakeholders.

2.1.4. Importance Organization Sustainability

In recent years, the capitalist economic system has encouraged a culture of mass consumption that celebrates and embraces fleeting, carefree, and hedonistic ideals (Migone, A.,2007; Grawitch, M.J.; Ballard, D.W.,2016). The foundation of this system lies in the pursuit of unlimited growth and constant renewal, achieved through cost outsourcing and the continuous generation of new consumer needs (Klein, N.,2015). It operates on a linear model (Raworth, K.2017) of production and consumption, where materials are extracted, transformed, distributed, and eventually sold as short-lived "use and waste" products (Millar, N.; McLaughlin, E.; Börger, T,2019). While this system has enriched companies and nations, it has also resulted in alarming environmental imbalances (Bonviu, F,2014; Prieto-Sandoval, V.; Jaca, C.; Ormazabal, M,2018).

However, there is a growing recognition among companies and consumers of the need to shift away from this unsustainable model (Angus, A.; Westbrook, G.,2019; Magon, R.B.,2018). This has led to increased social and environmental consciousness, reflected in many sustainable companies' management policies and philosophies. These companies strive for zero environmental impact by designing products and services with minimal ecological footprint. Their actions aim not only to compensate for the damage caused by economic activity but also to take responsibility for improving the state of the natural environment (Eccles, R.G.; Perkins, K.M.; Serafeim, G.,2012). This means adopting a model that emulates nature's cyclical and recycling processes (Korhonen, J.; Honkasalo, A.; Seppälä, J.,2018).

Traditionally, the primary objective of companies has been to generate returns for shareholders. However, sustainable organizations have a broader purpose - to create value for all stakeholders involved or affected by the company's operations (Lee, M.T.; Raschke, R.L.,2020). This includes customers, workers, suppliers, the community, and the environment. As a result, social responsibility becomes a defining element of the business's values and principles. Sustainable companies are increasingly valued for their social and environmental awareness, evident in their business strategies, commitment to stakeholders, and the creation of sustainable products and services. Their focus goes beyond philanthropy and encompasses a deep-rooted commitment to sustainable and ethical values (Mirchandani, D.; Ikerd, J,2008).

Furthermore, there is an increasing demand from customers, investors, workers, and citizens for companies to demonstrate a social commitment (Govindan, K.,2018; Vega-Zamora, M.; Torres-Ruiz, F.J.; Parras-Rosa, M.,2019). Consequently, a company's values and principles are crucial in differentiating businesses (Linnenluecke, M.K.; Griffiths, A.,2010). Companies that prioritize social and environmental awareness and genuine stakeholder commitment are seen as attractive (Govindan, K.,2018). In this new economic paradigm, companies must actively assume environmental responsibility and seek solutions to minimize their negative environmental impact (Mirchandani, D.; Ikerd, J.,2008). They integrate into the surrounding community and work towards creating a better world for all (Perrott, B.E,2015).

Sustainable models are being implemented in various sectors, including those associated with the common welfare, cooperatives, fair trade, and the circular economy movement (Felber, C,2019). The success of these businesses demonstrates that it is possible to move away from the neo-liberal economic model and its hyper-consumerist values and instead embrace an economy based on the common good. Companies prioritizing sustainability as a core value use GI as a primary tool. As a result, GI has become a common strategy for companies focused on the common good and concerned with sustainability issues.

2.1.5. The Concept and Measurement of Green Innovation

2.1.5.1. Green Innovation Concept

GI has emerged as a crucial tool for achieving sustainable development (Weng, H.H.R.; Chen, J.S.; Chen, P.C,2015). Previously environmental activities were considered unnecessary, but the rise of ecological regulations and environmentalism has changed the competitive landscape (Chen et al,2012). This shift has led to the adoption of methods and processes centered around environmental sustainability, with GI being at the forefront. As business consumer awareness of sustainability grows, companies have utilized the green schema to establish business models based on GI (Henriksen, K.; Bjerre, M.; Øster, J.; Bisgaard, T.,2012). This is driven by the increasing demand for sustainable products and responsible practices from customers (Tang et al,2018). Research supports (Borsatto, J.M.L.S.; Bazani, C.L.,2021, Schiederig, T.; Tietze, F.; Herstatt, C.,2012) the idea that GI initiatives improve a company's performance and competitiveness by enhancing product value and creating ecological differentiation. Innovation can be understood as a combination of design and product. Accordingly, G.I. is the sum of "eco-design + eco-production" (Chen, Y.S.; Chang, C.H.; Wu, F.S.,2012; Borsatto, J.M.L.S.; Bazani, C.L.,2021). Similarly, Wang et al. (2021) G.I. can be defined as the integration of eco-design and eco-production. G.I. involves the development of environmentally friendly products and processes through innovative technologies that promote energy efficiency, pollution prevention, and ecological product designs. Some researchers (Jabbour, C.J.C.; De Freitas,2015; Albort-Morant,2016) describe G.I. as focused on sustainable development and conserving natural resources by creating greener products and services. This entails adopting environmentally friendly materials during manufacturing or design and applying the principles of eco-design and eco-production from the conception of an idea rather than just at the end of a product's life cycle (MacDonald, E.F.; She, J,2015). While G.I. has predominantly focused on production processes, certain companies have expanded their scope to encompass all operations, including distribution channels and after-sale service. Consequently, G.I. permeates the entire business cycle, encompassing the design, production, supply, and end-use of commercial products, with a primary focus on environmental sustainability (Fei, J.; Wang, Y.; Yang,2016, Takalo, S.K.; Tooranloo, H.S.,2021).

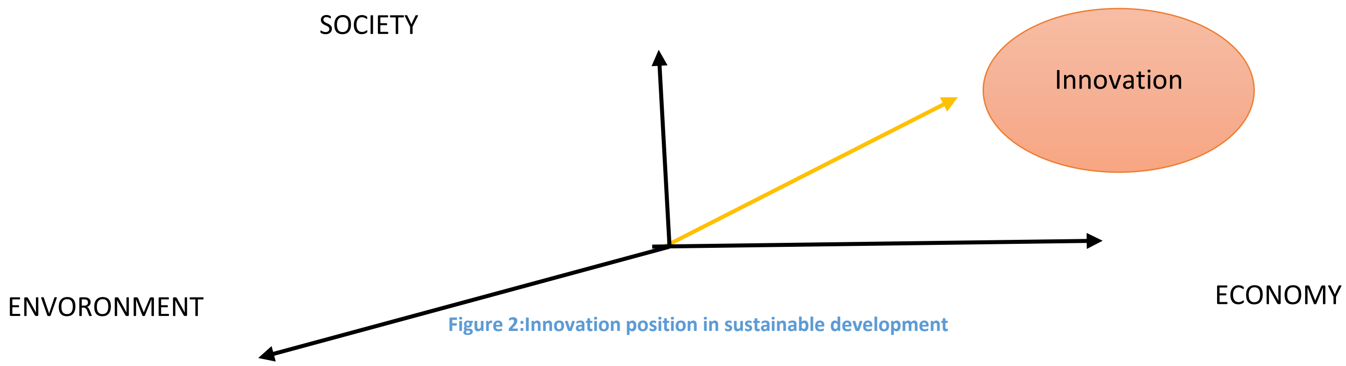

Figure 2:Innovation position in sustainable development

The ultimate aim of GI is to decrease human induced material flows and foster sustainability (Bleischwitz, R.; Bahn-Walkowiak, B.;2009). It involves implementing "eco-innovation" practices within corporations, which refers to the improvement of innovations that curtail environmental and social harm while driving economic improvement.

The definition of green innovation is not clearly defined as it is like concepts in the literature that are not empirically measured (Arundel et al., 2006). Researchers have not reached a consensus on a standard definition, making defining green innovation complex. In the literature, various terms such as "Green innovation," "Ecological innovation," "Environmental innovation," and "Sustainable innovation" have been used interchangeably (Boons and Lüdeke-Freund, 2013; Carrillo-Hermosilla et al., 2010; Hall, 2006). However, it should be noted that the first three terms encompass ecological and environmental aspects, while sustainable innovation contains a broader concept that includes an additional social dimension (Charter and Clark, 2007; Schiederig et al., 2012).

Kemp and Pearson (2008) provide a definition that encompasses various aspects of the innovation process. They define environmental innovation as the formation, assimilation, or use of a novel product, process production, service, or management/business method by an organization, resulting in a reduce in environmental risk and other adverse effects of resource use (including energy use) when compared to relevant alternatives.

According to Albort-Morant et al. (2017, p. 3), green innovation can be defined as a specific type of innovation that seeks to mitigate or avoid environmental damage while also protecting the environment, satisfying consumer demands, creating value and increasing company yields. Innovation is commonly defined as introducing new products, services, or processes that involve some level of organizational change, whether radical or incremental Ashok et al., (2014). As described by (Beise and Rennings ,2005), green innovation refers to the implementation of improved practices, processes, techniques, systems, and products to prevent or minimize environmental damage.

2.1.5.2. **Green Innovation Measurement**

Measuring green innovation (GI) presents unique challenges due to its essential eco-efficiency component, which requires measuring various social, economic, and environmental factors (Chen, Y.S.; Chang, C.H.; Wu, F.S.,2012). To address this, international institutions have identified specific indicators to measure eco-innovation. However, there needs to be more widely accepted and robust scales for measuring GI (Song, W.; Yu, H.,2018).

Validated scales with specific indicators are needed to measure GI actions accurately. Song et al. (Song, M.; Fisher, R.; Kwoh, Y,2019) indicate that there needs to be more uniformity in measurement, limited availability of statistics, and the need for designing activity-specific indicators. Another challenge is that GI is not officially recognized as a separate innovation sector, making data collection costly.

The European Union has started financing initiatives to address the measurement challenges in GI. Various methods, including survey analysis, patent analysis, and digital and documentary source analysis, have been highlighted by experts for measuring GI (Kemp, R.; Pearson, P.,2007).

2.1.6. Competitive advantage of SMEs

Competitive advantage is the ability of a business to achieve greater profitability or advantages compared to its competitors. This can be accomplished through various factors, such as cost, technology, brand, and management capabilities.

Porter (1980) defines competitive advantage as the ability of a company to deliver value to customers which includes by offering either lower prices or superior benefits compared to competitors. Barney (1991) defines competitive advantage as a value-creation strategy that no current or potential competitors replicate. Another consideration by companies to have a competitive advantage when it generates more economic value than its competitors and rivals (Peteraf, M.A.; Bergen, M.E, 2003) or achieves more tremendous success than competitors (Schilke, O,2014).

Businesses commonly employ three general strategies to achieve and sustain competitive advantage: overall cost leadership, differentiation, and focus (Porter, M.E,1980). Overall cost leadership involves becoming the lowest-cost producer, allowing the company to earn above-average profits while maintaining prices aligned with industry averages. Differentiation creates a perception that the company's products or services are superior to competitors' offerings. This can be achieved through design, brand image, technology, unique features, or exceptional customer service. By offering distinct products, brand loyalty increases, and the risk of substitution decreases (Speed, R.J., Mr Porter,1989). Businesses adopting this approach target niche markets with weak competition or low susceptibility to substitution, enabling them to achieve above-average returns.

Previous research has predominantly adopted a resource-based view to explain how green innovation impacts a company's competitive advantage. It has been suggested that differences in competitive advantage arise from the valuable, rare, difficult to imitate, and non-substitutable resources associated with green innovation practices. These resources can include financial subsidies for manufacturers of new-energy vehicles, specialized products like desulfurization equipment, and supportive systems such as management frameworks (de Guimarães et al., 2018; Ndofor et al., 2011). However, only possessing resources does not guarantee efficient utilization or the attainment of competitive advantage. Singjai et al. (2018), in their study on green innovation reform in hotel industry, indirectly supported this idea. They found that the influence of green innovation strategy was often not direct or observable, and strategic objectives needed to be executed through knowledge integration activities, such as organizational capabilities.

From this angle, competitive advantage can only be achieved through the implementation of specific and practical environmental management actions. Enterprises must efficiently integrate internal and external resources by fostering organizational capabilities, and they should incorporate the concept of green development throughout the entire product life cycle. This comprehensive approach ensures the successful execution of a green innovation strategy, ultimately leading to a positive impact on competitive advantage.

2.1.7. Green organizational capabilities

Numerous academic publications have contributed to the study of organizational capabilities and firm capabilities. Capabilities refer to intangible resources (Collis, D.J,1994; Hart, S.L,1995) that businesses use to address critical challenges uniquely. When combined in a structured manner through human consciousness, these resources become capabilities, allowing the enterprise to tackle specific problems effectively. Drawing from Collis's original theoretical framework (1994) in the context of the modern business environment and the increasing focus on sustainability, organizational capabilities are evolving in connection with sustainability, especially in SMEs, which face significant environmental pressures.

In response to the pressures, "Green Organizational Capabilities" refers to enterprises' collective abilities to strategically align their resources toward achieving environmental protection objectives. Building upon Collis' theoretical framework, the researcher identified four key components that define Green Organizational Capabilities in SMEs: Operational Capabilities (OPC), Green Dynamic Capabilities (GDC), Green Human capital(GHC), and Green Marketing orientation (GMO). These components allow SMEs to proactively address environmental challenges and promote sustainable practices in their operations.

According to the resource-based view, operational capabilities are defined as a company's ability to efficiently carry out functional activities by selecting and leveraging resources wisely. This includes effectively using inputs such as materials, labour, and technology and optimizing critical technologies, resources, and processes. Previous researchers like Protogerou et al. (Protogerou, A.; Caloghirou, Y.; Lioukas, S,2012) have shown that it contributes positively to the economic value of businesses by improving cost-effectiveness, quality, and efficiency in converting inputs into desired outputs (Ahmed, M.U.; Kristal, M.M.; Pagell, M,2014). Building on the insights provided by previous research and the work of Koufteros et al. (Koufteros et al,2002], we can say that operational capabilities consist of cultivated skills, processes, and habits embedded in the operational management system over time.

Based on the insights from dynamic capabilities theory, particularly from Teece (1997] and Chen & Chang (2013), green dynamic capabilities refer to an organization's abilities to analyze and utilize existing resources and knowledge that foster innovation and develop competencies related to environmental sustainability. This enables the organization to adapt to the ever-changing market dynamics. Qiu et al. (2020) have identified three critical components of green dynamic capabilities.

- Resource integration: Consolidating resources from internal and external sources, while resource reconfiguration focuses on optimizing.
- resource reconfiguration (Reallocating).
- Acquiring new resources and eliminating redundant ones.

Lastly, environmental literacy refers to the organization's proficiency in gathering and leveraging ecological information to identify opportunities or threats and respond to environmental changes. The study also study defines green dynamic capabilities as the SMEs proficiency in combining, constructing, and restructuring internal and external resources concerning ecological preservation.

A market-oriented company must have a good understanding of its competitors' strengths and weaknesses, and it must use this knowledge for developing and implementing business strategies that creates better customer value and satisfaction. A study by Narver and Slater (1990) found that market orientation has two dimensions: customer orientation and competitor orientation. The authors argue that these two dimensions should be combined with cross-functional coordination within a company to improve its competitiveness and customer satisfaction.

Kohli and Jaworski (1990) developed a model of market orientation that identifies three antecedents of market orientation: senior management support, interdepartmental coordination, and organizational structure. They also identified three consequences of market orientation: employee response, customer response, and company performance. Kohli and Jaworski (1990) define market orientation as a generation of market intelligence, dissemination of the intelligence to departments, and organizational-wide responsiveness. They argue that market orientation is a necessary condition for superior performance, but it is not sufficient.

Narver and Slater (1990) take a different approach to market orientation. They view market orientation as a cultural aspect of an organization. They measure market orientation at an individual level and define it as "the degree to which an individual's beliefs, attitudes, and values are market oriented."Smirnova et al. (2011) combine the two approaches of Kohli and Jaworski (1990) and Narver and Slater (1990) into a framework that they call "market knowledge competence." They define market knowledge competence as "the ability of an organization to acquire, disseminate, and use market knowledge."

Lengler et al. (2013) argue that it is essential for companies to integrate market orientation and international marketing. They found that customer orientation has a positive influence on relational capability, and that market orientation with a competitor orientation dimension has a positive impact on marketing performance. In conclusion, market orientation is a critical factor in achieving superior performance. Companies that are market-oriented are more likely to have a good understanding of their competitors, develop and implement strategies that create better customer value and satisfaction, and improve their competitiveness and customer satisfaction.

2.1.7.1. **Dynamic capabilities**

Dynamic capabilities, first introduced by Teece, Pisano, and Shuen (1997), refer to a company's capacity to combine and adapt both external and internal competencies in response to environmental changes. Since its inception, this concept has evolved through various significant studies. Eisenhardt and Martin (2000) brought a more detailed, procedural aspect to dynamic capabilities, leading to distinct lines of inquiry as demonstrated by Peteraf, Stefano, and Gianmario (2013).

A key debate stemming from these studies revolves around the relevance of dynamic capabilities in different market dynamics. While Teece et al. (1997) argue their significance in highly dynamic environments, Eisenhardt and Martin (2000) advocate for their importance even in moderately dynamic settings where change is somewhat predictable. In such markets, effective dynamic capabilities heavily rely on existing knowledge and routines that help companies seize opportunities.

The theoretical framework of dynamic capabilities comprises three main elements according to Teece et al. (1997) and Teece (2007): sensing (identifying opportunities), seizing (evaluating current and potential resources, and investments), and reconfiguring (adapting the resource base as the company expands and the market evolves). Additionally, other pivotal capabilities within dynamic capabilities include learning, integration, and coordination, as pointed out by Zahra, Sapienza, and Davidsson (2006).

Research suggests that dynamic capabilities are entered on strategic transformations and aligning the organization with its surroundings. The interplay between dynamic capabilities and organizational performance has been explored by scholars such as Spring and Araujo (2014), who investigated operational capabilities as potential mediators. Operational capabilities are essential for the existence of dynamic capabilities as they operationalize knowledge within the organization. Despite significant progress in understanding dynamic capabilities, further empirical examination across different contexts is deemed necessary to deepen our insights into this intricate domain.

2.1.7.2. **Operational Capabilities**

Operational capabilities allow organizations to consistently perform tasks to support existing services and products for the same consumer base. As described by Helfat & Winter (2011), these capabilities are crucial for both industrial firms and service providers. Within operational capabilities, two key areas have garnered attention: technological capabilities and marketing capabilities.

Technological capabilities encompass the skills and knowledge required to operationalize, maintain, and innovate technology. They enable organizations to adapt to rapid technological changes by developing and producing new technologies. On the other hand, marketing capabilities focus on building relationships with consumers, anticipating their preferences, and fostering enduring connections.

Researchers like Takahashi (2005), Protogerou et al. (2011), and Giacomini (2013) have explored the interplay between dynamic capabilities (DCs), operational capabilities, and performance. They argue that marketing and technological capabilities play pivotal roles in mediating the impact of DCs on organizational success by enhancing competitiveness and innovation.

Overall, a strong emphasis has been placed on understanding how operational capabilities like technological and marketing capabilities drive performance and contribute to competitive advantages in various industries. The link between these operational capabilities and organizational success has been a recurring theme in academic literature, pointing toward their significance in shaping business strategies and outcomes.

2.2. Empirical Review

2.2.1. The Effect of Green Innovation on Competitive Advantage

In the current knowledge economy, the key to gaining competitive advantage has shifted from material production factors to core innovation abilities. Innovation involves continuously seeking and efficiently applying new knowledge throughout the entire production and operational process in order to achieve efficiency advantages. According to Chen et al. (2006), green innovation involves creating new environmentally friendly technologies and knowledge and implementing them across all stages of a product or service's life cycle. By leading the way in replacing traditional high-pollution production methods with advanced environmental protection technologies, companies can reduce resource consumption and emissions. Therefore, from the perspective of the Resource-Based View (RBV) (Barney, 1991), green innovation technologies are beneficial for conserving production factors, reducing operating costs, and accumulating circulating capital. Additionally, improving resource utilization efficiency requires increased investment in developing new technologies and knowledge, which helps meet market and stakeholder expectations for sustainable, technology-intensive, and knowledge-intensive development. Therefore, by leveraging unique physical and cognitive resources, green innovation contributes to the creation and consolidation of a company’s competitive advantage in terms of self-capability and comparative advantage (Chen and Chang, 2013).

This shows that companies must focus on building their business strengths through green innovation to gain a competitive advantage (Ar, 2012). Additionally, it is essential for companies to manage their business environment by developing management plans that address environmental issues and align with customer preferences to achieve optimal performance (Sezen & Çankaya, 2013).

The challenge of attaining competitive advantage by considering environmental aspects is an intriguing topic that has caught the attention of various researchers, particularly in the context of SMEs (Jamsa et al., 2011; Simpson, 2004; Singh & Garg, 2008). To enhance their success in the customer market, SMEs need to establish their uniqueness by offering appealing products, and one way to accomplish this is by creating environmentally friendly products (Karlsson & Olsson, 1998). Green product innovation plays a critical role in boosting the competitive advantage and overall performance of SMEs.

Furthermore, SMEs can align their products with the market potential by employing market resource allocation strategies that enhance product distinctiveness and consider the potential for meeting customer needs (Bradley & Sean, 2001). For instance, companies can develop green innovation as a response to market demand, thereby establishing their competitive advantage (Nugroho Soebandrija, 2018). According to (Mady et al. 2021) on SMEs and found that there is a positive association between GI and competitive advantage. Rehman et al. (2021) reported a positive association between green innovation and environmental performance in a manufacturing firm. Therefore, we suggest the following:

Hypothesis 1(H1)*: Green innovation has a positive and significance effect on green competitive advantage.*

2.2.2. The mediating Effect of green organizational Capabilities on the relationship between GI and green competitive advantage

Arfi and colleagues (2018) suggest that incorporating external knowledge into the innovation process can be beneficial when employees, teams, and the organization have the necessary skills, experience, and capabilities. Correspondingly, Leal-Rodríguez et al. (2014) argue that firms face challenges using knowledge exploitation to drive innovation outcomes without a robust underlying capability. These organizational capabilities act as a catalyst, enabling the transformation of knowledge into actions by facilitating the integration of externally acquired knowledge with existing internal operations within the context of SMEs. This, in turn, drives the implementation of environmentally friendly initiatives.

The demand for innovation in firms is primarily driven by its potential to increase productivity and generate more value using the same resources (Rosenberg,2006). This focus on innovation influences all aspects of the organization, including adopting green practices. Successful innovation and green innovation require the organization's efficient and effective operation, encompassing support for activities throughout the production process to create environmentally friendly products and services. Previous studies have consistently shown that operational capabilities positively influence innovation (Yuniarty, Y.; Prabowo, H.; Abdinagoro, S., 2021).

In today's rapidly changing business environment, enterprises must adapt quickly and respond with high levels of innovation and creativity (Teece, D. J.,2007). Therefore, businesses need to develop green dynamic capabilities associated with green resources (Lin, Y.H.; Chen, Y.S,2017) to drive innovation, especially in sustainability (Chen, Y.S.; Lai, S.B.; Wen, C.T.,2006). The development of green innovation in businesses heavily relies on their ability to adapt to mandatory changes related to environmental governance (Sun, Y.; Bi, K.; Yin, S, 2020). Several previous studies have demonstrated that dynamic green capabilities positively impact green innovation in enterprises (Yousaf, Z.,2021; Singh, S.K.; Del Giudice, M,2022).

Eris and Ozmen (2012) found that market orientation, organizational learning, and innovation positively affect corporate performance. Singh and Garg (2008) found that SMEs need to receive more attention to develop effective strategies. SMEs face many constraints in the export sector due to a need for more resources and innovative capabilities. To retain their competitiveness, they must benchmark their assets, processes, and performance against the best product superiority in their industry.

J. Chen and Liu (2018) observed that green marketing has influenced the company's strategy for achieving business sustainability through green innovation. Galindo-Martín et al. (2020) and Guo et al. (2020) found that consumers perceive companies' green management practices as a commitment to preserving the environment, which affects stakeholders' behavior and addresses social, ethical, and environmental sustainability concerns. Companies that quickly adopt ecological management systems, minimize waste, and engage in voluntary environmental programs and mandatory regulations can achieve corporate green innovation, as Li et al. (2020) highlighted. Green and ecological marketing strategies contribute to corporate strategies to achieve performance growth. Holtzman and McManus (2008) emphasize that growth and innovation are crucial for corporate resilience in the future, while Lin & Chen (2007) and Meroño-Cerdán et al. (2008) underline the need for continuous technological and marketing innovations in many companies. Bodlaj (2003) states that market orientation (either proactive or responsive) plays a vital role in innovative performance, as reflected in the success of new product sales that provide additional value to customers and enhance corporate performance. Jensen and Harmsen (2001) view market orientation as a significant factor in corporate innovation performance, which is evident in the level of success in developing new products. Slater and Narver (1994) found a positive association between market orientation and the consequences of innovation, particularly in terms of innovative performance on new products.

Human capital is critical in enabling businesses to adapt to challenges in sustainable development, primarily through green innovation (Kooli, 2020). In a dynamic business environment, employees' knowledge, experience, and skills are essential for adaptation (Jardon & Dasilva, 2017). SMEs who have substantial and sufficient Structural capital can perform multiple value-creation tasks and enhance innovation performance (Buenechea-Elberdin et al., 2018; Messabia et al., 2022b; Pedro et al., 2018). Relational capital, characterized by trust and commitment among various stakeholders, also contributes to innovation competencies (Sapta et al., 2021a). Companies with high intellectual capital also possess more innovative capabilities (Ali et al., 2021a; Arsawan et al., 2022; Marco-Lajara et al., 2022). Based on the above research, the following hypothesis is proposed:

Hypothesis 2: *Green Organizational Capability (comprising operational capabilities, green marketing orientation, green dynamic capability, and green human capability) plays a mediating role in the relationship.*

Hypothesis 2a (H2a): *Operational capabilities mediate the relationship between green innovation and competitive advantage.*

Hypothesis 2b (H2b): *Green dynamic capabilities mediate the relationship between green innovation and competitive advantage.*

Hypothesis 2c (H2c): *Green marketing orientation mediates the relationship between green innovation and competitive advantage.*

Hypothesis 2d (H2d): *Human capital mediates the relationship between green innovation and competitive advantage.*

2.2.3. Green innovation and Green dynamic capabilities

An enterprise's ability to adapt and evolve its resources in response to changing market conditions (Barreto, 2010; Helfat & Winter, 2011) is vital for achieving green innovation and maintaining competitiveness. These dynamic capabilities include sensing market trends, seizing opportunities, and transforming the business model (Teece, 2017). They are unique to each firm and challenging for competitors to replicate. Firms with solid sensemaking capacity can respond quickly to competitors' actions, understand customer needs, and drive innovation in green product development t (Li & Lu, 2014).

Green innovation involves using environmentally friendly technologies and practices to improve products and processes while minimizing negative environmental impacts (Wong et al., 2012). It may face uncertainty, but firms with strong green dynamic capabilities can positively influence green product development performance, meeting stakeholders' environmental needs (Chen & Chang, 2012). This requires adopting various organizational practices, such as selecting greener materials, reducing material usage, and implementing eco-design principles (Chan et al., 2016). These capabilities continuously renew and develop the organizational capacities necessary for green innovation in a dynamic business environment.

We argue that the success of green product and process innovation depends on a firm's superior green dynamic capabilities, including sensing, seizing, and transforming s (Teece, 2017). These capabilities enable firms to orchestrate their resources effectively and deliver value to customers (Lin & Chen, 2017). By leveraging existing knowledge and resources, firms can renew and develop their green organizational capabilities in response to the dynamic business environment (Chen & Chang, 2012). Learning mechanisms are crucial in shaping organizational routines and driving corporate green innovation efforts. Well-developed knowledge further enhances the impact of green dynamic capabilities. Overall, green dynamic capabilities contribute to firms' competitiveness by promoting green management practices, strategic objectives, and R&D in pursuing green innovation (Amui et al., 2017). Consequently, we hypothesize that:

Hypothesis 3: *Green innovation positively influences green dynamic capabilities.*

2.2.4. Green innovation and Green marketing orientation

In 1969, Lazer introduced the concept of green marketing as part of social marketing. This form of marketing focuses on the limited environmental resources, conventional marketing practices, and the integration of environmentally friendly elements into traditional marketing strategies. According to Kotler et al. (2009), green marketing refers to marketing that satisfies the current needs of consumers and businesses while also preserving or enhancing the ability for future generations to meet their own needs. Green marketing starts by considering the impact of marketing on society and the environment and aims to address environmental concerns in marketing activities (Lazer, 1969).

Along with business ethics, research on green marketing has grown in importance (Papadas et al., 2019). Chahal et al. (2014) proposed various dimensions of green marketing orientation, including green innovation, greening the process, and developing a green supply chain. A green marketing orientation is crucial for achieving a competitive advantage through customer orientation. Slater and Narver (1994) found a relationship between market orientation and innovative outcomes, specifically in new product creation. Kohli et al. (1990) explained that the ability to rapidly respond to changing customer needs is vital when competing with aggressive rivals. Therefore, organizations should prioritize building a green marketing orientation to excel in product development and succeed in a competitive market. Additionally, Dabija et al. (2018) discovered that the factors influencing customer behavior and loyalty differ in the context of green products.

A number of studies have found that marketing orientation through green innovation is a critical choice for organizational strategies in creating unique products for their customers in the market (Ar, 2012; Dangelico & Pujari, 2010; R. J. Lin et al., 2013). Products with specific values and the advantages of green environmental products are a separate bargaining value for the company to customers to have an advantage over their competitors' products. As a result, the researchers proposed the following hypothesis:

Hypothesis 4: Green innovation has a significantly positive effect on green marketing orientation.

2.2.5. Green marketing orientation and green competitive advantage

A Market orientation is a crucial concept in marketing literature concerning how industries implement marketing principles. It is considered the most effective and efficient organizational culture for generating the behaviors necessary to deliver superior value to buyers, thereby continuously achieving superior business performance.

Market orientation encourages three key aspects: customer orientation, competitor orientation, and inter-functional collaboration. Academics and practitioners widely recognize these market-oriented corporate strategies as the primary pillars for achieving exceptional company performance across manufacturing and service industries (Kara et al.,2005).

However, there is an empirical need for more scarce linking market orientation with competitive measurements to develop interconnected models (Baker et al. Sinkula. 1999). Enhancing performance and competitiveness can be achieved by developing a market-oriented organizational culture that understands market needs, wants, and demands (Narver et al., 1995). This market orientation significantly contributes to developing various company competencies that foster high performance in cost management and successful service provision (Suparman et al.. ,2017).

Green marketing has changed significantly since the 1980s, moving away from traditional marketing practices. Huang et al. (2016a) discovered that green organizations are essential in promoting green innovation within companies. These organizations enhance green innovation by fostering genuine stakeholder commitment to preserve the environment. Organizations must pay attention to marketing aspects that care about the environment and influence their reputation in the customer market to sustain their performance.

The relationship between marketing activities and the environment is considered essential by Qi et al. (2020), as organizations see it as an opportunity to achieve their goals. Various other researchers have also discussed different concepts related to green marketing, such as green practices in management (Sellitto, 2018), environment sustainability (Shahzad et al., 2020), eco industry (Shahzad et al., 2020), green marketing perspective (Martínez, 2015), and orientation to green marketing for internal business (Papadas et al., 2019).

Ionescu (2021) conducted a study that found a relationship between green behavior and environmental sustainability. May et al. (2021) examined the perspective of employees' green behavior on organizational sustainability, with organizational trust and organizational identification mediating the relationship. The results showed that organizational identification partially mediated the impact of employees' green behaviors on environmental sustainability. Ionescu (2020) also revealed a relationship between environmental performance, sustainable energy, and green financial behavior.

Green or environmental marketing involves changing products, manufacturing processes, packaging, and advertising practices (Chahal et al., 2014). Companies aim to satisfy customers and contribute to society while pursuing profitable growth and minimizing negative environmental impacts for long-term business sustainability (Saether et al., 2021).

Market orientation enables us to understand customer needs and desires and establishes strong norms for learning from customers and competitors (Narver et al., 1995). The same study says commitment to market orientation can lead to superior value in customers' eyes and exceptional company performance. Applying market orientation as a competitive strategy directly impacts performance outcomes, including a heightened competitive advantage (Ahmed, Pervaiz K, dan Shepherd, Charles D. 2010).

Therefore, small and medium-sized enterprises (SMEs) must maintain competitiveness (Gorondutse et al., 2020). An SME's competitive advantage refers to a company's superior position in the market compared to its competitors (Porter, 1985). In the face of environmental uncertainties and competitive pressures, SMEs must develop unique approaches. They must also strengthen their product lines to survive in a competitive market by creating green innovations in response to rapid and unavoidable changes (Nuryakin & Maryati, 2020).

Kamboj and Rahman (2017) argue that market orientation is essential in providing value to customers. Market-oriented companies tend to develop capabilities that are more beneficial to competitive advantage. Market orientation and marketing resources are key drivers in developing competitive advantage and achieving firm performance (Davcik & Sharma, 2016). Market orientation can create a positive value and become an intangible asset of the firm to maintain its long-term sustainability or competitive advantage. From this, green market orientation significantly affects green competitive advantage. Therefore, the following hypothesis is formulated:

Hypothesis 5: *Green marketing orientation has a significantly positive effect on green competitive advantage of SMEs.*

2.2.6. The Impact of operational Capabilities on Competitive Advantage

Operational capabilities refer to the ability of a company to perform its operations with quality, flexibility, and timely delivery, which are essential for strategic competitiveness (Vanpoucke et al., 2017). These capabilities are based on operational strategies that involve various factors (Wu et al., 2012) and require a combination of skills within the organization (Teece, 2019; Zhang, Pawar, Shah & Mehta, 2013) to achieve efficient utilization of resources, technologies, and materials (Zhang et al., 2013). By improving operational performance, they enable companies to outperform their competitors (Ojha et al., 2013). Operational capabilities play a vital role in the effective selection and utilization of resources within a business's operational management system. These capabilities directly impact the organization's fundamental functions, making it crucial to achieve operational efficiencies (Saragih et al., 2020) and maintain a competitive edge (Zollo & Winter, 2002). The strength of operational capabilities positively affects overall performance and efficiency maintenance (Drnevich & Kriauciunas, 2011). For example, operational capabilities can increase revenue (Peng & York, 2001), reduce costs associated with product development (Wu, 2010), and improve the quality of existing processes and products (Lai et al., 2008). In today's dynamic and transformative business landscape, the important implementation of new operational processes enables SMEs to adapt to the stakeholders' requirement and trend. This ability is to differentiate itself in delivering value to customers is critical to gaining a competitive advantage (Mikalef et al., 2020).

Hypothesis 6: Operational capabilities have a significantly positive effect on green competitive advantage of SMEs.

2.2.7. Green human capital and green innovation

Human capital is vital to a company's value generation (Mačerinskienė & Survilaitė, 2012). Sustainable human capital refers to the environmental orientation exhibited by employees through their actions, attitudes, skills, experience, commitments, and knowledge (Huang & Kung, 2011). The management of human resources can promote sustainable human capital by adopting practices such as green recruitment, green training, and recognition of green initiatives (Renwick et al., 2016). Many organizations incorporate sustainability topics and issues in their training and change management programs (Stalcup et al., 2014; Feasby & Wells, 2011). Consoli et al. (2016) state that green job opportunities typically require higher levels of education, work knowledge, cognitive abilities, interpersonal skills, and training compared to non-green careers.

Sustainable human capital can also serve as a critical driver for the adoption of green innovation. Recent studies by Scarpellini et al. (2017) and Triguero et al. (2013) highlight how the assets, skills, and knowledge possessed by environmentally trained managers and employees can enhance eco-innovative entrepreneurship and the design of green products. Moreover, sustainable human capital is proactive in generating new ideas and transforming them into green solutions (Chen et al., 2006). It helps minimize ambiguity, tolerates risks, and overcome employee resistance towards green practices, thus facilitating their adoption (Chen & Chang, 2013). Based on these arguments, we can hypothesize that:

Hypothesis 7: Green human capital positively influences green innovation.

2.2.8. The Impact of Green Dynamic Capabilities on Competitive Advantage

As the business landscape evolves, diverse market needs lead to the development of various product lines. In dynamic environments like these, traditional, inflexible strategies may need to be more effective and help progress. Businesses need to adapt, adjust, remove, or redefine their business models as required, gathering insights from both internal and external sources (Lavie, D., 2006). Dynamic capabilities are crucial in sustaining a company's competitive edge (Teece, D.J., 2007).

Companies with robust dynamic capabilities can harness knowledge from different industries to drive innovation, turning potential opportunities into business benefits. By staying alert to environmental changes, companies can promptly gather and apply market intelligence to identify opportunities and risks. In today's digital era, speed is critical for companies seeking a competitive advantage (Stalk, G., 2023). Rapid decision-making increases the likelihood of seizing opportunities and mitigating risks, ultimately leading to a competitive position. Several studies have shown that dynamic solid capabilities positively impact enterprises' competitive advantage (Wu, L.Y., 2011). Dynamic capability, as part of the organizations management process, can also help stimulate RBV to improve SMEs' performance and competitive advantage.

Hypothesis 8: Green dynamic capabilities have a positive impact on the competitive advantage.

2.2.9. The Impact of Green Human capital on Competitive Advantage

Despite the potential benefits of GI for enhancing sustainability, the integration of these innovative activities within a company's value chain is a complex undertaking (Abadzhiev et al., 2022). Scholars suggest that to effectively align GI with the value chain, firms should cultivate internal and external capabilities such as leveraging social networks (Song et al., 2021), embracing open innovation practices (Meidute-Kavaliauskiene et al., 2021), implementing proactive environmental strategies (Mulaessa & Lin, 2021), and undergoing sustainable digital transformation (Feng et al., 2022).

Building upon the Natural Resource-Based View (NRBV) (Hart, 1995), the significance of Green Innovation Capabilities (GIC) alongside Green Human Capital (GHC) in driving sustainability and competitive advantage for firms is emphasized (Chen, 2008; Jirakraisiri et al., 2021; Ullah et al., 2022; Rustiarini et al., 2022).Scholars advocate for companies to leverage green intellectual resources, enhance employees' environmental knowledge(Wang & Juo, 2021), and nurture a green organizational identity to navigate the evolving environmental landscape successfully(Song & Yu, 2018). Companies are urged to adapt their human resource management strategies by incorporating green initiatives into training, promotion, and remuneration to facilitate the transition to a more sustainable workforce (Ullah et al., 2022; Cai et al., 2020; Singh et al., 2020).

Green Human Capital emerges as a strategic asset for promoting green competitiveness and enhancing financial and social performance (Agyabeng-Mensah & Tang, 2021). Recent studies highlight the importance of Green Human Resource Management (GHRM), Green Innovation Capability (GIC) management, and Green Innovation strategies in enhancing companies' sustainability efforts (Ullah et al., 2022; Shah et al., 2021; Bombiak, 2022; Liu et al., 2022; Malik et al., 2020). Additionally, research underscores the interconnectedness of GHRM, green leadership styles, and Green Innovation in driving corporate sustainability initiatives (Leroy et al., 2018; Ahmad et al., 2021; Song et al., 2020; Ahmad et al., 2022).

Hypothesis 9: Green Human capital have a positive impact on the competitive advantage.

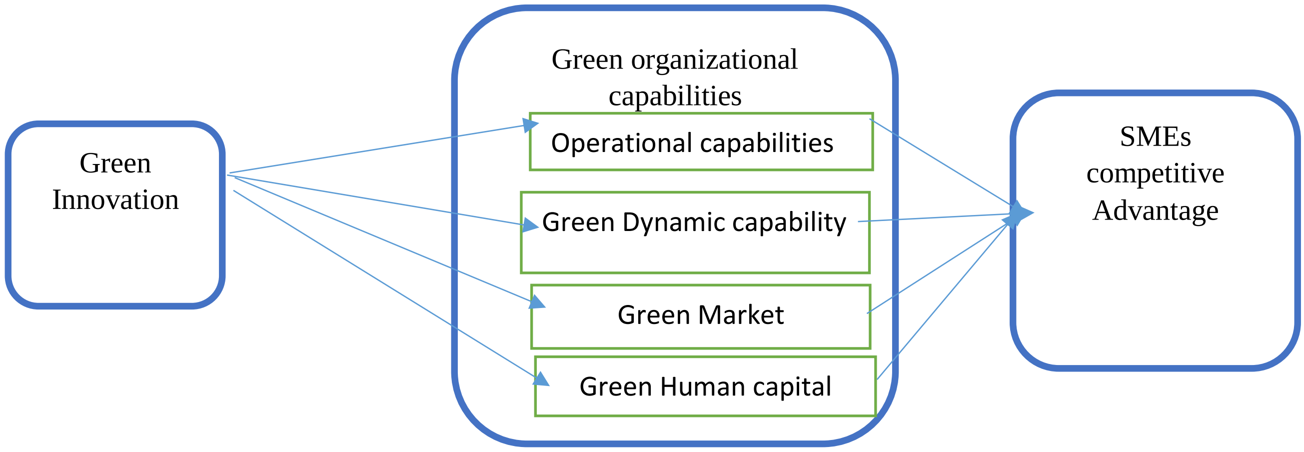

Figure 3: Research Model

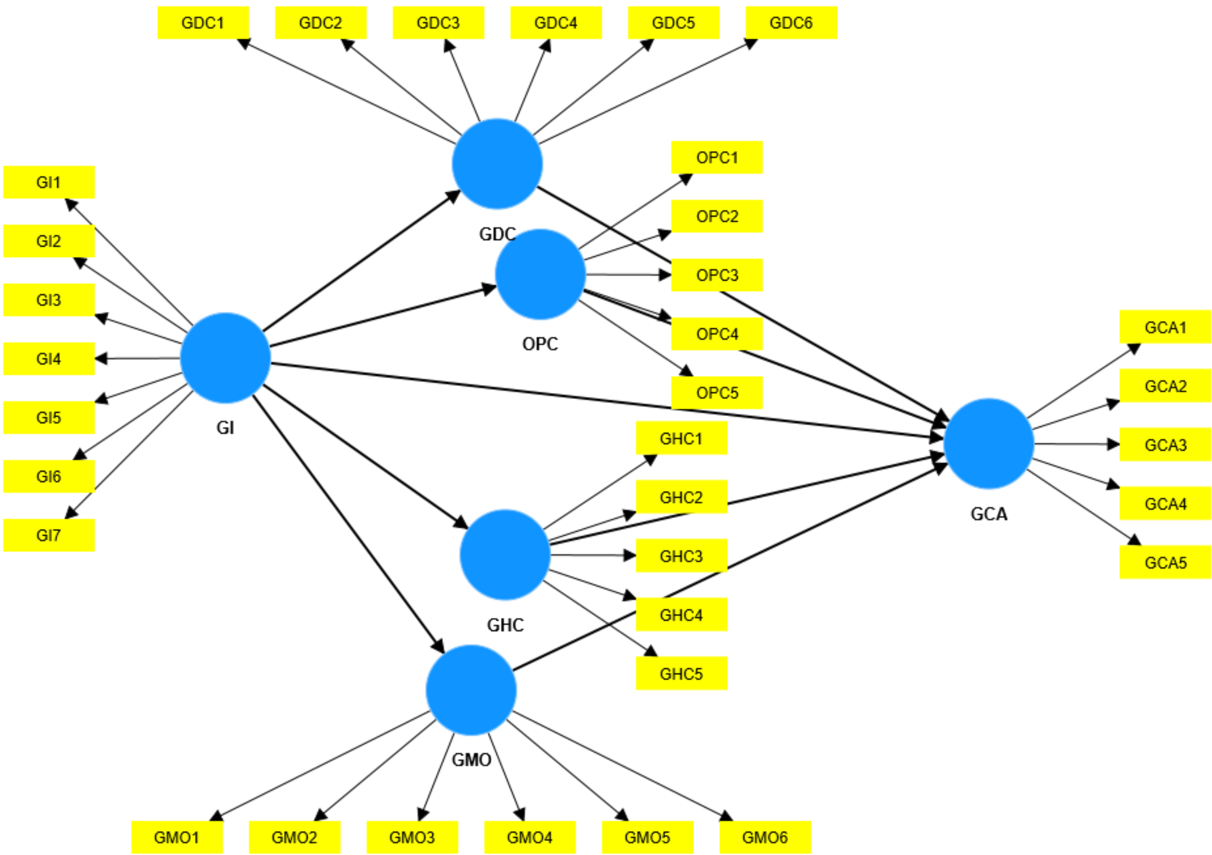

Figure 4: Study Model

CHAPTER THREE

3. RESEARCH METHODOLOGY

3.1. Sampling Techniques

The Ethiopian Micro and Small Enterprise Development Agency (EMDEDA) reported 3954 manufacturing SMEs in Addis Ababa from 2018 to 2022. This number was used as the sample frame. A total sample size of 350 manufacturing SMEs was selected using the Bukhari sample size method. A questionnaire was distributed to all the sample members based on the allocation for each of the eleven sub-cities, as shown in Table 1 below.

The sample was composed explicitly of manufacturing SMEs in Addis Ababa. This decision was made based on a 2023 UNDP working paper report highlighting the increase in Addis Ababa's share of manufacturing SMEs compared to other regions. In 2017, Addis Ababa accounted for 33 percent of manufacturing SMEs, while the Oromia region accounted for 30 percent, the Tigray region accounted for 12 percent, and the Amhara region accounted for 14 percent. By 2022, Addis Ababa's share had increased to 38 percent, while the Oromia region's share had decreased to 27 percent, the Tigray region's share had been reduced to 9 percent, and the Amhara region's share had decreased to 12 percent. This shows that manufacturing SMEs proportion as compared to other sectors is relatively higher than other sectors. The manufacturing sector is a vital driver of economic growth in Ethiopia. It contributes to job creation, export earnings, and poverty reduction. However, the manufacturing sector also has a significant effect on the environment. This is due to the emission of greenhouse gases, water pollution, and waste generation. This study examines the effect of green innovation on the competitive advantage of manufacturing SMEs and the role of organizational capabilities in Addis Ababa, Ethiopia.

The first criterion required the SMEs to be actively operational within the manufacturing industry. The second criterion targeted SMEs, characterizing the presence of manufacturing SMEs in Addis Ababa, Ethiopia. The selected sample is representative of the population of manufacturing SMEs. A questionnaire was administered to the managers, heads of departments, operational employees, and others who have a crucial role and understanding of the e SMEs. The questionnaire was distributed in eleven sub-cities of Addis Ababa, Ethiopia, for two months, from October to November 2023.

3.2. Research approach and design

This study utilized a quantitative research approach, specifically a cross-sectional data collection, to examine the relationships between various constructs using quantitative data. The study's findings were analysed using quantitative data, focusing on numerical measurements and statistical analyses (J.F. et al.,2020). When researching in the context of Small and Medium-sized Enterprises (SMEs) within the business field, a quantitative approach is often preferred to quantify and evaluate the connections between the constructs being studied (D.S. et al.,2023, E. Yadegaridehkordi, B. Foroughi, M. Iranmanesh, M. Nilashi, M.,2023). This approach allows for statistical analysis, hypothesis testing, and drawing inferences based on numerical evidence (J.F. et al.,2020).

The study used a cross-sectional design, meaning that the data was collected and analysed for a specific period and cannot predict outcomes over time. This design enabled the researchers to gather data on the variables of interest and examine their relationships within a particular timeframe. The researchers employed the deductive method, starting with a hypothesis and then collecting data to test it. Primary data was collected through modified questionnaires from previous studies. The total sample consisted of 350 respondents, selected using random sampling technique. The study focused on managers, department heads, and operational staff in manufacturing SME entrepreneurs in Addis Ababa. Questionnaires were distributed and collected across all sub-cities in the area. The investigation explored the connection between Green Innovation (GI) and green competitive advantage within the context of Manufacturing SMEs in Ethiopia.

Bukhari Formula for known population:

$$\text{Sample size} = \frac{\dfrac{z^2 \times p\,(1-p)}{e^2}}{1 + \left(\dfrac{z^2 \times p\,(1-p)}{e^2 N}\right)}$$

Bukhari Sample Size Calculator 2020

Confidence Level	95%
Sample Proportion (p)	0.5
Margin of Error (e)	0.05
Population Size (N)	**3954**
Alpha divide by 2	0.025
Z-Score (z)	1.96
Sample Size	**350**

Additionally, the aimed of the study to examine the mediating effect of Green Organizational Capabilities (GOC) between G.I. and the competitive advantage of SMEs. Detailed information on the number of questionnaires and response rates in the area can be found in Table 1. (1970) sampling table was followed. The first criterion required the SMEs to be actively operational within the manufacturing industry. The second criterion targeted SMEs, characterizing the presence of manufacturing SMEs in Addis Ababa, Ethiopia. The selected sample is representative of manufacturing SMEs in Addis Ababa, Ethiopia. A questionnaire was administered to the managers, heads of departments, operational employees, and others who have a crucial role and understanding of the e SMEs. The questionnaire was distributed in eleven sub-cities of Addis Ababa, Ethiopia, for two months, from October to November 2023.

Table 2:Response rate category of sample

Table 1		
Response rate category of sample		
Sub city	**The Sample Size**	**The Sample proportion**
Yeka	356	33
Bole	138	13
Lemikura	268	25
Kolfe Keranio	209	19
Addis Ketema	732	67
Akaky Kaliti	421	39
Arada	220	20
Gullele	629	58
Kirkos	365	34
Lideta	159	15
Nifas Silk-Lafto	301	28
Total	**3798**	**350**

Of the 350 selected sample questionnaires distributed, 294 were fully completed and returned, resulting in a response rate of 84%. This response rate is considered to be good and indicates that there is no potential biased response. The sampling technique used was random sampling, which means that the respondents were selected based on their chance of probability in developing their businesses. This was done to ensure that the respondents had the necessary knowledge and experience to answer the questions in the questionnaire.

3.3. Data collection and estimation techniques

Data were collected from a structured questionnaire adapted from prior research on green innovation, green organizational capabilities, and SMEs' competitive advantage. Questionnaires were distributed personally to managers, heads of departments, operational employees, and others of SMEs of Addis Ababa. When the respondents did not want personal visits, data were collected through mail-delivered questionnaires. We employed random sampling to attain the responses from the sampling frame and confirm that the full consent of respondents obtained from all participants for this research. The researchers made an appointment and took a survey from October 2023 to November 2023. The survey was voluntary, and we did not pay any financial benefit to the respondents.

Since we used PLS-SEM through Smart-PLS software, the normality condition is not necessary for the employed method and software. As discussed earlier, it was a quantitative study; therefore, the validity & reliability of items of the questionnaire were evaluated using factor loading, composite reliability, Cronbach's alpha, and average variance extracted (AVE). There were two sections in the questionnaire: the first part carried information related to demographics, and the second section contained information related to all variables of this paper.

A survey questionnaire consisted of a seven-point Likert scale with structured items & constructs. For the analysis, we employed the Smart-PLS 4.4 software for this research. We validated the measurement and structural models through convergent and discriminant validities, Fornel-Larcker Criterion, HTMT matrix, regression analysis (R-squared values), f-squared values, and hypothesized indirect & direct associations. The measurement model is the outer model between observed & unobserved variables and is evaluated through convergent validity using factor loading, Cronbach's alpha, average variance extracted, and composite reliability. However, the discriminant validity is validated using the average variance extracted, the Fornel-Larcker Criterion, the HTMT matrix, and the cross-loading. Thus, in this way, the modified items and constructs are validated, and our modified outer model (measurement model) is simultaneously validated. However, the structural model is an inner model between independent, dependent, and indirect variables. The structural or inner model is validated using regression analysis (R-squared values), f-squared values, predictive relevance Q2, and hypothesized indirect & direct associations. Hence, the entire modified model of the undertaken study is validated using measurement and structural models through Smart-PLS 4.4. We also measured the mediation model through the bootstrapping method with 5000 bootstraps. The mediation function is built-in Smart-PLS 4.4 software; previously, it was not available in the Smart-PLS 3.0 version. The smart-PLS 4.4 calculates the bootstrapping method by default.

3.4. Method of Data Analysis

SmartPLS 4.4 was used to determine the theoretical model in this study because it is one of the recommended growing second-generation techniques. PLS-SEM was used to test the hypotheses. A bootstrapping of 5000 subsamples was run to determine the significant values of factor loadings and path coefficients. SmartPLS has some advantages over other techniques, such as the fact that it does not require a normality test or multicollinearity check. This technique is also better for estimation than regression and is appropriate for complex and straightforward theoretical models. Researchers estimate two models in PLS-SEM: namely measurement and the structural models. For this study, we used convergent validity and discriminant validity to measure the measurement model.

The data in this study was analyzed using Partial Least Squares-Path Modelling (PLS-PM). PLS-PM is particularly useful for exploratory research because it focuses on predicting data (Lohmo¨ller, 1989; Bharati et al., 2013). It consists of both a factor model and a path model. The factor model helps researchers assess how items or observable variables relate to their underlying latent variables or factors. Meanwhile, path analysis measures the positive or negative connections between latent variables (Weston et al., 2008). Unlike traditional multivariate procedures, PLS provides explicit and estimated error variance parameters and allows for simultaneously examining multiple regression equations or relationships (Byrne, 2013). This statistical tool can handle complex relationships among variables, especially in situations where data may not be normally distributed or have multivariate pairwise normality.

3.5. Data treatment

The evaluation of hypotheses is an essential step in the research process. It allows researchers to determine whether their findings support their initial hypotheses. Several methods can be used to evaluate hypotheses, each with advantages and disadvantages.

In this paper, we used the following methods to evaluate our hypotheses:

One-dimensionality: We used Cronbach's alpha coefficient to assess the one-dimensionality of our constructs. Cronbach's alpha is a measure of internal consistency, indicating the extent to which the items in a scale measure the same construct. A Cronbach's alpha of 0.7 or higher is considered acceptable.

Composite reliability: We also used CR to assess the reliability of our constructs. CR measures how well the items on a scale measure the same construct. A CR of 0.7 or higher is considered acceptable.

Content validity: We assessed the content validity of our constructs in the exploratory study and pre-tests. Content validity measures how well the items in a scale measure the construct they are intended to measure.

Convergent validity: Convergent validity is assessed by observing the average variance extracted (AVE). AVE measures how much variance in a construct is explained by its indicators. The AVE for each construct should be greater than 0.5.

Discriminant validity: This is assessed by comparing the square roots of the AVEs for each construct with the correlations between the constructs. This is calaculated as square roots of the AVEs which should be greater than the relation of the correlations between the constructs.

Harman's one-factor test: This is used to assess the likelihood of common method bias. It occurs when the results of a study are influenced by the method used to collect the data. Harman's one-factor test is a statistical test that can be used to identify common method bias.

Pearson's determination coefficient (R2): This is used Pearson's (R2) to fit the data to the measurement model. R2 is a measure of how well the model fits the data. A high R2 indicates that the model fits the data well.

Relevance or predictive validity (Q2): We also used relevance or predictive validity (Q2) to assess the model's fit. Q2 is a measure of how well the model predicts the dependent variable. A high value of Q2 shows that the model predicts the dependent variable well.

Effect size (f2): We also used effect size (f2) to assess the model's fit. f2 is a measure of the magnitude of the effect of the independent variables on the dependent variable. A large f2 indicates that the independent variables significantly affect the dependent variable.

Variance accounted for (VAF): This is used to test and categorize the mediating effect. VAF, which measures how much the variability of the exogenous variable can be explained by the mediating variable. A high VAF indicates that the mediating variable significantly predicts the dependent variable. The results of our hypothesis evaluation indicated that our hypotheses were supported. The constructs in our model were one-dimensional, reliable, and valid. The model fit the data well, and the mediating effect was significant.

CHAPTER FOUR

4. RESULTS AND DISCUSSION

4.1. Respondents' Demographic Characteristics

Table 3 shows that 294 general managers, department heads, and operational employees of Manufacturing SMEs participated in the survey. Most respondents were female, which accounts for 152, with a frequency percentage of 51.7%, and males were 142, with a percentage of 48.3 %, so findings depend on female respondents. Of these, 30.3 % had been operating in textile and garment; this indicates that the Ethiopian textile and garment sector has increased in recent years, driven by solid demand from both domestic and international markets. Most SMEs (54.4%) had 1–5 employees, followed by 18 % having 6-19 employees. The overall demographic statistics are narrated in Table 2.

Table 3:Demographic Data of respondents

Sample characteristics	Category	Number	Percent
Gender	Male	142	48.3
	Female	152	51.7
Experience	Less than 5 years	72	24.5
	6-10 years	102	34.7
	11-15 years,	75	25.5
	More than 15years	45	15.3
Position	General Manager	130	44.2
	Lead of department	136	46.3
	Operational employee	22	7.5
	Others	6	2.0
Industry	Textile and garment	89	30.3
	Food processing and beverage	42	14.3
	Leather and leather products	43	14.6
	Metal works and engineering	48	16.3
	Wood works including furniture.	33	11.2
	Traditional handicrafts and jewelries	11	3.7
	Agro processing	11	3.7
	Construction materials production	9	3.1
	Others	8	2.7
Firm Size	1-5employee	160	54.4
	6-19 employees	53	18
	20-100 employees	38	12.9
	More than 100 employees	43	14.6
Educational level	Bachelors	48	17.8
	Masters	209	77.7
	PhD	8	3.0
	Others	4	1.5
Age	20-30 year,	243	82.7
	31-40years	29	9.9
	41-50 years,	21	7.1
	More than 51 years	1	0.3

4.2. Descriptive Statistics

The descriptive statistics results are shown below in Table 4. The study's findings indicate that the average values for the items above 4 indicate a general agreement among respondents regarding the statements. The median values are also above 5, further supporting these results. It can be inferred from the data that the respondents hold a positive attitude towards green innovation and the organizational capabilities that contribute to developing a green competitive advantage within their firms. The mean value of 4 suggests that the respondents neither agree nor disagree with the aspects of the study questionnaires. Lastly, a mean value below 4 indicates that the respondents do not exhibit a positive attitude towards the specific questions presented in the questionnaires. The skewness value -0.205 suggests that the data distribution is skewed to the left. In contrast, the excess kurtosis value of -0.659 indicates that the distribution is flatter than what would be considered normal.

Table 4:Descriptive statistics

	Mean	Median	Min	Max	SD	Excess kurtosis	Skewness	N	P- value
GCA1	4.507	5.00	1	7	1.452	-0.659	-0.205	294	0.000
GCA2	4.646	5.00	1	7	1.308	-0.250	-0.102	294	0.000
GCA4	4.276	4.00	1	7	1.371	-0.298	0.003	294	0.000
GCA5	4.088	4.00	1	7	1.248	0.162	0.127	294	0.000
GDC1	4.310	4.00	1	7	1.366	-0.196	-0.187	294	0.000
GDC3	5.085	6.00	1	7	1.703	-0.532	-0.690	294	0.000
GDC4	3.986	4.00	1	7	1.631	-0.777	-0.011	294	0.000
GDC5	4.650	5.00	1	7	1.515	-0.574	-0.300	294	0.000
GDC6	5.218	5.00	1	7	1.507	-0.323	-0.644	294	0.000
GHC1	4.469	4.00	1	7	1.269	0.098	-0.232	294	0.000
GHC2	4.500	4.00	1	7	1.402	-0.141	-0.350	294	0.000
GHC3	3.966	4.00	1	7	1.547	-0.620	-0.131	294	0.000
GHC4	3.796	4.00	1	7	1.622	-0.748	0.064	294	0.000
GHC5	3.884	4.00	1	7	1.852	-1.059	0.067	294	0.000
GI4	4.714	5.00	1	7	1.335	-0.554	-0.190	294	0.000
GI5	4.541	4.00	1	7	1.376	-0.424	-0.141	294	0.000
GI6	5.088	5.00	1	7	1.428	-0.436	-0.565	294	0.000
GI7	5.095	5.00	1	7	1.472	-0.124	-0.628	294	0.000
GI9	5.024	5.00	1	7	1.413	-0.286	-0.559	294	0.000
GMO1	3.718	4.00	1	7	1.505	-0.456	0.001	294	0.000
GMO2	4.139	4.00	1	7	1.536	-0.395	-0.111	294	0.000
GMO3	3.741	4.00	1	7	1.703	-0.832	-0.007	294	0.000
GMO5	5.143	5.00	2	7	1.320	-0.647	-0.319	294	0.000
GMO6	5.109	5.00	1	7	1.338	-0.635	-0.277	294	0.000
GMO7	4.983	5.00	1	7	1.413	-0.527	-0.326	294	0.000
OPC1	4.663	5.00	1	7	1.447	-0.237	-0.480	294	0.000
OPC2	4.007	4.00	1	7	1.744	-0.985	-0.045	294	0.000
OPC3	4.058	4.00	1	7	1.353	-0.180	-0.139	294	0.000
OPC4	4.395	4.00	1	7	1.476	-0.544	-0.262	294	0.000
OPC5	4.483	4.00	1	7	1.365	0.044	-0.340	294	0.000

4.3. The PLS- SEM Algorithm and Bootstrapping.

The study utilized the PLS-SEM method to analyse data. PLS-SEM can efficiently run regression analysis to test the complex relationship among the constructs. Due to PLS-SEM's non-parametric nature does not require the assumption of normality and a large sample size (Hair et al., 2011). It is a multivariate technique that assesses the measurement and structural model with low error variance. PLS-SEM is suitable as it simultaneously validates and describes the relationship among the constructs (Hair et al. 2014). A bootstrapping method using 5000 resampling was used to assess the structural model. A structural equation model with latent constructs consists of two components. The 1st component is the structural model, which shows the relationships between the latent constructs. Only recursive relationships are allowed in PLS-SEM, meaning no causal loops exist. This shows the structural paths between the latent constructs can only go in one direction. In the structural model, there are exogenous constructs with no relationships pointing at them and endogenous constructs explained by other constructs through relationships.

The 2nd component of the structural equation model is the measurement model, also known as the outer model in PLS-SEM. These models include the predictive relationships between each latent construct and its observed indicators. Each indicator variable is associated with only one latent construct, as multiple relations are prohibited. It shows that PLS-SEM can handle both formative and reflective measurement models. Reflective indicators are seen as a reflection of the latent construct, where changes in the construct result in changes in the indicator variables. Reflective indicators are represented by arrows pointing from the latent construct to the indicator variables, and the coefficients for these relationships are called outer loadings. On the other hand, formative indicators are assumed to cause the latent variables. Formative indicators are represented by arrows pointing from the indicator variables toward the latent construct, and the coefficients for these relationships are called outer weights.

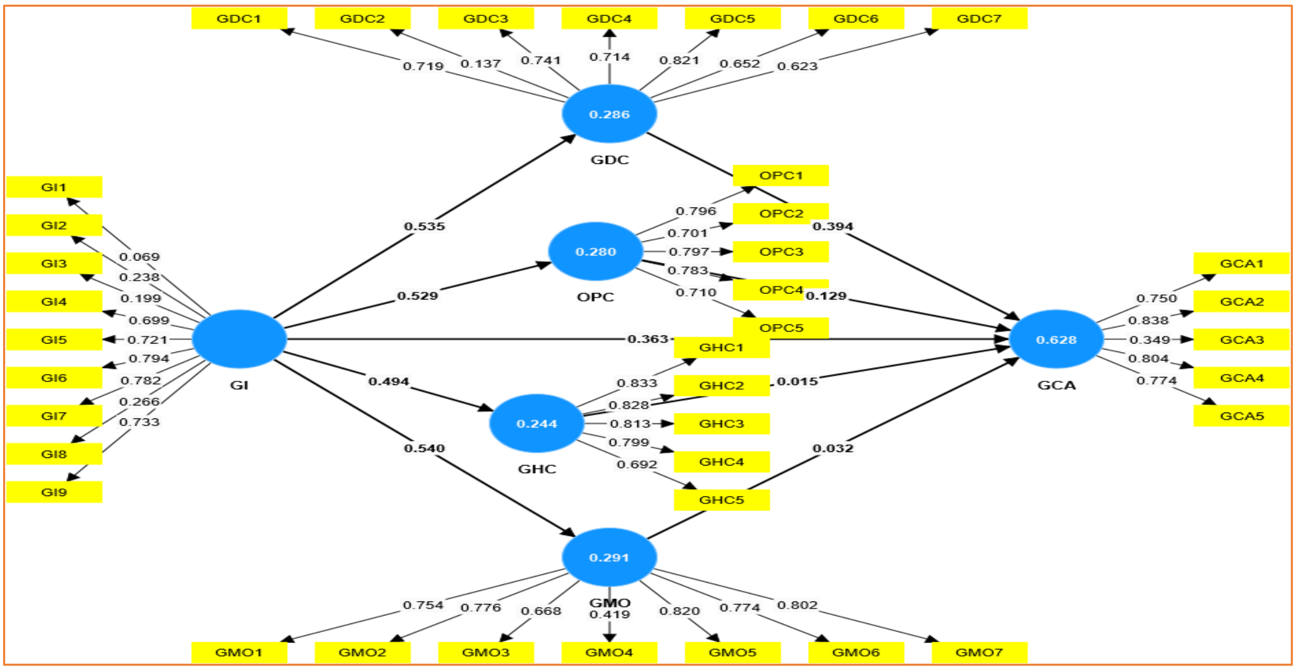

Figure 5: PLS-SEM Results and bootstrapping

4.4. How to Build the inner and outer models

Based on the research model discussed earlier in this paper (refer to Figure 3), an inner model can be easily constructed in SmartPLS. To begin, click on the modelling window on the right-hand side and then select the second-to-last blue circle icon labelled "Switch to Insertion Mode." Click in the window to create red circles representing your latent variables. After placing the circles, right-click on each latent variable to modify the default name and assign the appropriate variable name used in your model. Finally, use the last icon labelled "Switch to Connection Mode" to draw arrows connecting the variables (refer to Figure 6).

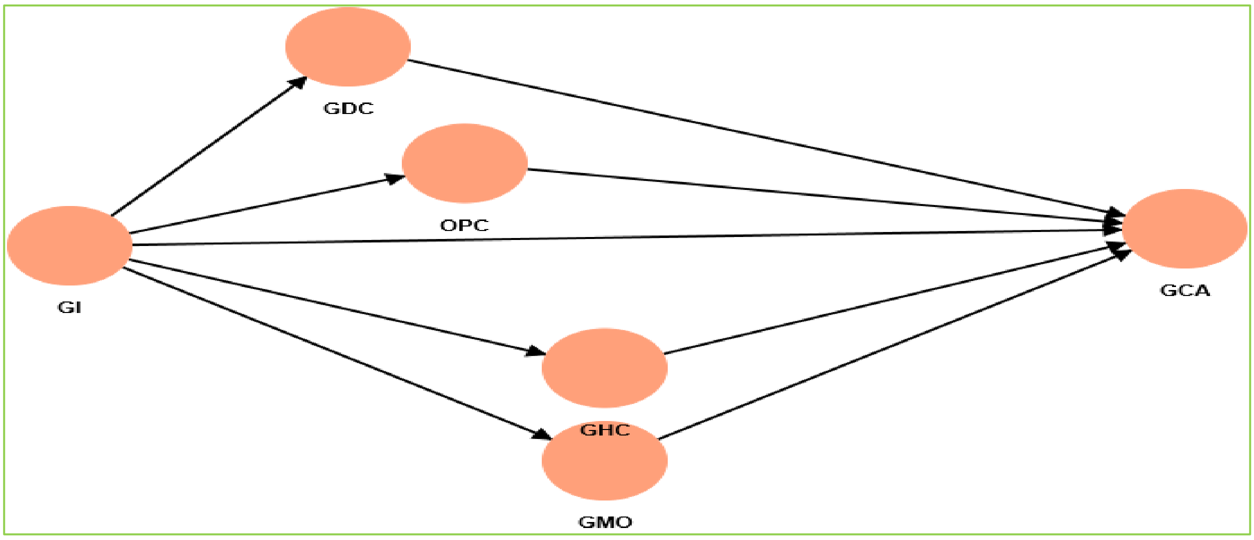

Figure 6 : Inner Model

To constructing the external model. This involves connecting the indicators with the latent variable by dragging them individually from the "Indicators" tab to their respective red circles. A yellow rectangle symbolizes each indicator, and once the connection is made, the color of the latent variable will shift from red to blue. If desired, you can easily reposition the indicators on the screen by right-clicking on the blue-colored latent variable and utilizing the "Align Top/Bottom/Left/Right" function. The final model should resemble the examples shown in Figure 7.

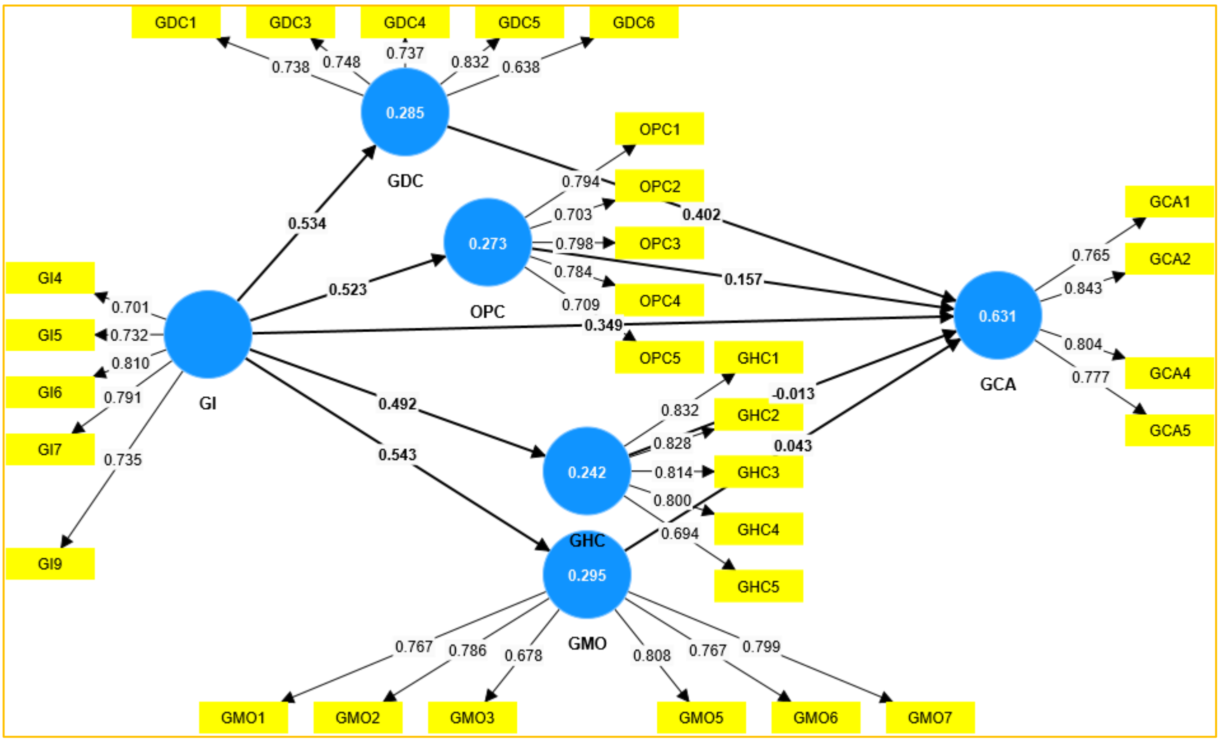

Figure 7: Outer Model

4.5. Measurement Model Assessment

The measurement model assessment aims to ensure our measurements are valid and reliable. The measurement model consists of several components, including content validity, reliability, discriminant validity, consistency reliability, and convergent validity of individual items (Hair et al., 2017). The reliability of the individual constructs is evaluated by examining their outer loadings (Hair et al., 2017; Chatfield, 2018). It is essential to differentiate between reflective and formative models to evaluate measurement models (Henseler et al., 2009). Reflective measurement models assess reliability and validity. In terms of construct reliability, composite reliability is commonly used to measure a construct's internal consistency. Unlike Cronbach's alpha, composite reliability considers the varying reliability of different indicators, making it more appropriate for PLS-SEM, where indicators are prioritized based on their reliability during model estimation. In exploratory research, composite reliability values of 0.60 to 0.70 are considered satisfactory, while values from 0.70 to 0.90 are preferred in more advanced stages of research (Nunnally & Bernstein, 1994). If the result is less than 0.60 indicates a lack of reliability.

Additionally, each indicator's reliability should be considered, with standardized loadings above 0.70 indicating good reliability. Indicator values with loadings between 0.40 and 0.70 may be removed from the scale if their deletion improves composite reliability beyond the suggested threshold. However, when deciding to delete indicators, one should also consider their impact on validity. Weaker indicators may be retained if they contribute to content validity. Indicators with low loadings of 0.40 or lower should generally be eliminated from reflective scales.

In terms of validity assessment for reflective measurement models, convergent and discriminant validity are essential considerations. Convergent validity can be checked using the average variance extracted (AVE). An AVE value of 0.50 or higher suggests sufficient convergent validity, meaning that the dependent variable shows more than half of the variance in its indicators. Discriminant validity can be checked using the Fornell-Larcker criterion and cross-loadings. The Fornell-Larcker criterion states that a latent construct should show more variance with its assigned indicators than any other unobserved variables in the structural model. In statistical terms, the AVE values of each latent variable should be more than the squared correlation between that latent variable and any other construct. The second criterion for discriminant validity is that an indicator's factor loading with its associated latent construct should be greater than its loadings with all other constructs (i.e., the cross-loadings).

4.5.1. Internal consistency Reliability/ reliability

As we have seen a reflective measurement models assess reliability and validity. In terms of construct reliability, composite reliability is commonly used to measure a construct's internal consistency. In social science research, the conventional method of measuring internal consistency reliability has been using "Cronbach's alpha." However, in the context of PLS-SEM, this measurement tends to be conservative. To address this issue, previous studies have recommended the utilization of "Composite Reliability" as an alternative measure (Bagozzi and Yi, 1988; Hair et al., 2012). According to J.F. Hair, M. Howard, and C. Mitzi (2020), a composite reliability reading above 0.7 is acceptable. The C.R. values exceeding 0.7 demonstrate internal consistency across items, indicating that each construct assesses different concepts. Similarly, the Cronbach alpha values exceeding the value of 0.7

affect the constructs. The values presented in Table 5 below indicate that the obtained Composite Reliability scores for all reflective latent variables surpass 0.7, suggesting a high level of internal consistency reliability.

4.5.2. Convergent validity

Convergent validity is a type of validity that assesses the extent to which different measures of the same construct are related to each other. This means all indicators that measure one construct have a high correlation and evaluate mutual variables based on appropriate theory. Convergent validity is assessed by evaluating the Average Variance Extracted (AVE) for each latent variable. As shown in Table 5 below, it is found that all of the AVE values exceed the recommended cut-off point above 0.50 as Fornell and Larker (1981) state that an acceptable value for AVE should be above 0.5, thus confirming convergent validity or indicating sufficient convergent validity (Hair et al., 2017). The C.R. coefficients also exceeded the recommended threshold of 0.70, indicating construct reliability (Hair et al., 2017). Table 5 shows that all outer loading values range between 0.655 and 0.884, which indicates that the constructs or internal consistency are reliable. Outer loading and AVE are used to assess convergent validity.

Cronbach's alpha evaluates the internal consistency of each construct, while composite reliability examines the internal consistency of each factor. It reflects the relationships between items within a single construct. According to J.F. Hair, M. Howard, and C. Mitzi (2020), a composite reliability reading above 0.7 is acceptable. The C.R. values exceeding 0.7 demonstrate internal consistency across items, indicating that each construct assesses different concepts. Similarly, the Cronbach alpha values exceeding the value of 0.7 affect the constructs. As shown in Table 5 below, all the C.R., AVE and Cronbach alpha criteria are fulfilled, and convergent validity is proved.

Table 5:Constructs Reliability and convergent Validity

Construct	Indicators	Loadings	Cronbach's alpha	CR (rho_a)	AVE
	GCA1	0.758	0.809	0.813	0.636
Green Competitive Advantage	GCA2	0.846			
	GCA4	0.802			
	GCA5	0.782			
Green Dynamic Capabilities	GDC1	0.738	0.797	0.821	0.549
	GDC3	0.747			
	GDC4	0.737			
	GDC5	0.832			
	GDC6	0.638			
	GHC1	0.832			

Green Human Capital	GHC2	0.828	0.858	0.879	0.632
	GHC3	0.814			
	GHC4	0.800			
	GHC5	0.693			
Green Innovation	GI4	0.701	0.810	0.812	0.570
	GI5	0.732			
	GI6	0.810			
	GI7	0.791			
	GI9	0.735			
Green Market orientation Capability	GMO1	0.767	0.862	0.869	0.591
	GMO2	0.786			
	GMO3	0.678			
	GMO5	0.808			
	GMO6	0.767			
	GMO7	0.799			
Operational Capabilities	OPC1	0.794	0.816	0.821	0.575
	OPC2	0.703			
	OPC3	0.798			
	OPC4	0.784			
	OPC5	0.708			

4.5.3. Discriminant validity

Discriminant validity refers to a measure of the extent to which different constructs are distinct from one another (Cable, DeRue, 2002). This study assessed discriminant validity using the three criteria proposed by Leguina (2015), Fornell and Larcker criterion (1981), cross-loading and the Heterotrait-Monotrait (HTMT) ratio.

4.5.3.1. The Fornell-Larcker criterion of testing

According to Fornell and Larcker (1981), establishing discriminant validity involves calculating the Average Variance Extracted (AVE) square root for each latent variable. If the values of AVE are greater than the correlation values between the latent variables, discriminant validity is established. Fornell-Larcker criterion also measures the difference between the squared correlation of a construct with its indicators and the squared correlations of the construct with other constructs. A significant difference indicates that the construct is distinct from other constructs. According to the Fornell-Larcker criterion, the values of the square root of the AVE for each variable should be greater than the correlation between that construct and any other construct. The results in Table 6 (highlighted bold values) demonstrate the comparison of a latent variable with the square root of AVE the variance of each variable, indicating the discriminant validity of each factor. Significantly, the square root of the AVE for each factor surpasses the correlation found between the factors, confirming their distinctiveness from other constructs. Consequently, discriminant validities have been achieved (J.F. Hair, M. Howard, C. Mitzi, 2020).

For instance, based on the AVE value of 0.549 obtained for the latent variable GDC (as shown in Table 5), its square root is calculated as 0.741. This value is greater than both the correlation values in the column for GDC (0.578,0.534,0.458 and 0.695) and those in the row for GHC (0.525). A similar observation is made for the latent variables GDC, GHC, GI, GMO, and OPC. These findings indicate that discriminant validity has been successfully established.

Table 6:Fornell-Larcker criterion for discriminant validity

Constructs	GCA	GDC	GHC	GI	GMO	OPC
Green competitive Advantage	**0.798**					
Green dynamic capability	0.711	**0.741**				
Green Human Capital	0.525	0.578	**0.795**			
Green Innovation	0.662	0.534	0.492	**0.755**		
Green Market orientation	0.496	0.458	0.734	0.543	**0.769**	
Operational capability	0.636	0.697	0.665	0.523	0.571	**0.759**

Source: own calculation

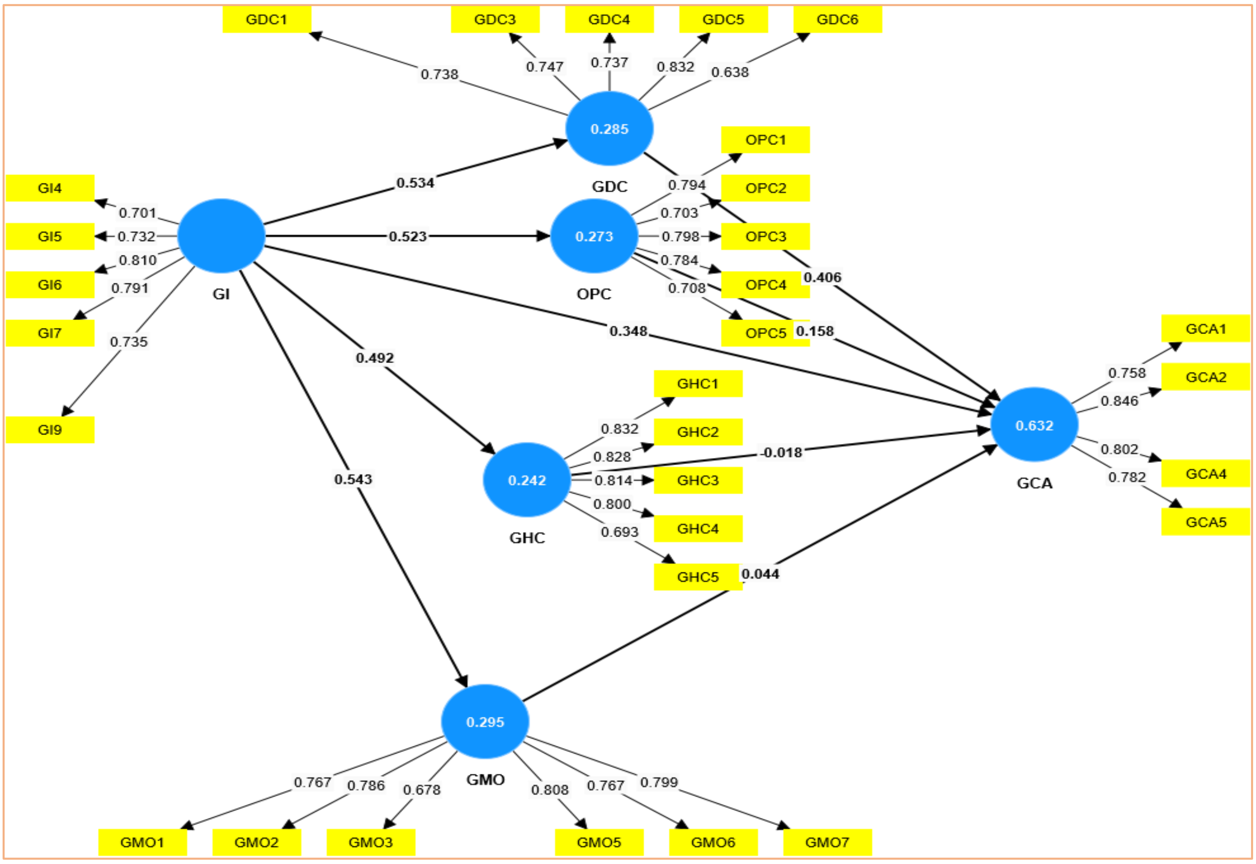

Figure 8:Measurement model

4.5.3.2. Heterotrait-Monotraint (HTMT) ratio matrix

The HTMT ratio matrix is a matrix that is used to assess the discriminant validity of a measurement model in PLS-SEM. The HTMT ratio is the ratio of the squared correlation between two constructs to the product of their AVE values. The values of the HTMT ratio should be below 0.90 to establish discriminant validity. Table 7 shows that each HTMT is less than 0.90, another criterion for achieving discriminant validity between two constructs; therefore, the discriminant validity condition has also been met (J.F. Hair, M. Howard, C. Mitzi,2020). Thus, it is determined that the considered measurement model is supported by the model's dependent variable, which is a green competitive advantage.

The HTMT ratio matrix can be calculated using the following formula:

$$HTMT = r_{ij}^2/(AVE_i * AVE_j)$$

Where r_{ij}^2 is the squared correlation between constructs i & j, AVE_i is the average variance extracted for construct i and AVE_j is the average variance extracted for const j

Table 7:Heterotrait-monotrait ratio (HTMT) – Matrix

	GCA	GDC	GHC	GI	GMO
GDC	0.839				
GHC	0.618	0.660			
GI	0.809	0.637	0.559		
GMO	0.588	0.526	0.849	0.637	
OPC	0.775	0.852	0.752	0.627	0.669

4.5.3.3. Cross-loading

As presented in the table 8 below, each items loading (bolded) of the latent variables greater than the cross loading (with other scale items).

Table 8:Cross-loading.

	GCA	GDC	GHC	GI	GMO	OPC
GCA1	**0.758**	0.466	0.455	0.566	0.422	0.496
GCA2	**0.846**	0.588	0.411	0.629	0.403	0.526
GCA4	**0.802**	0.583	0.462	0.472	0.391	0.488
GCA5	**0.782**	0.629	0.354	0.440	0.368	0.518
GDC1	0.727	**0.738**	0.447	0.502	0.422	0.519
GDC3	0.457	**0.747**	0.462	0.356	0.376	0.553
GDC4	0.439	**0.737**	0.343	0.326	0.198	0.461
GDC5	0.535	**0.832**	0.513	0.403	0.355	0.598
GDC6	0.348	**0.638**	0.342	0.325	0.292	0.429

GHC1	0.503	0.570	**0.832**	0.508	0.638	0.677
GHC2	0.427	0.529	**0.828**	0.491	0.648	0.629
GHC3	0.405	0.414	**0.814**	0.314	0.548	0.425
GHC4	0.403	0.409	**0.800**	0.294	0.537	0.429
GHC5	0.308	0.298	**0.693**	0.264	0.522	0.390
GI4	0.465	0.337	0.363	**0.701**	0.430	0.453
GI5	0.435	0.384	0.341	**0.732**	0.374	0.363
GI6	0.492	0.446	0.401	**0.810**	0.464	0.379
GI7	0.458	0.374	0.340	**0.791**	0.422	0.347
GI9	0.625	0.459	0.400	**0.735**	0.358	0.422
GMO1	0.467	0.401	0.705	0.407	**0.767**	0.542
GMO2	0.416	0.415	0.742	0.391	**0.786**	0.547
GMO3	0.291	0.252	0.567	0.276	**0.678**	0.382
GMO5	0.357	0.351	0.450	0.481	**0.808**	0.387
GMO6	0.384	0.348	0.450	0.514	**0.767**	0.369
GMO7	0.344	0.317	0.490	0.386	**0.799**	0.401
OPC1	0.464	0.606	0.527	0.343	0.483	**0.794**
OPC2	0.393	0.442	0.331	0.279	0.282	**0.703**
OPC3	0.564	0.546	0.386	0.351	0.338	**0.798**
OPC4	0.514	0.506	0.457	0.462	0.399	**0.784**
OPC5	0.453	0.534	0.777	0.506	0.631	**0.708**

4.6. Structural model Analysis

The main determinates used to check the structural model are the R^2 measures and the significance of the path coefficients. In prediction-oriented PLS-SEM, the goal is to explain the variance of the endogenous latent variables, so having a high R^2 for the vital target constructs is essential. However, high R^2 can vary depending on the research discipline. For example, in consumer behaviour, an R^2 of 0.20 is considered high, while in success driver studies, an R^2 value of 0.75 would be seen as high. In marketing research studies, R^2 values of 0.75, 0.50, or 0.25 for dependant latent variables in the structural model can be analysed as substantial, moderate, or weak, respectively. The path coefficients obtained from the path model analysis in the PLS structural model can be interpreted as standardized beta coefficients of ordinary least squares regressions. Just as with the indicators' weights and loadings, the significance of each path coefficient can be assessed using a bootstrapping procedure. Paths that are nonsignificant or show signs contrary to the hypothesized direction do not support a prior hypothesis. In contrast, significant paths showing the hypothesized direction empirically support the proposed causal relationship.

Paths that are go against(non-significance) the hypothesized direction do not support the initial hypothesis. In contrast, paths who are significance align with the same direction empirically support the proposed causal relationship. Another assessment result of the structural model is its predictive capability. The Stone-Geisser's Q^2 measure is commonly used to check predictive significance. It requires the model to predict each endogenous latent construct's indicators accurately. The Q^2 value is obtained through a blindfolding procedure that omits specific data points and uses the estimates to predict the omitted part. Choosing an appropriate omission distance is crucial, typically between 5 and 10.

4.6.1. Hypothesized direct relationship.

Table 9 outlines the full structural model, identifying the interaction between the independent, dependent, and mediating variables. To test the hypotheses of the variables, we examined the T-values and P-values. The threshold values are $T > \pm 1.96$ and $P < 0.05$. If the results of the variables meet these criteria, then the relationship between the two variables will be supported and significant. Table 9 depicts the hypotheses' results, which are based on the relationship between independent factors. For example, green innovation is considered an independent variable. However, its dependent variable is a mediating variable, green organizational capability. At the same time, green innovation is considered independent, and green competitive advantage is a dependent variable. The relationship of these variables is shown in a graphical path in Figure 6 for SEM, which identifies the values needed to evaluate the hypotheses.

This research employed the PLS algorithm and a bootstrapping using 5000 resamples to determine the path coefficient level and its significance for the formulated hypothesis. The path coefficient, p-value, and t-statistics values were used to accept and reject the hypotheses, as shown in Table 9 below. The strength of the relationship between the variables can be examined through path coefficient values. Path coefficient values near +1 indicate a strong relationship and vice versa (Hair et al. 2016). p-Values and t-statistics refer to the acceptance and rejection of the proposed hypotheses. Additionally, the low or zero value of the Standard deviation shows that the respondent answers all or most of the questions in the survey using the same answer or answer pattern.

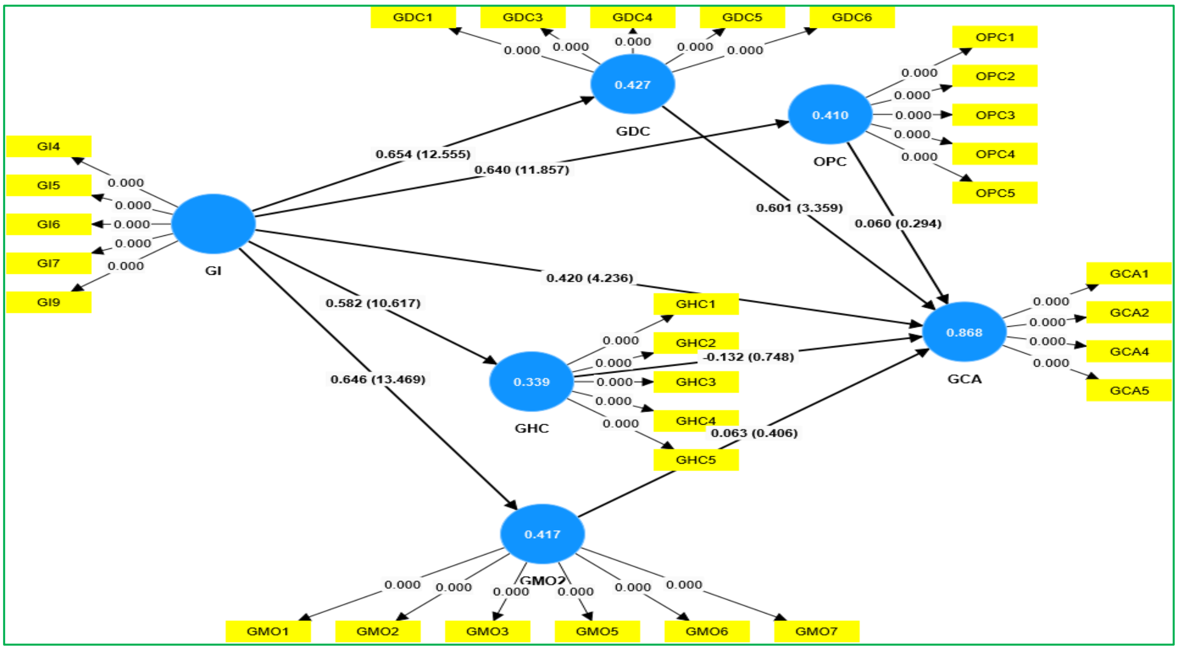

Figure 9 :Structural research model assessment

In this study, the results of the hypotheses have been summarized in Table 9 below. As shown below, green dynamic capability positively and significantly affects green SMEs' competitive advantage, which was accepted with ($\beta = 0.406$, $p < 0.001$, $t = 3.359$); green innovation has a positive effect on green SMEs competitive advantage was accepted ($\beta = 0.348$, $p < 0.000$, $t = 4.236$). The hypothesis proposed that GI has a significant and positive effect on GDC was supported ($\beta = 0.534$, $p < 0.000$, $t = 12.555$); GI has a positive and significant effect on GHC was supported ($\beta = 0.492$, $p < 0.000$, $t = 10.167$); GI has a positive and significant effect on GMO has supported ($\beta = 0.543$, $p < 0.000$, $t = 13.469$) . Finally, GI has a positive and significant effect on operational capability, which was accepted ($\beta = 0.523$, $p < 0.025$, $t = 11.857$). As evident from the findings, green innovation has a significant impact on the different organizational capabilities (human capital, green dynamic capabilities, and green marketing orientation).

Table 9:Hypothesised Direct relationship.

Hypothesis	Path Coeff(β)	Mean (M)	SD	T-Values	P-values	95% CI		Decision
GDC -> GCA	0.406	0.619	0.179	3.359	0.001	0.311	1.019	Accepted
GHC -> GCA	-0.018	-0.137	0.176	0.748	0.454	-0.472	0.214	Rejected
GI -> GCA	0.348	0.416	0.099	4.236	0.000	0.207	0.596	Accepted
GI -> GDC	0.534	0.657	0.052	12.555	0.000	0.552	0.756	Accepted
GI -> GHC	0.492	0.583	0.055	10.617	0.000	0.468	0.686	Accepted
GI -> GMO	0.543	0.648	0.048	13.469	0.000	0.550	0.737	Accepted
GI -> OPC	0.523	0.642	0.054	11.857	0.000	0.532	0.744	Accepted
GMO -> GCA	0.044	0.066	0.154	0.406	0.685	-0.227	0.365	Rejected
OPC -> GCA	0.158	0.049	0.204	0.294	0.769	-0.364	0.414	Rejected

4.6.2. Checking Structural Path Significance in Bootstrapping

SmartPLS can produce T-statistics for importance testing both the inward and external show, employing bootstrapping. In this method, an expansive number of subsamples (e.g., 5000) are taken from the initial test with substitution to deliver bootstrap standard errors, giving assumed T-values for significance testing of the structural path. The Bootstrap result approximates the data normality. In SmartPLS, test sample size of the given study is known as Cases inside the Bootstrapping setting, while the number of bootstrap subsamples is known as Samples of the study. Since there are 294 substantial observations in the study data set, the number of "Cases" (not "Samples") within the setting ought to be expanded to 294. The other parameters stay unaltered:

- Sign change: No Sign Changes
- Cases: 294
- Tests: 5000

It is worth noticing that in case the bootstrapping result turns out to be insignificance utilizing the "No Sign Changes" choice, but the inverse result is accomplished utilizing the "Individual Sign Changes" alternative, you ought to re-run hence the method using the centre "Construct Level Changes" choice and use that result instep. This is often because this choice is known to be a great compromise between the two extraordinary sign alter settings. Once the bootstrapping procedure is completed, go to the "Path Coefficients (Mean, SD, T-Statistics) found in the bootstrapping results. Check the numbers within the "T-Statistics" column to see whether the path coefficients of the inner model are statistically significant or not with in the application of the two-tailed t-test within level of 5% significance. The path coefficient is significance if the T-statistics is bigger than 1.96. The study illustration shows that the "GHC – GCA" linkage (0.748), GMO-GCA linkage (0.406) and OP-GCA linkage (0.294) are not significant. This shows prior discoveries when looking at the PLS-SEM, which comes about outwardly (see Figure 5). All other path coefficients within the inner model are fulfils the criteria to be statistically significance (see Figure 6 and Table 9)

4.6.3. Regression analysis or R-squared value (R^2)

We determined the relationship between independent and dependent variables by incorporating the mediating variables to assess the change in the model (see Table 10 below). The results in Table 10 showed that the values of R-squared are within the threshold cut-off point; for example, 0.632 (Green competitive Advantage), 0.285 (green dynamic capabilities),0.242(Green Human Capital), 0.295 (green market orientation), and 0.273 (operational capability) exerted the change on their respective dependent variables.

Table 10:Regression analysis or R-squared values

Factors	R-square	R-square adjusted
Green competitive advantage	0.632	0.626
Green dynamic capability	0.285	0.282
Green Human capital	0.242	0.239
Green Market Orientation	0.295	0.292
Operational capability	0.273	0.271

4.6.4. F-squared analysis

Table 11 shows the f-squared value of GI with green SMEs competitive advantage is 0.211, which is a medium change when the exogenous construct is removed from the model. According to J. Cohen (1988) if f ≥ 0.02 is small; f ≥ 0.15 is medium & f ≥ 0.35 is large, the value between GI and GDC is 0.398, which is considered large. The f-squared analysis between GI and GHC, GMO and OPC are 0.319, 0.418and 0.402, respectively all are large. The mediation of GCA with GHC and GMO are 0.001 and 0.004 respectively are small; however, the remaining of the f-squared analysis is either small or medium between the variables.

Table 11:F-squared values

	GCA	GDC	GHC	GMO	OPC
GDC	0.337				
GHC	0.001				
GI	0.211	0.398	0.319	0.418	0.402
GMO	0.004				

Source: researcher calculation

4.6.5. Multicollinearity analysis (VIF)

The VIFs for the inner model are typically used for result discussion compared to the outer model. Inner model shows relationships between the latent variables and the theoretical constructs of interest. Outer model shows the relationships between the latent variables and the observed variables, which are the measures of the latent variables. Therefore, the VIFs for the inner model are more relevant to interpreting the results. Each set of exogenous latent variables in the inner model is checked for potential collinearity problems to see if any variables should be eliminated, merged into one, or have a higher-order latent variable developed. The results in Table 12 show that the values of VIFs are below 5. This shows that there is no multicollinearity problem (J.F. Hair, C. Ringle, M. Sarstedt, 2011). The VIF values between GI and GCA are 1.660 and 1.00, correspondingly. Likewise, the remaining values of VIFs are also below five between the factors. In conclusion there is no problem with multicollinearity.

Table 12:Multicollinearity Statistics (VIF)

	GCA	GDC	GHC	GMO	OPC
GDC	1.717				
GHC	2.585				
GI	1.660	1.000	1.000	1.000	1.000
GMO	2.404				

4.6.6. Mediation Analysis Results

4.6.6.1. What is Mediation?

Mediation refers to examining how a third variable intervenes, or impacts, the relation between two other variables (Hayes, 2009). For example, in an intervening model, a variable X is postulated to affect an outcome variable Y via one or more intervening variables, sometimes called mediators (Hayes 2009). The total effect of X on Y may come through various forces, both direct and indirect. We focus on the indirect force in this paper.

Direct effects are the relationships between two constructs that are connected by a single line while indirect effects are relationships between constructs that pass through one or more other constructs. Table 13 below shows the direct effect of the constructs evaluated by the p-values, T-statistics, SD , mean and the path coefficient (o)

Table 13 Path coefficients (Mean, STDEV, T values, p values) -Direct effect

Constructs	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
GDC -> GCA	0.601	0.619	0.179	3.359	0.001
GHC -> GCA	-0.132	-0.137	0.176	0.748	0.454
GI -> GCA	0.420	0.416	0.099	4.236	0.000
GI -> GDC	0.654	0.657	0.052	12.555	0.000
GI -> GHC	0.582	0.583	0.055	10.617	0.000
GI -> GMO	0.646	0.648	0.048	13.469	0.000
GI -> OPC	0.640	0.642	0.054	11.857	0.000
GMO -> GCA	0.063	0.066	0.154	0.406	0.685
OPC -> GCA	0.060	0.049	0.204	0.294	0.769

4.6.6.2.**How to test the mediating effect using indirect effect**

Unlike the classic approach for assessing mediation presented by Baron and Kenny (1986), which does not rely on standard errors, the new approach for testing mediation introduced by Kock (2014), which builds on Preacher and Hayes (2004) and Hayes and Preacher (2010), is more efficient and less fallible. As we have seen in the below figures (Fig 10 and fig 11) the effect between the independent variable and dependant variable should be significantly decreased from 0.843 from the total effect to 0.42 from the direct effect when the mediation effect exist .

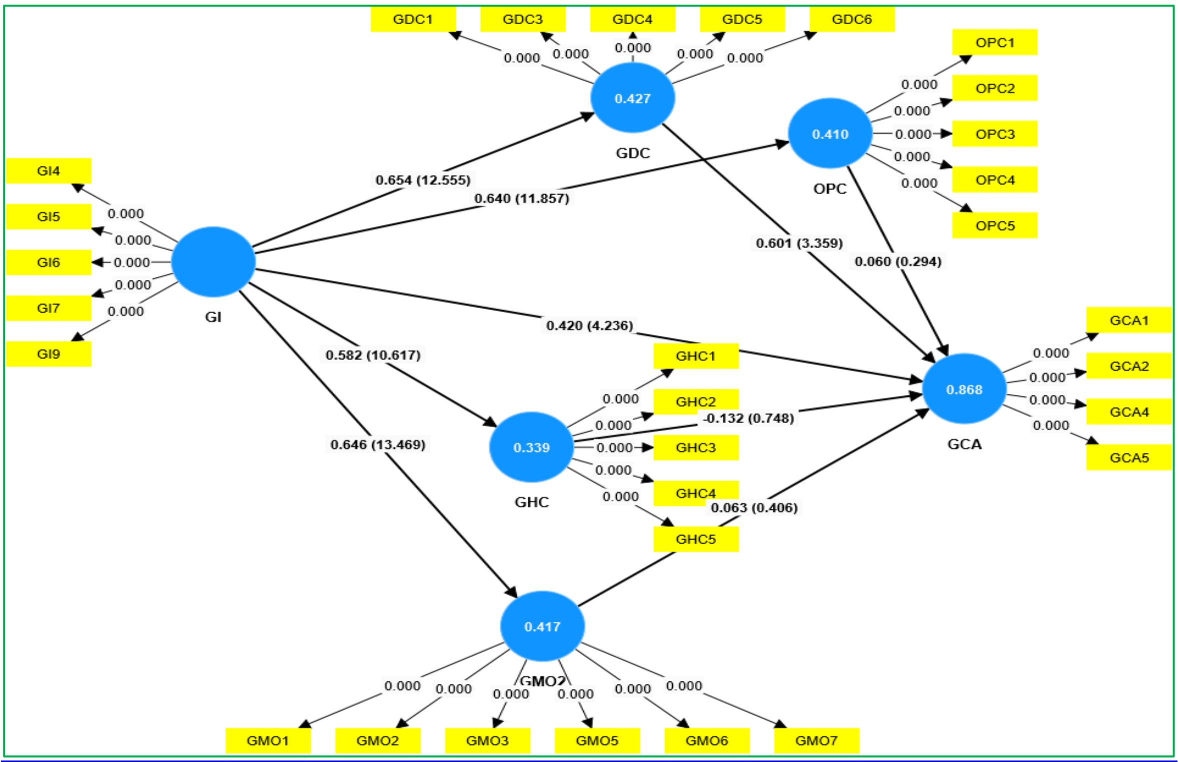

Figure 10: The mediating effect

In this study the mediating effect analysis was calculated. The mediating analysis involves establishing the indirect theoretical relationship between the dependant and the independent variables including the mediating variables, that is, it determines the degree to which indirect effect through the mediating variables modify the hypothesis direct path. In this study the variables Green organizational Capabilities (Green dynamic capability, green human capital, green market orientation and operational capability) were hypothesised to mediate the relationship between green innovation and green SMEs competitive advantage. The goal is not only to check the significant path coefficient(β) which is the original mean(o) in this case in the below table 14 but also to expose significant and important indirect effect relationships.

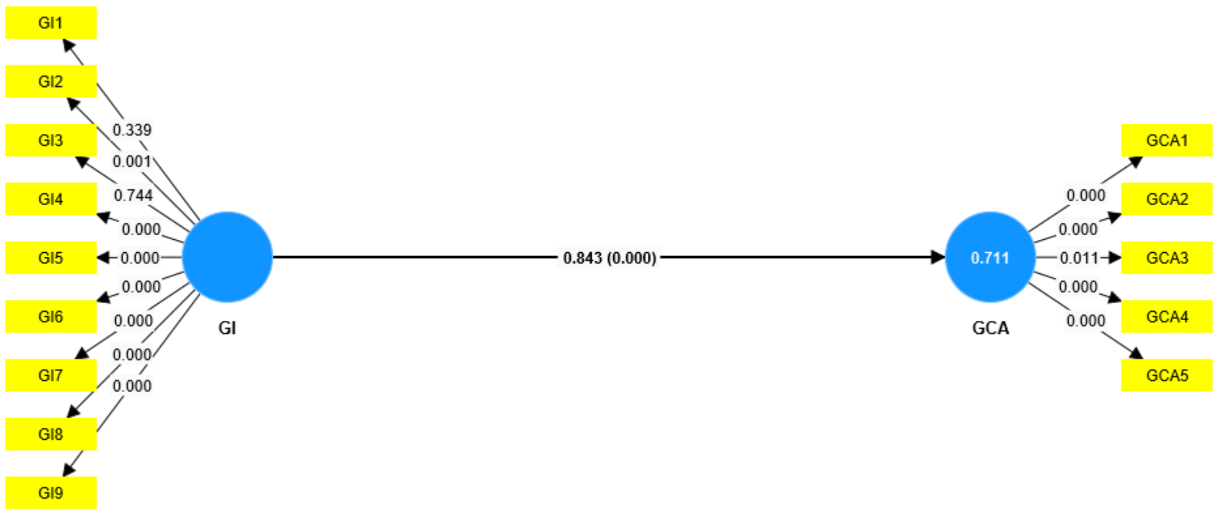

Figure 11 : The direct effect model

The mediating effects of GDC, GHC, OP, and GMO on the relationship between GI and SMEs' green competitive advantage were evaluated using PLS-SEM. The results showed that GDC positively and significantly mediates the effect of GI and GCA ($\beta = 0.393$, $t = 3.113$, $p < 0.002$); therefore, Hypothesis H2c was accepted. This can be interpreted as the mediation exists, and the combined effect of green innovation and dynamic capabilities on green innovation is explained by the path coefficient of 0.393. This implies that the indirect impact of green innovation on green SMEs' competitive advantage through the mediation of green dynamic capability is the coefficient value =0.393, the t-statistics =3.113, and the p-value of 0.002. Therefore, we can conclude that the hypothesis is supported.

The indirect effect of the other variables interpreted as the hypothesis is not supported.

Table 14:Mediations Analysis through Indirect effect

Constructs	Original sample (O)	STDEV	T statistics (|O/STDEV|)	CI		P-Value (bootstrapping)	Mediation
GI -> GDC -> GCA	0.393	0.126	3.113	0.205	0.695	0.002	Supported
GI -> GHC -> GCA	-0.077	0.104	0.741	-0.282	0.125	0.459	Not supported
GI -> GMO -> GCA	0.04	0.101	0.399	-0.152	0.241	0.690	Not supported
GI -> OPC -> GCA	0.038	0.133	0.288	-0.244	0.271	0.773	Not supported

Likewise, the study used an extensively accepted and recommended test called the VAF test to evaluate the mediating variables. According to (Hair et al., 2019), if the VAF value is lower than 20, it's considered no mediation; if it falls between 20 – 80, it's regarded as partial mediation; and if it's lesser than 80, it's considered as complete mediation. It can be calculated as follows.

$$\text{VAF} = \text{Indirect Effect} / \text{Total effect}$$

The study shows that the VAF value 48 % for the mediation effect of the GDC on the relationship between GI and GCA. Therefore, the mediation effect is partial mediation.

Table 15 The mediating effect of Green dynamic capability

Hypothesis	Direct effect without mediation	Sig	Direct effect with mediation	Sig	Indirect effect	P-Value (Bootstrapping)	**2.5%**	**97.5%**	**Total effect**	**VAF**	**Mediating**
GI -> GDC -> GCA	0.826	0	0.395	0	0.393	0.002	0.205	0.695	0.815	48	Partial mediation

4.2. Discussion

The research study investigated the relationship between green innovation and the competitive advantage of small and medium enterprises (SMEs). The study also explores the mediating role of green organizational capabilities, including green dynamic capabilities, green human capital capabilities, green market orientation, and operational capabilities. The empirical study's findings demonstrate that the research successfully achieves its objectives and contributes to the existing literature on green innovation, specifically within the context of SMEs in the Ethiopian context, which has been underrepresented in previous research. Additionally, the study contributes to theoretical development through the proposed model.

Hypothesis 1: Based on the research results, there is a significance and positive relationship between green innovation and SMEs' competitive advantage. The coefficient (β) of 0.348 indicates that for every unit increase in green innovation, the SMEs' competitive advantage increases by 0.348 units, holding all other factors constant. The t-value of 4.375 suggests that the relationship between green innovation and competitive advantage is statistically significant. This means that the observed results are unlikely to occur by chance, indicating robust empirical support for the hypothesis. Furthermore, the p-value of 0.000 confirms the statistical significance. A p-value of below 0.05 is commonly used as a threshold to determine statistical significance, and in this case, the p-value is below 0.05. The result shows that null hypothesis is rejected and shows conclude that (H1) GI positively and significantly impacts SMEs' competitive advantage. The results indicate a significant relationship between Green Innovation (GI) and Green Competitive advantage (H1). The findings shows that the importance of investing in green innovation for SMEs to enhance their competitive advantage. Prior studies by Sun et al. (2021) and Ar. et al. (2012) have acknowledged the importance of GIs in driving the effective implementation of Green Competitive Advantage.

Therefore, lacking GI may hinder Firms' competitiveness and engagement and impede the adoption of green innovation.

Hypothesis 2: While all four mediating variables were found to have a significant relationship with the independent variable (green innovation), only green dynamic capability showed a significant relationship (β=0.534, P=0.002) with the dependent variable (β=0.402, P=0.002) (green competitive advantage). This implies that green dynamic capability mediates green innovation and competitive advantage, indicating its importance in driving organizational success in environmental sustainability. The research results of the developed hypothesis that states the mediating effect of green dynamic capability has a positive and significant relationship within the relationship between green innovation and competitive advantage are consistent with other research findings. Zhou et al. (2018) found that green dynamic capability mediates the relationship between green innovation and firm performance. Similarly, a study by Chen et al. (2019) found that green dynamic capability mediates the relationship between green innovation and competitive advantage. A study by Zhang et al. (2019) found that green dynamic capability can help firms differentiate themselves from their competitors and achieve a higher market share.

Similarly, Li et al. (2019) found that green dynamic capability can increase customer satisfaction and loyalty. These findings suggest that green dynamic capability can help firms to attract and retain customers and achieve a sustainable competitive advantage. The implication of this research result indicates that green dynamic capability plays a crucial role in mediating the relationship between green innovation and green competitive advantage. It suggests that green dynamic capability is the primary mechanism through which green innovation positively affects green competitive advantage.

Hypothesis 3: The research indicates a positive and significant relationship between green innovation and green dynamic results. The research results of the developed hypothesis that states green innovation has a positive and significant relationship with green dynamic capabilities are consistent with other research findings. A study by Chen et al. (2016) found that green innovation positively affects green dynamic capabilities. The study also found that green dynamic capabilities positively affect firm performance. Another study by Lin et al. (2017) found that green innovation positively affects green dynamic capabilities and firm performance. The study also found that green dynamic capabilities mediate the relationship between green innovation and firm performance. These findings suggest that green innovation can lead to green dynamic capabilities, which in turn can lead to improved firm performance. The study's results also suggest that GI can be a source of GCA for firms. A study by Zhou et al. (2017) found that green innovation can lead to a sustainable competitive advantage for firms. The study also found that green innovation can increase market share, profitability, and customer satisfaction. These findings suggest that green innovation can be a valuable tool for firms looking to improve their competitive position.

Hypothesis 4: The fourth hypothesis, the results of the developed hypothesis that states green innovation has a positive and significant relationship with **green market orientation** are consistent with other research studies have provided empirical evidence supporting the positive relationship between green innovation and green market orientation. For example, a survey by Durmuşoğlu and Karabayır (2017) found that organizations with higher levels of green innovation were likelier to adopt green market orientation practices. This suggests that investing in green innovation can enhance the ability of firms to effectively address environmental concerns and meet the demands of environmentally conscious consumers. The findings revealed that companies implementing green innovations had a stronger green market orientation and achieved better market performance outcomes, such as increased market share.

A study by Chen et al. (2016) found that green innovation positively affects green market orientation. The study also found that green market orientation positively affects firm performance. Another study by Lin et al. (2017) found that green innovation positively affects green market orientation and firm performance. According to entrepreneurship theory, continuous innovation is essential for sustainable performance and competitiveness. This finding aligns with prior research (Lin, R.-J.; Chen, R.-H.; Huang, F.-H.,2014, Kammerer, D.2009; Kopnina, H.,2015). Consumers in today's environmentally conscious era prefer eco-friendly products and support companies that engage in eco-friendly business practices. This shows that Manufacturing SMEs should prioritize green innovation to meet market demands. Greenmarket orientation drives companies to enhance product innovations, develop environmentally friendly products, implement process innovations, and minimize negative environmental impacts. Thus, SME owners and managers must recognize that increasing green market orientation will foster green innovation within the company.

Hypothesis 5*:* The research result states a positive and significant relationship between green innovation and green human capabilities. The beta coefficient (β) of 0.492 indicates the strength and direction of this relationship, while the p-value of 0.000 suggests that this relationship is statistically significant. A beta coefficient of 0.492 means that for a one-unit increase in green innovation, there is an expected increase of 0.492 units in green human capabilities. This positive beta coefficient indicates that as green innovation increases, so does the level of green human capabilities. The p-value of 0.000 suggests that the relationship between these two variables is statistically significant. A p-value below the conventional threshold of 0.05 shows that strong evidence against the null hypothesis, which implies that the relationship is not due to chance. Consistent with (Chen et al., 2006), green human capital is employees' knowledge, skills, and abilities related to environmental sustainability. It is essential for green innovation to help firms develop and implement new products and processes that are more environmentally friendly. Green human capital can also help firms to decrease their environmental impact and improve their energy. By implementing green human capital, firms can improve their innovation, reduce their mental impact, and improve their energy. This indicates to a competitive advantage and a more sustainable business adoption (Chen & Chang, 2013)

Hypothesis 6*:* The research results of the developed hypothesis that states green innovation has a positive and significant relationship with operational capability are consistent with other research findings. A study by Zhou et al. (2018) found that green innovation positively affects operational capability and improves firm performance. Similarly, a study by Chen et al. (2019) found that green innovation is positively associated with operational efficiency. These findings suggest that green innovation can help firms improve their operational capabilities and achieve a sustainable competitive advantage. The study's results shows that GI can be a competitive advantage for firms. A study by Zhang et al. (2019) found that green innovation can help firms differentiate themselves from their competitors and achieve a higher market share. Similarly, a study by Li et al. (2019) found that green innovation can lead to increased customer satisfaction and loyalty. These findings suggest that GI can help firms attract and retain customers and achieve a sustainable competitive advantage.

The results indicate that the linkages of GHC - GCA, GMO - GCA, and OP - GCA are not found to be statistically significant based on the t-values and p-values obtained. This implies that these linkages do not have a significant mediating effect on the relationship between green innovation and green SMEs' competitive advantage.

Since the p-value is greater than the significance level of 0.05, we can deduce that the green human capital, green marketing orientation and operational capabilities are not significantly related to the competitive advantage of green SMEs in this study. The beta coefficient values indicate a weak positive relationship between the two variables, though this relationship is not statistically significant. GHC – GCA" linkage (t=0.748, p-value = 0.454), GMO-GCA linkage (t=0.406, p-value=0.685), and OP-GCA linkage (t= 0.294, p-value=0.769). The study found that operational capabilities did not correlate significantly with competitive advantage ($\beta = 0.158$, $p > 0.769$), meaning the Hypothesis operational capability is not statistical significance with the green SMEs competitive advantage was not supported. This could be due to the complex structure of the manufacturing industry, which connects many stakeholders through the supply chain model. Most manufacturing SMEs must have operational capabilities to survive, and cannot gain a competitive advantage solely through this kind of capability.

CHAPTER FIVE

5. CONCLUSION, IMPLICATIONS AND RECOMMENDATION

5.1. Conclusion

Environmental damage highlights the need to balance economic, social, and environmental performance across all business sectors. However, SMEs tend to prioritize economic performance. To address public matter about universal environmental issues GI is a solution that can enhance both the sustainability and competitiveness of SMEs. Following institutional theory, entrepreneurs seek to establish legitimacy by conforming to external factors. Pressures from external institutions effects on SMEs to adopt GI to meet sustainable goals. Employing GI guides businessperson in fulfilling their environmental and social responsibilities while allowing SMEs to reap economic profit.

Manufacturing SMEs in Ethiopia are significant contributors to environmental issues. The lack of action of eco-friendly business practices has redounded in ecological problems that bear serious attention. In the period of sustainable development, SMEs must consider factors that affect their business sustainability, particularly environmental, social, and profitable factors. Promoting an environmentally friendly request- acquainted approach is pivotal for SMEs to contribute to sustainability, meet the demands of green consumers, and enhance business performance.

This study offers precious perceptivity into the significance of green invention in the SME's competitive advantage and the interceding effect of green organizational capabilities in the relationship between green invention and SMEs competitive advantage on business performance. Findings showed that green invention supportively affects adding green competitive advantage. Companies prioritizing environmentally friendly requests, mortal capital, green dynamic capabilities, and functional capabilities increase organizational capacity to apply practices that minimize their environmental impact. Hence, companies must use green invention to conduct environmentally friendly business operations and give environmentally friendly products. The findings suggest that companies can transform business competitiveness by adopting green invention. Thus, Ethiopian manufacturing SMEs should welcome the vital part of green invention in practicing eco-friendly business approaches and enhancing business competitiveness in an environmentally conscious period.

Moreover, in the study of green organizational capabilities, the mediating variable (green dynamic capability) has a significant result with the independent variable (green innovation), as well as with the dependent variable (green competitive advantage). However, the other three mediating variables (green human capital, green market orientation, and operational capability) are not significant with the dependent variable. The implication of this research result suggests that green dynamic capability plays a crucial role in mediating the relationship between green innovation and green competitive advantage. It indicates that green dynamic capability is the primary mechanism through which green innovation positively affects green competitive advantage.

From a theoretical standpoint, the findings of this study support the Institutional Theory and underscore the necessity for manufacturing SMEs to align their business strategies with social and environmental responsibilities. The study also highlights the importance of investigating antecedent factors that influence the adoption of green innovation from an entrepreneurial perspective. Academics can collaborate with manufacturing SMEs to foster the creation of green innovations and deepen our understanding of environmentally friendly processes and products. On a practical level, this study encourages SME owners to maximize the potential of their GI capacity to create environmentally friendly products and processes. SMEs should accelerate the transition towards more efficient and responsible energy utilization methods. SMEs must consider the implications of incorporating green innovation and allocate some of their profits towards its implementation and other social and environmental responsibility endeavours. This approach will yield significant benefits for sustainability and financial performance.

The other main purpose of this study is to illustrate the managerial implication that shows how a SMEs manager, head of departments, operational staffs and others can enhance their business by understanding the relationship between green innovation, green organizational capabilities (green dynamic capability, green human capital, green market orientation and green operational capability) and green SMEs competitive advantage. Through a survey of manufacturing SMEs and subsequent structural equation modelling in SmartPLS, the critical factors that contribute to enhance the competitive advantage of manufacturing SMEs and the implementation of green innovation with the mediating role of organizational capabilities are identified.

The study results can inform policymakers and practitioners of the importance of green innovation and organizational capabilities for SMEs' competitive advantage in Ethiopia. The results can also be used to develop training programs for SMEs on green innovation and organizational capabilities. The results of this study have several implications for managers and policymakers. First, the results suggest that green innovation can provide a competitive advantage for firms. This means that firms should consider investing in green innovation to improve performance. Second, the results suggest that green dynamic capabilities of firms to achieve a competitive advantage through green innovation. This means that firms should focus on developing green dynamic capabilities to maximize the benefits of green innovation. Third, the results suggest that government policies can support the development of green innovation by promoting green dynamic capabilities.

Limitations of the study

Although this study presented a valuable contribution and a novel framework that addresses SMEs' green competitive advantage based on green innovation and organizational capabilities, this study has several limitations. Future research should investigate additional internal and external factors that could influence green innovation implementation to enhance SMEs' green competitive advantage with the other variables as a mediating effect of organizational capabilities.The study also delved into Green human capital , Green Dynamic Capabilities, green marketing orientation and Operational Capabilities as an organizational capabilities , there are other organizational capabilities that require further exploration, particularly in the contemporary business landscape. Another limitation is related to the population of the study, which is the manufacturing industry of Addis Ababa. This indicates that there may be generalization issues as different sectors have different behaviors and locations in the country. Therefore, it is suggested that future research should attempt to conclude different regions of the country to know the diversity of the nature of the industry.

To overcome these limitations, future research could explore additional organizational capabilities, extend the data collection sectors for a more holistic comprehension, and consider alternative statistical and analytical models in conjunction with SEM analysis to reassess the influence of organizational capabilities on firms' competitive advantage. Prioritizing these suggestions could enhance the overall strength and breadth of research findings.

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Appendix A. Supplementary material

SURVEY QUESTIONNAIRE

The Effect of Green Innovation on SMEs' Competitive Advantage in Ethiopia: Exploring the mediating Role of Green Organizational Capabilities.

Dear Sir / Madam,

Thank you for being so cooperative in participating in completing this survey. We are working on research titled "The Effect of Green Innovation on SMEs' Competitive Advantage in Ethiopia: Exploring the Mediating Role of Sustainable Organizational Capabilities". The main target of this survey is to identify the effect of green innovation on SMES competitive Advantage in Ethiopia. This questionnaire is purely for research purposes, and your personal information will be kept private.

SECTION A: GENERAL INFORMATION

This section is intended to obtain general information about you and your firm. Please put (√) to select the right choices.

1. Gender	**3. Year of Experience**	**6. Industry /product**
☐ Male	☐ <5 ears	☐ Textile and apparel
☐ Female	☐ 6-10 years	☐ Food Processing and beverage
2. You Position in organization	☐ 11-15 years	☐ Leather goods
☐ General Manager	☐ >15 years	☐ Chemical & related materials
☐ Head of Department	**4. Age**	☐ Pharmaceutical and medical
☐ Operational employees	☐ 20-30 years	☐ Rubber and plastics
5. Level of education	☐ 31-40 years	☐ Non-metallic mineral products
☐ Bachelor	☐ 41-50 years	☐ Metal and engineering
☐ Masters	☐ 51 and above	☐ Electrical machinery and equipment
☐ PhD	**7. Firm size**	☐ Others
☐ Others	☐ 1-4 employees	
7. Firm Age	☐ 5-19 employees	
☐ No more than five years	☐ 20-99 employees	
☐ 6-9 years	☐ More than 100 employees	
☐ 10-20 years		
☐ More than 20 years		

SECTION (B): Green Innovation

Please indicate the extent to which you are agree or disagree of the following statement regarding green innovation Adoption in your company (1=Strongly Disagree, 2 = Disagree,3 = Partially Disagree,4 = Neutral,5 = Partially Agree,6 = Agree, 7 = Strongly Agree):

A	**Green Innovation**							
	Has your company ever taken the following action in the production process?							
	Statement							
	Indicator	1	2	3	4	5	6	7
1	Our company has effectively reduced the consumption of water, electricity, or oil in the product process.							
2	Our company has effectively reduced the emission of hazardous substances or waste in the product process.							
3	Our company has effectively made innovations to reduce the use of raw materials in the product process.							
4	Our company has effectively recycled waste and emissions in the product process.							
6	Our company has used energy-efficient raw materials in product development							
7	Our company has used environmentally friendly raw materials in product development.							
8	Our company has designed the product to be easy to use, recycle, and compost.							
9	Our company has created an effective and comprehensive waste recycling system.							

SECTION (C): SMEs Green Competitive Advantage (SCA)

Please indicate the extent to which you are agree or disagree of the following statement regarding Competitive Advantage in your company (1=Strongly Disagree, 2 = Disagree,3 = Partially Disagree,4 = Neutral,5 = Partially Agree,6 = Agree, 7 = Strongly Agree)

GCA								
No	Indicator	1	2	3	4	5	6	7
1	Our company's revenue from new products and services is significantly higher than that of our competitors.							
2	Our company's operating costs, during production and/or service delivery, are lower than those of our competitors.							
3	Our company's profitability from new products and services is significantly higher than that of our competitors.							
4	Our company's new products and services incorporate knowledge and concepts of environmental sustainability.							
5	Our company's new products and services are produced and offered in a manner that respects the principles of entrepreneurial social responsibility.							

SECTION (D): Green Organizational Capabilities(GOC)

Please indicate the extent to which you are agree or disagree of the following statement regarding **Green Organizational Capabilities** in your company (1=Strongly Disagree, 2 = Disagree,3 = Partially Disagree,4 = Neutral,5 = Partially Agree,6 = Agree, 7 = Strongly Agree)

Operational Capability (OP)								
No	Indicator	1	2	3	4	5	6	7
1	Our company has an information system that allows for easy collaboration across functions.							
2	Our company has formal procedures that facilitate teamwork across functions.							
3	Our company continuously standardizes production and working processes.							

4	Our company has a system in place to control the inputs and outputs of products easily and quickly.							
5	Our company continuously reduces waste and variance.							
6	Our company always ensures that work is handed over to partners in accordance with agreements.							
Green Dynamic Capability (GDC)								
No		1	2	3	4	5	6	7
1	Will incorporate the knowledge and competence of suppliers into regulating impacts on the environment.							
2	Will receive consultation from environmental experts in evaluating and designing green products.							
3	Will engage in restructuring to concentrate on environmental sustainability.							
4	Will realign its relationships with suppliers to mitigate the environmental pollution caused by its products.							
5	Can timely understand and master the support policies related to green development.							
6	Can timely keep abreast of and respond to industry green technology changes.							
7	Can timely keep abreast of customers' green needs to adapt to market changes.							
Green Human Capital (GHC)								
No		1	2	3	4	5	6	7
1	Our employees contribute to environmental protection.							
2	Our employees have less knowledge about environmental protection.							
3	Our employees provide products and services that are environmentally friendly.							
4	Our employees work in teams to protect the environment.							
5	Our employees receive full support to protect the environment.							
Green Market Orientation (GMO)								
No		1	2	3	4	5	6	7
1	Customer satisfaction encourages our company to run an environmentally friendly business.							
2	Our company always commits to and serves environmentally friendly customers.							
3	Our company provides employees and customers with information on environmentally friendly products and services.							
4	Our company's competitive advantage is determined by environmentally friendly customer-oriented knowledge.							
5	Our company always measures customer satisfaction through environmentally friendly products and services attributes.							
6	Our company invests more in environmentally friendly products and services than those of competitors.							
7	Our company provides information for customers to assess the quality of environmentally friendly products and services.							

Thank You for Your Co-operation