

Examining the Role of Technological Innovation, and the Impact of Green Procurement on Competitive Advantage and Company Performance

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Abstract

This study investigates the relationship between competitive strategy, green purchasing practices, and firm performance among firms in the Tema Metropolis. Adopting the Resource-Based Theory as its theoretical foundation, positivist research methodology, and explanatory research design, 161 respondents were surveyed. The associations between the variables were determined using the Structural Equation Modeling (SEM) method with Smart Partial Least Square (PLS) software version 3.0 as well as the Statistical Package for Social Sciences (SPSS). The study analysis revealed that findings reveal a positive association between competitive strategy and green purchasing adoption, but a negative relationship between green purchasing practices and firm performance. However, technological innovation can mitigate this negative effect, suggesting that firms can balance their green initiatives with performance goals by investing in innovation. The study's recommendations include adopting competitive strategies to encourage green purchasing, considering the potential negative impact on competitive advantage and performance, leveraging technology, and providing policy support for sustainable practices and economic growth. This research contributes to the literature on green practices and firm performance, providing practical implications for firms and policymakers.

Keywords: Green Procurement, Procurement System, Competitive Advantage and Company Performance, Technological Innovation

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1.0 INTRODUCTION

In today's dynamic business environment, the adoption of sustainable practices such as green purchasing has become increasingly crucial for organizations aiming to enhance their competitive advantage and overall performance. This study investigates the relationship between green purchasing, competitive advantage, and firm performance, with a particular focus on how technological innovation moderates this relationship. As sustainability gains prominence in business strategies, understanding the impact of green purchasing practices on organizational outcomes is essential. Moreover, the role of technological innovation as a moderator adds a

nuanced layer to this investigation, highlighting the interplay between sustainability initiatives and technological advancements in shaping competitive advantage and firm performance. This research aims to contribute to the existing literature by examining how firms can leverage green purchasing not only to enhance their competitive positioning but also to optimize performance outcomes, taking into account the influence of technological innovation as a moderating factor. By exploring these dynamics, organizations can gain valuable insights into strategic pathways that align sustainability efforts with technological capabilities for superior business outcomes.

The rising global economy has given affluence, but it has also caused environmental pollution (Ghosh, 2018), including climate change, depletion of the ozone layer, habitat destruction, contamination, deterioration, and depletion of air, freshwater, resources, and farmland (Tarigan, Tanuwijaya, & Siagian, 2020). These challenges have grown critical for businesses since stakeholders like regulatory bodies, consumers, rivals, non-governmental organisations, and workers are progressively demanding that businesses tackle social and ecological sustainability in their practices (Yook, Choi, & Suresh, 2018). Businesses that want to reduce their ecological effect may find that their capacity to do so is contingent on their capability to handle extremely complex distribution networks (Nu'man, Nurwandi, Bachtiar, Aspiranti, & Pratama, 2020). Supply chain management (SCM) develops and regulates business operations from raw material providers to end and connects stakeholders in a distribution chain (Choi, Min, & Joo, 2018), which is a great place to start when trying to improve conservation (Yook et al., 2018).

This study looks at the environmental aspects of sustainability, specifically in the context of green purchasing. Environmental protection has transitioned from the business level to the supply chain level, as per (AlNuaimi & Khan, 2019). As a result, Green Purchasing (GP) has arisen as a method of combining environmental management with supply chain management (Zhang, Li, Cao, & Huang, 2018). The entire life span of a product is considered, from the design process through end-of-life maintenance (Ghadge, Kidd, Bhattacharjee, & Tiwari, 2019).

Firms implement GP practises as a result of external causes, most of which are related to stakeholder demand, and the internal environment arising from business-led strategy processes (Foo, Kanapathy, Zailani, & Shaharudin, 2019). On the plus side, management has cited enhanced company reputation, productivity improvements, and innovative leadership as motivators for implementing green supply chain management (González-Benito, Lannelongue, Ferreira, & Gonzalez-Zapatero, 2016). According to a recent McKinsey (2014) poll, 43% of respondents want to link sustainability with their company's overall objectives. Prior studies claim that correctly structured environmental protection in the supply chain may offer a competitive advantage and increase performance (Khan & Qianli, 2017).

On the negative side, the consequences connected with noncompliance with environmental regulations encourage GP practices. External risks include the industry climate, supplier geography, and structural and institutional background, whereas endogenous risks include management actions, business size, as well as other firm-specific difficulties (Ghadge et al., 2019). According to González-Benito et al. (2016), an environmentally friendly supply chain demonstrates the firm's capacity to prepare for, manage, identify, react to, and recuperate from possible global hazards. Risks can be direct or indirect, and they can have substantial, such as profit and company value, or minor, such as item quality and client happiness, performance effects (Schmidt, Forest, & Schaltenbrand, 2017). For instance, environmental catastrophes may increase regulatory demands (AlNuaimi & Khan, 2019), result in a major drop in share price (Song, Yu, & Zhang, 2017), harm a company's brand and reputation, and prompt consumers to protest or cancel orders (Zhang et al., 2018). Since purchasing organisations cannot pass the risk of unsatisfactory environmental practises onto vendors, growing dependence on an outsourced supplier network necessitates active control of sustainability management issues (Chiu & Hsieh, 2016).

Companies are gradually focusing on exterior supply chain participants in addition to implementing fewer ecologically destructive methods in their regular domestic processes (Chiu & Hsieh, 2016). Companies are growing increasingly reliant on their suppliers to achieve a competitive edge in the global market (AlNuaimi & Khan, 2019), and firms may be held accountable not just for their individual firms but also for the social and environmental impact

of their vendors (Chiu & Hsieh, 2016). Firms have created vendor assessment methods that incorporate environmental and social factors (Ağan, Kuzey, Acar, & Açıkgöz, 2016) and demand environmental assessments or environmental licenses from vendors in reaction to requests from different stakeholders (Song et al., 2017).

GP practises have been created as a realistic approach to pursuing an ecologically conscious strategy (Zhang et al., 2018). They may be seen from four distinct viewpoints. The first viewpoint is concerned with danger. According to Walsh & Dodds (2017), the larger the anticipated loss to the company, the more likely the company will respond in some way to reduce the anticipation of loss. Ghosh (2018) observed, nevertheless, that risk-averse administrators confronted with ambiguity were more inclined to make little changes to their internal factors operations than major and dramatic changes. These businesses use basic risk-management steps and are likely to employ more organised techniques such as information collecting and supplier evaluations (González-Benito et al., 2016). In contrast, other businesses attempt to limit risks by constantly seeking new market possibilities through creativity and innovative product creation (Song et al., 2017). As a result, they are more likely to engage in the most sophisticated sorts of environmental supplier efforts (Chiu & Hsieh, 2016). For example, a company may choose to take on the risk associated with its suppliers' sustainability practices and budget for disaster management, or they may choose to actually participate in enhancing their suppliers' environmental sustainability (Mao, Zhang, & Li, 2017).

The second point to consider is the innovativeness of actions, which can range from modest, reactive activities to proactive efforts to gain a competitive edge through enhanced environmental efficiency and ecological innovations (Chiu & Hsieh, 2016). Moving past "low hanging fruit" to more aggressive environmental targets necessitates substantial investment, fundamental adjustments in operating standards, and the reconfiguration of existing supply networks (Mao, Zhang, & Li, 2017).

A third point of view is connected to the sharing of performance advantages since enterprises may be encouraged to optimize their own productivity, that can result in suboptimal supply chain effectiveness. Supply chain partners who work together may access and exploit each other's assets, as well as reap the benefits that come with it (Ghosh, 2018). Collaboration, though, is not without its challenges (Mao, Zhang, & Li, 2017). The unequal allocation of rewards may dissuade businesses from fully supporting environmental measures, resulting in unrealized potential (Walsh & Dodds, 2017). Ghosh (2018), for instance, contends that some GSCM management practises may be counter-productive since they encourage vendors to act unscrupulously, such as disguising possible difficulties.

Finally, a fourth aspect is time-related. Intertemporal conflicts exist in business sustainability, as per Song et al. (2017), since businesses might participate in operations that contrast short-term and long-term viewpoints or actions that alienate the short-term and long-term. Environmental activities frequently incur short-term expenses while reaping long-term advantages. As a result, while making decisions under uncertainty, organisations must find a means to balance conflicting goals by considering short-term and long-term implications (Mao et al., 2017).

While environmental sustainability appears to be a source of competitive advantage for a growing number of organisations, the link between competitive strategy and GP remains ambiguous. GP, as per Schmidt et al. (2017), may help a company's competitive strategy by boosting its ecological image. Several scholars (for example, Foo et al., 2019) have emphasised the necessity of establishing alignment between competitive and supply chain strategies.

1.1 Problem Statement

Many businesses face challenges that force them to adapt or adjust on a regular basis (Kirchoff, Tate, & Mollenkopf, 2016). It is critical that development organisations undergo modifications in order to react to innovative development circumstances. This is also true if the company wishes to improve its performance. Businesses' success is influenced by how well they respond to and adapt to technology advances that provide them with a competitive edge and increased efficiency. Previous research on company success has laid the road for future research. Previous research has shown that green purchasing has an influence on enhancing business

performance, despite the fact that green supply chain management is expensive (Kushwaha & Sharma, 2016). Green purchasing, though, had no meaningful influence on firm performance since few company owners or managers have integrated green supply chain operations in their businesses (Mao et al., 2017). Green procurement has a major impact on green innovation, with enterprises implementing green supply chain management increasing green innovation (Chiu & Hsieh, 2016). Companies developed green purchasing and green innovation in response to external shareholder demand, with the goal of improving company performance (Walsh & Dodds, 2017). There is a positive relationship between green innovation and company performance, indicating that technical breakthroughs in innovation that include environmental implications can improve business performance (González-Benito et al. (2016).

There is a growing need for green supply chain management, green innovation, and firm performance in Ghanaian businesses. According to the literature, studies on the influence of green purchasing on competitive advantage and firm performance are also scarce, which is supported by Baah & Jin (2019), who advocate for further study in this field to expand understanding. In light of these requests, investigations must focus on the moderating influence of technical innovation in the link between green buying and company success.

The purpose of this research is to determine how Ghanaian businesses might enhance their performance through green innovation and green purchasing. Good firm performance may help a corporation maximise productivity, have appropriate human resources, expand market share, and enhance performance. Consequently, the study seeks to ascertain the effect of green purchasing on competitive advantage and firm performance: the moderating effect of technological innovation.

2.0 LITERATURE REVIEW

The purchasing strategy of an institution's organisational procedures has an effect on the firm's competitive advantage. The chapter is a survey of various publications in order to discover literature gaps. The chapter examines several studies in order to identify literature gaps and empirical findings. Theoretical and empirical literature are discussed, and a conceptual framework is presented.

2.1 Green Purchasing (GP)

The relevance of using sustainability criteria to assess and report supply chain management has grown (Khan et al., 2022). As per Foo et al. (2019), supply chain deployment assessment has garnered increased attention as a result of firms shifting their competitive nature from an organisational to a supply chain basis. Leadership have used GP to minimise nonrenewable material use and waste creation while increasing afterlife recovery opportunities (Syafri et al., 2020). Green Purchasing seeks to optimise environmental profit by using a life-cycle approach to design, material selection, manufacture, sales, and recovery (Khan, Chen, Zhang, & Golpíra, 2019). Management may use Green Purchasing to design and execute sustainable development approaches, as well as dramatically enhance operations (Foo, Kanapathy, Zailani, & Shaharudin, 2021). According to Zhu (2022), there are eight components of GP that influence the firm's economic, ecological, and social efficiency. Green purchasing, green manufacturing, green delivery, green packaging, green marketing, environmental education, internal environmental management, and investment recovery are the eight dimensions covered by Khan et al. (2020). As a result, company executives should take a holistic approach to supply chain sustainability, assessing each connection and collaborating with all stakeholders.

Green procurement is a natural outgrowth of the traditional supply chain. The GP is the incorporation of environmental concepts into standard supply-chain management practises (Sugandini et al., 2020). The green supply chain strives to decrease a product's environmental impact over its entire lifespan by enhancing resource conservation, eliminating hazardous materials, and implementing product recycling methods (Foo et al., 2019). According to Khan et al. (2019), the application of excellent GP practices assists firm managers in increasing eco-friendly actions and decreasing hazardous waste. Yet, management teams were unaware of the effects of GP practices on organisational performance. As per Zhu (2022), the implementation of

GP can result in a win-win situation in terms of financial and environmental advantages. Employing GP might improve firms' competitive edge and support long-term industrial prosperity (Najy, 2021).

In a survey, Ananda et al. (2018) differentiated between internal and exterior GP practises. Internal GP performance is something that each manufacturers may implement and control on their own. External GP performance often necessitates some sort of engagement with various parties or stakeholders like suppliers and clients (Park et al., 2022). Several elements, including rules, marketplaces, shareholders, and vendors, may push company managers to use GP. The most important part of designing and sustaining an ecological strategy is an enterprise's vision and mission statements demonstrating managerial commitment to environmental sustainability (Najy, 2021).

GP entails incorporating environmental thoughts into all stages of continuing supply chain processes, including extracting raw materials and acquisition, industrial design, material buying and choice, output, delivery of the final item to clients, and product end-of-life governance after its usable life has expired (Zhu, 2022).

Determinants of Green Purchasing implementation

Green purchasing comprises acquiring items from vendors with environmentally friendly characteristics including reusability, recyclability, and the use of non-toxic ingredients (Ananda et al., 2018). Moreover, green purchasing can involve reducing waste, material replacement, and toxic chemical source reduction (Park et al., 2022). Design for the ecosystem concentrates on creating goods that have a little ecological impact throughout their full life cycle (Sugandini et al., 2020). Reverse logistics (also known as closed-loop supply chains) encompasses not just the actual collection of end-of-life items, but also the facilitation of recycling or re-manufacturing (Sugandini et al., 2020).

GP has been known in intellectual circles for around two decades (Park et al., 2022), although it is still a relatively young concept (Foo et al., 2019) due to the expense and complexity associated with its application (Najy, 2021). Surprisingly, in the GP procedure, choice of materials and purchase are the 2 most significant operations prior to processing within the facility. As a result, GP necessitates a great deal of focus from academics and professionals. Yet, emphasis on GP has only lately gotten undivided attention from academics (Zhu, 2022). In reality, Sugandini et al. (2020) claimed that while "environmental buying is a subdivision of environmental supply chain management, it may be a very big portion based on an organisation's form and the significance of the logistics system."

Drivers for Green Purchasing in business-to-business supply chains

The "drivers" can be thought of as catalysts that urge businesses to embrace Green Purchasing practices (Kanapathy et al., 2016). Earlier studies divided the drivers into two categories: internal and external. The "internal drives" are the complete backing of the firm's owners or founding members, upper and middle management, and any initiative, especially efforts to avoid environmental damage. Furthermore, worries for a GP do not lie just with top or middle management for the company but trickle all the way down the organisational ladder to the lowest levels. Consequently, workers' general concerns and awareness about the adverse consequences of the environmental impacts of products motivate them to cut costs via waste minimization, improved productivity, and safety. Compliance with compliance requirements concerns, market forces (buying firms) for green supply chain management, competitive pressure among rivals for obtaining a competitive edge in the industry, cultural pressure from environmental activist groups, and partnership with providers are examples of "external drivers" (Foo et al., 2019).

Zhang & Yang (2016) conducted a thorough literary assessment of the drivers of GP practises in public and private businesses and concluded that exogenous causes impact ecological supply chain management practises more than internal factors. Appolloni et al. (2014) analysed UK firms and discovered that the major drivers of GP practice are internal drives and law. ElTayeb et al. (2010) found that GP implementation is driven by a broad range of factors, including legislation, consumer demand, social responsibility, and predicted commercial

advantages, in their research of 132 Malaysian manufacturing enterprises (ISO 14001 certified). Environmental perspective, GP practises, and firm profitability were experimentally investigated in 194 Chinese firms by Chan et al. (2012), who found that internal and exterior views substantially and significantly affect the adoption of green practices.

From January to March 2009, Ageron et al. (2012) studied 178 French companies and found that top management's vision, statutory compliance, type of business, service standards, competitive dynamics, pressure from non-governmental organisations, and vendors' commitment to sustainability were the prime motivations for sustainable supply management (SSM). Hoejmose et al. (2012) identified senior management support (MS) and trust as important determinants of GP in another research. Yen & Yen (2012) investigated 863 Taiwanese electronics manufacturing enterprises and discovered that collaboration with suppliers, top management, and customer pressure were the key causes of GP. In related research, researchers examined 132 Malaysian production groups with ISO 14001 certifications and discovered that governmental pressure, consumer pressure, competitive intensity, and socio-cultural obligation were the driving forces behind green supply chain initiatives such as GP, design for the environment, and reverse logistics (Alshura & Awawdeh, 2016). Researchers discovered external and internal factors encouraging the implementation of GP programmes in a recent notable study on micro, small, and medium companies (MSMEs) in India Khan et al. (2017), noticed state regulations, consumer demands, and perceived advantages impacting GP implementation in a more recent survey of Malaysian industrial companies with 150 or fewer personnel.

2.1.2 Competitive Advantage

A company is considered to have a sustained competitive advantage (CA) when existing or future competitors cannot reproduce it or will cost a lot of money to mimic it. When adopting a planned resources-based perspective, corporate assets should be valuable in using opportunities/or neutralising risks; this must be rare, imperfectly imitable, and not biased to have equal possibilities for sustained human capital (Hagiu & Wright, 2020). CA may be influenced by being innovative and competitive. It must be remembered that business capacity to innovate leads to competitive advantage. Given that innovation may need the conversion of an institution into a viable corporation, corporate resources are required for innovation. Other key elements include customer behaviour, which can influence their conduct, which in turn can influence a company's inventive behaviour and innovation (Kumar & Pansari, 2016).

Stricter contests and also more pivotal clients in product selection require corporations to become more inventive in manufacturing their goods. Product accomplishment would then lead to market effectiveness, which is when a product will be regarded by customers, if the products had anything different and competitive, especially in comparison to certain other competing companies' products (Distanont & Khongmalai, 2020). Every corporation that participates in a sector, whether openly or tacitly, must formulate a competitive strategy. Essentially, competitive strategy is founded on defining a basic framework for how a corporation will approach a contest, what its aim will indeed be, and what policies would be required to attain the goal. A competitive strategy is a mix of a corporate's ultimate aim and the tool (policy) that allows it to reach there (Koch & Windsperger, 2017). The danger of replacement product substitution, the strength of purchasers' and suppliers' offers, and competitiveness among rivals are all examples of CA. CA is a situation in which a corporation has control over a commercial rivalry field; they have advantages that are difficult to copy, allowing a business to seize and sustain market dominance.

Product distinctiveness, quality of the product, and competitive pricing are some criteria employed to quantify CA. The first sign is a company's item originality, which mixes crafts and client want. Product quality differs from corporate quality in terms of design. Whereas competitive price, the final signal, is a firm's capacity to change its cost of the product to market rates (Kumar & Pansari, 2016). Businesses gain long-term competitive advantage via their capacity to create a set of fundamental competencies that allow them to effectively serve their intended clients than their rivals. The term "primary competency" relates to a collection of distinct skills acquired in a corporation in key areas including quality, customer support,

teamwork training, creativity, adaptability, and reactivity in order to outperform rivals (Distanont & Khongmalai, 2020).

The presence of innovation or innovative products is primarily to meet consumer demands. As a result, that creative offering is one of the factors that businesses may employ to get a strategic advantage. Product innovation is a method of increasing value as a corporate entity, which may lead to organisations gaining a competitive edge and becoming market leaders (Koch & Windsperger, 2017). The degree to which a firm is capable of developing a position that can maintain the marketplace as long as rivals exist is referred to as CA. Firms get a competitive edge by defining competitive ability or priority as tactical choices or characteristics in which companies decide to operate in certain marketplaces (Kumar & Pansari, 2016). By possessing a competitive edge, the business will be able to thrive and stay afloat. To accomplish the product's performance or performance, the firm or product must have absolute competitiveness (Koch & Windsperger, 2017). Because rivalry is so fierce, businesses must have a CA; else, they would fail. A CA may be acquired in a company by focusing on greater quality for consumers, environment, and environment in order to increase productivity and performance (Distanont & Khongmalai, 2020). Product distinctiveness, product quality, and competitive pricing are all characteristics of CA.

2.1.3 Firm Performance

Firm performance is a multifaceted concept with 3 indications that might boost the rate of growth of company profits: production, finance, as well as marketing. Businesses confront a multitude of threats in establishing, maintaining, and improving business productivity as a result of unpredictability and a hypercompetitive market (Otto et al., 2020). Firm performance defines how much the corporation improves output, resource goals, advertising, and financing (Dvouletý et al., 2021). Complexity, vitality, and equivalence are the three categories of corporate success. Since there are various players, different strategies, and different sizes of comprehension, complexity is a disagreement of viewpoint. Dynamism is the purpose of senior management in managing corporate performance to achieve superior long-term and short-term returns for shareholders. Finally, comparability is the appropriate benchmarking in comparing competing firms in terms of market share (Mehrez et al., 2020). Regarding firm performance, the emphasis is on evaluating a business's actions. Typically, in the business community, company performance is measured using metrics such as sales, profit, and stock (Chen et al., 2021).

2.1.4 Technological Innovation

A technical innovation is a new or better product or procedure that has considerably different technological qualities than previous versions. Implemented technical product innovations are newly released goods (product innovations) or processes in use (process innovations). The product or method is deemed innovative if it provides specific benefits to the organisation; these benefits do not have to be novel in the eyes of other enterprises or the market (Sun et al., 2021). Technological advancements seek to enhance industrial processes. Recent interest to financial, cultural, and, most importantly, environmental sustainability implies that technical breakthroughs are approaches not just for cost reduction but also for enhancing firm sustainability (Bergek, 2019).

2.2 Theoretical Literature Review

2.2.1 The Resource-Based Theory

The Resource Based Theory, first proposed by Penrose (Penrose, 1959) but extended by others, is an exceptional theory in innovation and competitiveness research (Wernerfelt, 1984; Barney, 2005). According to the principle, organisations have assets that they may use into becoming effective. According to the notion, a corporation might achieve a competitive edge by having unique resources or qualities that are valued, difficult to copy, and scarce in the market (Hitt et al., 2016). This school of thought contends that firms should focus on internal factors of competitiveness rather than external factors. As per RBV advocates, it is far more practical to capitalise on external chances by repurposing existing assets than attempting to learn new abilities for each chance. Firm assets and procedures are significant because they impact the

firm's conduct and actions. A resource is an important asset, expertise, organisational procedures, data, expertise, or talent that is hard to reproduce and doesn't have a close equivalent (Alvarez & Barney, 2017). Firms' ongoing viability and improved returns are driven by specific resources (Hitt et al., 2016).

A corporation is thought of as a unified collection of resources that may be used to gain a long-term competitive edge (Sedera et al., 2016). Firm resources are assets that are linked to it semi-permanently and comprise human, social, technical, intellectual, physical, and financial resources (Davis, 2017). Firms with significant resources that are scarce and difficult to replicate obtain a durable competitive edge via the development of inventive new goods (Sedera et al., 2016). Institutional assets have a favourable impact on the creative process because they provide elements that are integrated and converted to create inventions that contribute to achieving competitive advantage (Hitt et al., 2016). By producing outputs that are desirable, unusual, and difficult to copy, innovation offers a mechanism for the organisation to gain a competitive edge (Sedera et al., 2016).

Financial resources are one of the key resources for a company that may be utilised to promote creative operations, particularly R&D. Similarly, human capital is an important predictor of corporate success and efficiency. Knowledge-based assets are another important asset for a firm's profitability. Information makes it easier to uncover new ideas and capitalise on possibilities for creativity. As a result, it is valuable for manipulating, transforming, and developing other competing resources (Davis, 2017). This idea supports the research of some other competitiveness component known as company resources, which influence a corporation's actions, particularly innovation. Firm resources have an impact on a firm's conduct, including how it operates in the market. Distinctive, original, uncommon, and difficult-to-copy resources provide a company a competitive advantage.

2.2.2 The Dynamic Capability Theory

Teece and Pisano (1997) proposed the Dynamic Capability (DC) hypothesis. Relying on the mechanisms that occur in a corporation to fit the fluid, variable market, this theory explains how businesses acquire and preserve competitiveness. The theory's urgency was prompted by the failure of resource-based and action-based theories to meet dynamic economies. Entrepreneurship, innovation, organisational learning, and information and project initiation are all part of the Dynamic capability paradigm (Chowdhury & Quaddus, 2017). The capacity of a corporation to adapt to market shifts via innovation is critical for corporate performance. The underlying urge that propels capitalism, it is said, originates from the invention of new goods, new production technology, new markets, and new kinds of industrial organisation. DC refers to a company's capacity to create new goods and procedures in reaction to changing market conditions (Zhang et al., 2022). Dynamic capabilities are skills, processes, organisational frameworks, and decision theories that organisations may use to produce and retain value. Transformation procedures, product design, and inventive managerial qualities may all contribute to the competencies. They allow the firm to better match its distinct resources/competencies with the changing marketplace. Dynamic capabilities are crucial to a firm's long-term profitability (Gupta, 2021). Dynamic capabilities allow organisations to successfully arrange their assets, competencies, and other assets in order to survive in dynamic environments and marketplaces (Chowdhury & Quaddus, 2017). Capabilities are critical in a challenging environment of fast change, which is prevalent in a rising number of businesses (Jiang et al., 2018).

Innovation is recognised as one of the important corporate competencies influencing a firm's long-term competitive advantage and exceptional success (Chowdhury & Quaddus, 2017). Firms with innovation capabilities may leverage existing assets to generate additional materials, goods, processes, and platforms, and also discover innovative methods to employ existing resources to obtain a competitive edge (Jiang et al., 2018). Instruction and training, R&D, procedures, firm organisation, and affiliations with other stakeholders like as consumers, vendors, government and research organisations, and industry groups may all help to improve innovation capabilities.

The availability of dynamic skills also indicates a company's capacity to handle industry difficulties and gain a fresh and unique competitive edge (Zhang et al., 2022). The method highlights a firm's ability to update competency while also integrating and reconfiguring resources to meet and generate market shifts via innovation (Chowdhury & Quaddus, 2017). Dynamic capabilities give a wider paradigm for understanding how organisations produce value for competition in a dynamic world. This is necessary because of developments in customer wants, goods, equipment, and the competitive pressures of other enterprises, all of which can endanger a firm's current role or open the door to a fresh or superior one.

2.2.3 Theory of the Innovative Firm

This concept was proposed by economist William Lazonick to explain greater performance in the aftermath of market imperfections. Based on this notion, the job of a corporation is to convert production factors into commercially viable items and services. This may be accomplished by a company participating in innovation. As a consequence, improved economic success results from creative firms producing higher-quality goods at reduced costs (Lazonick, 2017). Innovative businesses may convert production factors into higher-quality, lower-cost items and services, resulting in a win for consumers and other economic players (Lazonick, 2019). Based on this notion, a corporation may achieve and maintain competitiveness in order to compete effectively in its industry through innovation. These businesses use innovation to create or maintain their viability.

An inventive company may also innovate in order to maintain its share against such an imaginative rival or to obtain a critical position in the marketplace (Teece, 2019). Innovative enterprises can compete via innovation rather than altering pricing and volume. This theory is applicable even if innovation economics holds that continuous increases in the process of production are no longer adequate to justify the rise in production that can be attributed to a firm's innovative efforts (Braunerhjelm et al., 2018).

Innovative businesses become effective by engaging in both high-quality and plentiful valuable capacity. This allows businesses to create better goods, products, and much more efficient ways of manufacturing, organisation, and promotion (Teece, 2019). In the near term, an innovative business is not dictated by cost increases but rather develops high-quality products, resulting in a drop in unit cost and a gain in market share (Lazonick, 2017). Innovation helps the inventive business to gradually enter numerous market niches based on the purchasers' varying economic strength. This offers a foundation for businesses to build capabilities to enter additional market categories (Lazonick, 2017).

The inventive corporation may also utilise innovation to achieve distinction by providing distinctive products and services to customers. Companies may compete by implementing an innovation plan. Continuous product, method, and technique development, as in invention, contributes to diversification, which leads to greater company competition in innovative businesses (Lazonick, 2017). This theory was helpful in describing the function of invention and how it contributes to company the market's competitiveness by producing better services and products. Diversification is a significant aspect in the competition since it creates new unique goods, methods, marketplaces, and organisational approaches. This assists businesses in dealing with rivalry. The idea validates the importance of innovation in corporate performance.

2.3 Empirical Review

2.3.1 Green Purchasing practices and firm performance

Regardless of the fact that some practitioners feel that engaging in green supply chain efforts raises manufacturing costs and hence reduces profit, experts have disproved this claim (Ghosh, 2018). Several writers have tried to establish business performance categories attributed to GP. Environmental management approaches, according to experts, contribute to improved financial success (Ahmed et al., 2020). Habib & Bao (2019) investigated the impact of green buying on business performance. They discovered that environmental buying is highly connected to business performance using survey and archival data. Jia & Wang (2019) found that enterprises with formal environmental management systems (ISO 14000 certified) have

substantial positive correlations with several variables of operational performance. Singh & Hong (2020) discovered that GP practises increase both environmental and financial performance.

Ecological, fiscal, and organisational effectiveness were classified by Khan, et al. (2019). They discovered a substantial correlation between green buying and financial performance. Jawaad & Zafar(2020) examined the literature on socially and environmentally responsible procurement (SERP) published between 2000 and 2010 and identified four themes: external environment, internal environment, SERP, and business performance. They discovered a consecutive relationship, in which drivers impact SERP, which in turn influences business performance. The results of Chan et al. (2012) confirmed the results of prior researchers that GP actions such as green purchasing had a large and favourable influence on company productivity. Other research looked into the impact of environmental procurement on four different variables: functional, financial, ecological, and social factors.

The study included 105 Malaysian manufacturing enterprises, and the researchers discovered that environmental buying had positive and substantial associations with operational, economic, and social performance, but no link with environmental performance (Namagembe et al., 2018). Yook et al. (2017) investigated 239 Japanese enterprises and discovered that dynamic and operational green purchasing skills had a favourable impact on environmental and economic performance. Vijayvargy et al. (2017) discovered that GP adoption improves operational effectiveness in 161 Indian enterprises. Al-Ghwayeen and Abdallah (2018) found that GP had a favourable and substantial impact on environmental and export performance in 221 manufacturing enterprises. Another recent study found that using environmental management methods leads to greater operational and environmental performance (Famiyeh et al., 2018). However, most previous studies have generally focused on a few categories of GP performance, such as financial, environmental, or operational performance, or a combination of two or three categories. As a result, it remains unclear what constitutes "performance" obviously attributed to GP. The current study expands on previous work by incorporating five major performance variables: financial, operational, environmental, social, and market-related.

2.3.2 Green Purchasing and Competitive advantage

Sustainable development takes into account the three Ps (people, profit, and planet) to establish the green value chain, which generates a sustainable competitive advantage (Khan et al., 2022). Green manufacturing, green purchasing, green distribution, and green logistics are all GP factors that have a significant impact on competitive advantage and organisational performance (Vargas et al., 2018). Environmental practices (green purchasing, customer collaboration, and investment recovery) have a substantial correlation with company success and competitiveness (Zameer et al., 2020). There are links between GP practices and environmental performance, operational performance, competitive advantage, and financial performance (reducing hazardous chemicals and waste material, reusing, and recycling materials) (Abdel-Baset et al., 2019). Internal green practices, external green integration, green performance, and an organization's competitiveness all have connections. Internal green practices and external green collaboration have a favourable impact on green performance, which boosts company competitiveness (Haseeb et al., 2019).

GP lessens the negative environmental impact of industrial operations, improves energy consumption efficiency, and lowers production costs, all of which boost competitiveness by enhancing quality, flexibility, dependability, delivery, and prices (Khodaparasti et al., 2020). A survey of various research publications has shown that GSC practises generating long-term competitive advantages (Casado Salguero et al., 2019). GP implementation within the three performance drivers of environmental, social, and economic performance produces and preserves a company's competitive edge. Improved exploitation of these drivers enhances both internal resource utilisation and external interactions (Sharma, 2017).

Using GP for raw material and/or final product transportation reduces gas emissions, hazards, and total supply chain costs (Jabbour et al., 2016). DHL, for instance, utilises inventive alternative energy to be more ecologically responsible all through SCM, reducing its environmental impact while improving performance, serviceability, achievement, and fuel

efficiency, all of which merge to save money and enhance the firm's financial and competitive place (Makabila et al., 2017). There are significant links between GP, supply chain performance and competitive advantage. GP practices have an impact on the management of supply chains to get a competitive advantage. Competitive advantage is influenced by managing the supply chain and ecologically friendly methods (Purkayastha & Sharma, 2016). The integration of the three GSC elements in the development of green products has a considerable impact on incremental environmental innovation, but only customer integration has a significant impact on radical environmental innovation (Gautam & Ghimire, 2017).

2.3.3 Green Purchasing and Firm Performance

Green supply chain management, used in an effort to conserve the planet, may help organisations cut raw material prices and employ recycled resources, increasing revenues and improving firm performance. According to Geng et al. (2017), there are five major components in supply chain sustainability and business performance: economy, environment, and operations. Choi & Hwang (2015) discovered that green supply chain management may benefit firm performance, assisting organisations in developing modified environmental management that leads to improved firm performance. Green supply chain management has a favourable and significant influence on business performance, demonstrating that it may establish a competitive advantage and increase financial performance over time (Khan & Qianli, 2017). There are disparities in corporate perspectives when it comes to implementing green supply chain management to boost firm performance because organisations need to understand the variables in green supply chain management so that they may be adopted and be sustainable in the company (Kuei et al., 2015).

2.4 Conceptual Framework

The study envisions a framework made up of interconnecting variables. Green purchasing, competitive advantage, technological innovation and firm performance are interconnected per the study's conceptual framework. Figure 2.1 depicts the link between green purchasing, competitive advantage, technological innovation and firm performance in the study's conceptual framework. The dependent variables are competitive advantage and firm performance while the independent variable is green purchasing. Technological innovation moderates the relationship between the dependent and independent variables

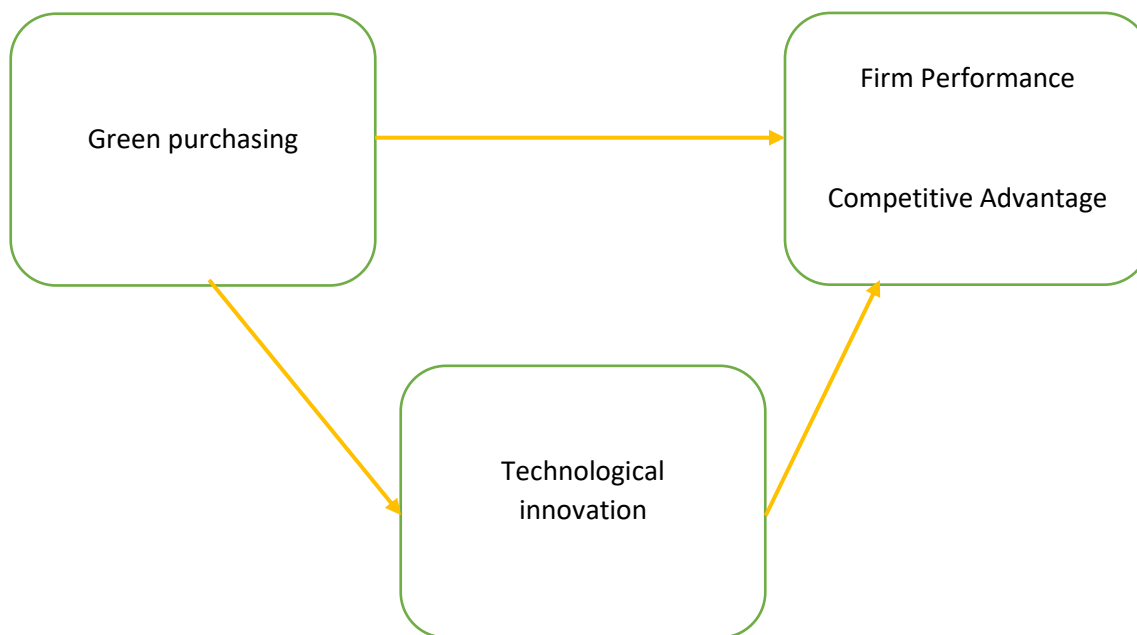


Figure 2.1: Conceptual framework

Source: Author's Construct (2023)

3.0 RESEARCH METHODOLOGY

The previous chapter explored the purchasing strategy of an institution's organisational procedures has an effect on the firm's competitive advantage. In this chapter, the focus is on the study's selected research paradigm, research design, sources of data, sampling, data analysis and ethical considerations.

3.1 Research Paradigm

A research paradigm is defined as "the collection of shared views and agreements among scientists on how issues must be comprehended and treated (Rehman and Alharthi, 2016). Research paradigms may be defined by how researchers react to three fundamental questions: ontological, epistemological, and methodological. Social scientists can base their investigations on any variety of paradigms." None are right or wrong; they are just more or less beneficial in a given context. They all influence the type of theory developed for universal comprehension (Kivunja and Kuyini, 2017). This subsection of the chapter discusses the research paradigm that fits the study.

3.1.1. Positivism

Positivism as a research paradigm gained popularity in the 19th century on the back of influential works by August Comte (Rehman and Alharthi, 2016). Positivists attempt to comprehend the natural world similarly to the social world. Positivism, as a philosophy, holds that only "factual" information received by observing (the senses), particularly measurement, is reliable. The author's function in positivist studies is confined to data gathering and impartial analysis. In other terms, the investigator is an impartial analyst who separates herself from subjective ideals while carrying out the investigation. The study outcomes in these sorts of investigations are frequently apparent and quantitative. Positivism is based on quantitative observations that result in statistical analysis. Positivists believe that there are laws that govern social phenomena and through the application of scientific methods, researchers can formulate laws that describe and predict social phenomena (Kivunja and Kuyini, 2017).

3.1.2. Interpretivism

Interpretivism is best described as a reaction to the domination of positivism. According to Greener (2008), interpretivism discards the idea of a single, verifiable reality that exists independent of the human senses. The ontology of interpretivism is anti-foundationalist. Interpretivism rejects the adoption of any perpetual, constant (or foundational) benchmarks by which truth can be generally known (Bell, Bryman, and Harley, 2022). In its place, interpretivism believes in socially fashioned numerous realities. According to interpretivism, truth and reality is the creation of humans, and not discovered. Therefore, it is impossible to know reality as it is usually mediated by the human senses. The epistemology of interpretivism is subjective because the external reality that is available to observers is contaminated by concepts, backgrounds, worldviews, beliefs, etc.

For Zikmund, Babin, Carr, and Griffin (2013), researchers are inseparably inclusive of the social reality they research and as such cannot detach themselves from whatever it is they are studying. In the instance of distinctive well-argued analyses about a particular phenomenon, one interpretation is not selected or desired over others as the "correct" one but the idea that there exist multiple pieces of knowledge is accepted with the credit that diverse researchers convey diverse perspectives to the same issue. The aim of the interpretive analysis is not to find objective truths, but to understand people's perceptions of the social phenomenon they are interested in.

With the discussion of the two main paradigms, the study selects positivism. The positivism framework best fits the study's objective to investigate the effect of green purchasing on competitive advantage and firm performance: the moderating effect of technological innovation. In achieving this objective, the study will rely on correlations, regression, and

quantitative analysis which is in line with the positivist framework (Hair, Page, and Brunsveld, 2019).

3.2 Research Design

Research design is the plan a researcher follows in executing the research (Akhtar, 2016). There are various research designs employed by researchers and they include exploratory, descriptive and explanatory. Concerning the objectives, the study will employ explanatory research design in the gathering, and analysing of the data. Explanatory research design is a research method for determining how or why a specific phenomenon occurs and forecasting subsequent events. Explanatory research seeks to find the degree of causal relationships (Sreejesh, Mohapatra, and Anusree, 2014). It can be employed to aid in the assessment of the impacts of precise changes on present norms, several processes, etc. According to Sekaran and Bougie (2016), the focus of explanatory research is to explain the existence of patterns and relationships. Explanatory is focused on cause-effect relationships. Concerning the study objectives and the positivism paradigm, the study employs the explanatory research design.

3.3 Population of the Study

A study population is a recognizable group of cases from which a researcher selects the sample (Burns and Burns, 2008). Initial contact with the National Board for Small-Scale Industries (NBSSI) showed a list of 324 manufacturing firms in the study location.

3.3 Sample and Sampling Techniques

The number of actual respondents considered under investigation according to Malhotra (2006), is the sample size. The study relied on this model to determine the sample size of the study. $\text{Sample size} = \frac{\text{Sampling Population}}{1 + \frac{\text{margin of error}^2}{\text{population}}}$ to calculate the sample size (Miller & Brewer, 2003). From a population of 324, the study will sample 179 respondents at a 0.05 margin of error.

$$n = \frac{324}{1 + \frac{0.05^2}{324}}$$

$$n = \frac{324}{1 + 0.00077}$$
$$n = \frac{324}{1.00077}$$

$$n = \frac{324}{1.81}$$
$$n = 179$$

A simple random sample is a subset of a population chosen at random. Each individual in the group has an equal probability of getting chosen using this sampling procedure. The population will be gathered from the manufacturing industry. The researcher will rely on the random number table to randomly select the specified number of respondents for the study. The researcher will then contact the selected respondents. The respondents of the study will be 179 managers or owners of manufacturing SMEs.

3.4 Data Sources

Researchers have been relying on primary and secondary data to address their research objectives. In this study, the researcher will also employ on primary and secondary data to answer the research questions. For Sreejesh, et al. (2014), primary data is the type of data gathered by the researcher himself/herself, such as surveys, interviews, and experiments designed specifically to understand and solve the study topic at hand. The primary data required for the study will be gathered from the managers of SMEs. According to Bell et al. (2022), secondary data is information that has already been gathered from primary sources and made

easily available for use by researchers in their own study. The study's secondary data will be acquired largely from scientific journals, books, and documents provided by the SMEs.

3.4.1 Variables Description and Measurement

Table 3.1: Variables and Measurements

Variables	Symbol	Number of Questions	Measurement
Competitive Strategy	COMST	5	Factory operations, product quality, process quality, leadership, customer focus
Green purchasing	GP	5	Environmentally Friendly Practice
Competitive advantage	COMAD	6	Cost, Quality, time, reliability, and innovation
Technological Innovation	TI	4	Electronic Informing, Electronic Sourcing, Electronic Ordering, Electronic Tendering
Firm Performance	FM	6	Profit margins, return on investment, market share costs

Source: Authors' construct (2023)

3.4.2 Data Collection Instruments and Procedure

In gathering the primary data, the study will rely on a questionnaire to answer the study's research questions. The study will rely on a five-point Likert scale where 1 represents strongly disagree and 5 represents strongly agree. The Likert scale will help provide quantitative data that can be analysed to test the study hypotheses. The questionnaire will be structured into six sections. The first section will focus on the background of the respondents and the firms. The next section will focus on competitive strategy. This will be followed by questions on green purchasing. The next section will focus on the competitive advantages. The subsequent section will be on technological innovation. The last section will focus on firm performance. The questions will be uploaded onto google forms and sent to the phones (SMS, WhatsApp, Telegram, or E-mails) of respondents. This means of administering the questionnaire will mean that the respondents will respond at their best times.

3.5 Data Analysis Procedure

With the reliance on quantitative data, the data gathered will be statistically analysed through descriptive statistics, correlation and multiple regression using a Statistical Package for the Social Sciences (SPSS) version 20 software and Smart Partial Least Squares Structural Equation Modelling (PLS-SEM). The multiple regression analysis will be conducted by using the PLS-SEM. The researcher will rely on PLS-SEM as the structural model is complex and includes many constructs, indicators and relationships (Ringle, Da Silva, and Bido, 2015). The demographic data will be analysed through descriptive statistics to generate tables and pie charts.

3.5.1 Validity and Reliability of Constructs

Bougie and Sekaran (2019, p. 44) defined reliability as the 'degree of consistency that the instrument or procedure demonstrate' whilst validity refers to the congruence or "goodness of fit" between an operational definition and the theory it is supposed to measure. The researcher will initially conduct a pilot test with ten respondents who will be randomly selected. Subsequently, comments made will be used to revise the final questionnaires before they were sent out to the participants to solve the issue of validity. To ensure reliability, the study will apply the internal consistency approach with Cronbach's Alpha as a proxy measure of the reliability of the data.

3.6 Ethical Consideration

The ethics of research oversees the standards of conduct for researchers. According to Hair et al. (2019), researchers should adhere to the principles of ethics to protect the dignity and welfare of research participants. To ensure adherence to research ethics, during data collection, the researcher will explain the purpose of the research to the participants. The participants will have to indicate their willingness to participate in the study. All the participants will be guaranteed complete anonymity and confidentiality in this research. The researcher will ensure that the respondents are offered the chance to decline to participate in the study.

3.7 Chapter Summary

The theoretical and philosophical assumptions behind the study technique are discussed in this chapter. In addition, the research design for this study was discussed. The study will rely on primary data to answer the research questions in chapter two.

4.0 DATA ANALYSIS

The study aimed to investigate the extent to which competitive strategy influences the adoption of green purchasing practices and how green purchasing practices impact competitive advantage and firm performance. The study also explored the role of technological innovation in moderating the relationship between green purchasing practices and firm performance. The findings provide valuable insights for businesses and policymakers on the importance of considering both competitive strategy and technological innovation when implementing green purchasing practices.

4.2 Descriptive Statistics

The descriptive statistics for the study covered gender, age, formal education level, department, area of expertise, and position of the respondents. The majority of responders (63.4%) are men, while the remaining 36.6% are women. Concerning age, the majority of the respondents (representing 57.8%) are between the ages of 24 and 29 years. This is followed by 31.7% who are between 30 and 35 years. 10.6% of the respondents are between 36 and 40 years. Concerning the position of the respondents, the majority (representing 52.8%) are managers. This is followed by 47.2% who are owners. The majority of the respondents (47.2%) have been in their position between 1 and 3 years. This is followed by 31.7% who have been in their position between from 4 to 7 years. This is presented in Table 4.1

4.1: Background of Respondents

Variables	Frequency	Percentage
Gender		
Male	102	63.4%
Female	59	36.6%
Age		
24–29 years	93	57.8%
30–35 years	51	31.7%
36–40 years	17	10.6%
Position		
Manager	85	52.8%
Owner	76	47.2%
Years in the Position		
1-3 years	76	47.2%
4-7 years	51	31.7%
8 -10 years	17	10.6%
11 years and above	17	10.6%

Source: Field data, 2023

The majority of the businesses (47.2%) are registered as Private Limited companies. This is followed by 31.7% registered as Partnerships. Only 21.1% are sole proprietorships. The majority of the businesses (52.8%) are between 3-4 years. This is followed by companies that have been in operation between 1 and 2 years. 10.6% of the companies have been in existence for about 5 to 7 years.

Concerning the staff strength of the surveyed companies, the majority of the respondents (representing 36.6%) are between 1 to 3 workers. This is followed by 21.1% that are between 11-14 workers. On the annual income, the majority of the businesses (52.8%) earn revenue between GHS500,000 and GHS1,000,000. 47.2% of the businesses earn revenue below GHS 500,000. This is presented in Table 4.2.

Table 4.2: Background of companies

Variables	Frequency	Percentage
Type of Business		
Sole proprietor	34	21.1%
Partnership	51	31.7%
Private Limited company	76	47.2%
Age of the Organisation		
1-2 years	42	26.1%
3-4 years	85	52.8%
5-7 years	17	10.6%
8-10 years	17	10.6%
Workers		
1-3 workers	59	36.6%
4-7 workers	17	10.6%
8-10 workers	17	10.6%
11-14 workers	34	21.1%
15-20 workers	17	10.6%
21 workers and more	17	10.6%
Annual Revenue		
Less than 500,000	76	47.2%
500,000 – 1,000,000	85	52.8%
Total	161	100

Source: Field data, 2023

4.2 Reliability and Validity Analysis

Prior to analysing the structural routes of the study's conceptual framework, the measuring model is evaluated, and the construct reliability and validity are provided. This research focuses on two forms of validity: convergent and discriminant validity. factor loadings, average variance extracted (AVE), as well as composite reliability (CR) are all signs of convergent validity. Table 4.3 reports the convergent validity and reliability of five constructs measured in a research study, using several statistical measures: The Cronbach's alpha is a measure of internal consistency, indicating how well the items in each construct measure the same underlying construct. It ranges from 0 to 1, with higher values indicating better internal consistency. All constructs have acceptable levels of internal consistency, with values ranging from 0.765 to 0.928.

Composite reliability (rho_a and rho_c) measures of reliability that take into account the inter-correlations among the items in each construct. They range from 0 to 1, with higher values indicating greater reliability. All constructs have acceptable levels of reliability, with values ranging from 0.114 to 1.016.

Average variance extracted (AVE) is a measure of convergent validity, indicating the proportion of variance in each construct that is explained by its underlying items. It ranges from 0 to 1, with higher values indicating better convergent validity. All constructs have acceptable levels of convergent validity, with values ranging from 0.325 to 0.673.

Table 4.3 Convergent validity and reliability

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
CA	0.816	0.907	0.864	0.565
CS	0.928	-1.43	0.637	0.325
FP	0.865	0.968	0.898	0.614
GP	0.876	1.016	0.91	0.673
TI	0.765	0.114	0.735	0.439

CA=Competitive Advantage, CS= Competitive Strategy, FP= Firm Performance, GP= Green Purchasing, TI= Technological Innovation

4.3 Discriminant Validity

The Fronell-Larcker criteria is a prominent approach for testing the discriminant validity of measurement scales. The square root of the mean-variance retrieved by a concept has to be bigger than the relationship between the construct with any other construct, based on these criteria. Discriminant validity is demonstrated after this requirement is met. There are several approaches to prove discriminant validity, which relates to how separate the ideas are. This paper describes two methods for determining discriminant validity: cross-loading as well as Fornell-Larcker. The square root of all constructs in this study was shown to be greater than the value of any link among constructs. This totally confirms the study's discriminant validity. Table 4.4 reports the results of the Fornell-Larcker criterion, which is a test of discriminant validity. Discriminant validity refers to the degree to which constructs are distinct from each other and not measuring the same underlying construct.

The Fornell-Larcker criterion assesses discriminant validity by comparing the square root of the AVE for each construct to the correlations between that construct and other constructs. If the square root of the AVE for a construct is greater than its correlations with other constructs, then the construct has discriminant validity. The table presents the correlations between each construct and the square root of their AVE on the diagonal. The off-diagonal values represent the correlations between each pair of constructs.

Based on the Fornell-Larcker criterion, the results suggest that all constructs have discriminant validity. This is indicated by the fact that the square root of the AVE for each construct is larger than the correlations between that construct and other constructs. the square root of the AVE for CA is 0.865, which is greater than its correlation with CS (-0.137) and GP (-0.042). Similarly, the square root of the AVE for GP is 0.905, which is greater than its correlation

with CS (-0.464). Overall, the results suggest that the constructs in the study are distinct and not measuring the same underlying construct.

Table 4.4 Fornell-Larcker

	CA	CS	FM	GP	TI
CA	0.751				
CS	-0.137	0.57			
FP	0.431	0.297	0.784		
GP	-0.042	-0.464	-0.209	0.821	
TI	0.829	0.213	0.648	-0.364	0.662

CA=Competitive Advantage, CS= Competitive Strategy, FP= Firm Performance, GP= Green Purchasing, TI= Technological Innovation

Moreover, an additional approach (cross-loading) was used to verify that the constructions are sufficiently diverse from one another. Table 4.4 shows the cross-loading figures, which show that all components were substantially loaded on their own constructions and were lower than their cross-loading with other constructs' items. Discriminant validity had also been established in this aspect.

According to the observed variables, the constructs in this study are credible, reliable, and different from one another, with good variation accounted. This provides the author with the green light to continue with the structural model and evaluate the link between the components in the conceptual framework.

Table 4.5 Cross loadings

CA1	0.597	-0.086	0.227	-0.089	0.256
CA2	0.664	0.33	0.179	-0.527	0.698
CA3	0.788	0.145	0.284	0.092	0.718
CA4	0.847	-0.25	0.492	0.23	0.704
CA5	0.829	-0.399	0.282	-0.256	0.719
CS1	0.13	-0.875	-0.126	0.646	-0.284
CS2	0.216	-0.796	-0.109	0.652	-0.115
CS3	0.064	-0.388	0.114	0.59	-0.188
CS4	0.321	-0.23	0.044	0.666	0.016
CS5	0.048	-0.145	-0.037	0.343	-0.107
FP1	0.493	0.513	0.874	-0.099	0.711
FP2	0.534	-0.214	0.262	-0.15	0.368
FP3	0.301	0.008	0.857	-0.124	0.321
FP4	0.326	-0.057	0.805	-0.381	0.472
FP5	0.133	0.554	0.93	-0.266	0.451
FP6	0.378	-0.033	0.778	-0.061	0.543
GP1	0.009	-0.031	-0.097	0.663	-0.154
GP2	0.142	-0.678	-0.09	0.899	-0.141
GP3	-0.173	-0.626	-0.255	0.919	-0.5
GP4	0.009	-0.208	-0.191	0.841	-0.22

GP5	0.03	-0.213	-0.097	0.754	-0.267
TI1	0.676	0.3	0.062	-0.074	0.679
TI2	0.681	0.513	0.403	-0.512	0.739
TI3	0.8	-0.289	0.489	-0.123	0.828
TI4	0.639	-0.303	-0.208	-0.091	0.25

CA=Competitive Advantage, CS= Competitive Strategy, FP= Firm Performance, GP= Green Purchasing, TI= Technological Innovation

4.4 Structural Model Analysis

SmartPLS 4 software was used in this study to test the conceptual model. The research used a 5000-resample bootstrapping approach to establish the importance of the constructs' pathways and values.

4.4.1 The role of competitive strategy in green purchasing adoption among firms in the Tema Metropolis.

Table 4.6 presents the results of a statistical analysis examining the relationship between competitive strategy and green purchasing adoption among firms in the Tema Metropolis. Specifically, it examines the extent to which competitive strategy predicts the adoption of green purchasing practices. The estimated regression coefficient for the relationship between competitive strategy (CS) and green purchasing adoption (GP). The coefficient value of 0.827 suggests that there is a strong positive relationship between CS and GP, indicating that firms that adopt a more competitive strategy are more likely to also adopt green purchasing practices.

The average value of the variable for the sample. In this case, the sample mean for CS and GP is 0.827, indicating that the sample as a whole tends to exhibit both high levels of competitive strategy and green purchasing adoption. The Standard deviation (STDEV) is a measure of the variability of the data around the mean. In this case, the standard deviation for CS and GP is 0.023, indicating that there is relatively little variability in the data.

T statistics ($|O/STDEV|$) is a measure of the strength of the relationship between the variables, relative to the amount of variability in the data. In this case, the t-statistic of 36.034 indicates that the relationship between CS and GP is statistically significant, meaning that the probability of observing such a relationship by chance is very low. P value is a measure of statistical significance, indicating the probability of observing a relationship between the variables by chance. In this case, the p-value is 0, indicating that the relationship between CS and GP is statistically significant at the 0.05 level of significance.

The results of this analysis suggest that there is a strong positive relationship between competitive strategy and green purchasing adoption among firms in the Tema Metropolis, with firms that adopt a more competitive strategy being more likely to also adopt green purchasing practices.

Table 4.6: The role of competitive strategy in green purchasing adoption among firms in the Tema Metropolis.

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics ($ O/STDEV $)	P values
CS -> GP	0.827	0.827	0.023	36.034	0

CS= Competitive Strategy, GP= Green Purchasing

4.4.2 The effect of green purchasing on the competitive advantage of firms in the Tema Metropolis.

Table 4.7 presents the results of a statistical analysis examining the relationship between green purchasing and competitive advantage among firms in the Tema Metropolis. Specifically, it examines the extent to which green purchasing practices affect the competitive advantage of

firms. The estimated regression coefficient for the relationship between green purchasing (GP) and competitive advantage (CA). The coefficient value of -0.591 suggests that there is a negative relationship between GP and CA, indicating that firms that adopt green purchasing practices are less likely to have a competitive advantage. The average value of the variable for the sample. In this case, the sample mean for CA and GP is -0.609, indicating that the sample as a whole tends to exhibit both low levels of competitive advantage and green purchasing adoption. The standard deviation for CA and GP is 0.094, indicating that there is relatively little variability in the data.

The t-statistic of 6.322 indicates that the relationship between GP and CA is statistically significant, meaning that the probability of observing such a relationship by chance is very low. The p-value is 0, indicating that the relationship between GP and CA is statistically significant at the 0.05 level of significance. Overall, the results of this analysis suggest that there is a negative relationship between green purchasing practices and competitive advantage among firms in the Tema Metropolis. This indicates that firms that adopt green purchasing practices are less likely to have a competitive advantage.

Table 4.7 The effect of green purchasing on the competitive advantage of firms in the Tema Metropolis.

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
GP -> CA	-0.591	-0.609	0.094	6.322	0

CA=Competitive Advantage GP= Green Purchasing

4.4.3 The effect of green purchasing on the firm performance of firms in the Tema Metropolis.

Table 4.8 presents the results of a statistical analysis examining the relationship between green purchasing and firm performance among firms in the Tema Metropolis. Specifically, it examines the extent to which green purchasing practices affect the firm performance of the firms. The estimated regression coefficient for the relationship between green purchasing (GP) and firm performance (FP). The coefficient value of -0.34 suggests that there is a negative relationship between GP and FP, indicating that firms that adopt green purchasing practices are less likely to have better firm performance.

The sample mean for FP and GP is -0.355, indicating that the sample as a whole tends to exhibit both low levels of firm performance and green purchasing adoption. The t-statistic of 8.591 indicates that the relationship between GP and FP is statistically significant, meaning that the probability of observing such a relationship by chance is very low. The p-value is 0, indicating that the relationship between GP and FP is statistically significant at the 0.05 level of significance. The results of this analysis suggest that there is a negative relationship between green purchasing practices and firm performance among firms in the Tema Metropolis. This indicates that firms that adopt green purchasing practices are less likely to have better firm performance.

Table 4.8 The effect of green purchasing on the firm performance of firms in the Tema Metropolis

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
GP -> FP	-0.34	-0.355	0.04	8.591	0

GP= Green Purchasing; FP= Firm Performance

4.4.4 The moderating effect of technological innovation on the relationship between green purchasing and firm performance of firms in the Tema Metropolis.

Table 4.9 presents the results of a statistical analysis examining the moderating effect of technological innovation on the relationship between green purchasing and firm performance among firms in the Tema Metropolis. Specifically, it examines whether the effect of green purchasing on firm performance is moderated by the level of technological innovation of the firms.

The estimated regression coefficient for the relationship between green purchasing (GP) and firm performance (FP) when technological innovation (TI) is included in the model as a moderator. The coefficient value of -0.091 suggests that there is a negative relationship between GP and FP, indicating that firms that adopt green purchasing practices are less likely to have better firm performance. However, the coefficient value is smaller than in Table 4.8, indicating that the negative relationship is weaker when technological innovation is included in the model.

The average value of the variable for the sample. In this case, the sample mean for FP and GP is -0.08, and for TI and FP it is 0.605. The t-statistics of 1.801 and 13.261 indicate that the relationship between GP and FP and between TI and FP are both statistically significant but to different degrees. The p-value for GP and FP is 0.072, indicating that the relationship is not statistically significant at the 0.05 level of significance. However, the p-value for TI and FP is 0, indicating that the relationship is statistically significant at the 0.05 level of significance.

Overall, the results of this analysis suggest that the negative relationship between green purchasing practices and firm performance is moderated by the level of technological innovation of the firms. The negative effect of green purchasing on firm performance is weaker when technological innovation is high, indicating that technological innovation can help firms overcome the potential negative effects of green purchasing on firm performance.

Table 4.9: The moderating effect of technological innovation on the relationship between green purchasing and firm performance of firms in the Tema Metropolis.

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
GP -> FP	-0.091	-0.08	0.051	1.801	0.072
TI -> FP	0.581	0.605	0.044	13.261	0

GP= Green Purchasing; FP= Firm Performance

4.5 Theoretical and Managerial Implications

4.5.1 The role of competitive strategy in green purchasing adoption among firms in the Tema Metropolis. The finding that there is a strong positive relationship between competitive strategy and green purchasing adoption has important theoretical implications. This suggests that firms that adopt a competitive strategy are not only focused on traditional performance metrics such as profitability, but also on environmental sustainability. This finding supports the resource-based view (RBV) of the firm, which argues that firms can gain competitive advantage by leveraging unique resources and capabilities. In this case, green purchasing adoption can be viewed as a unique resource or capability that can contribute to a firm's competitive advantage.

The practical implications of this finding are also significant. Firms that adopt a more competitive strategy can use green purchasing practices as a way to differentiate themselves from their competitors and gain a competitive advantage. This can be achieved by using green purchasing practices to reduce costs, improve product quality, and enhance their reputation with customers who value environmental sustainability. Additionally, firms can use green purchasing practices as a way to comply with regulations and improve their relationship with stakeholders such as governments, non-governmental organizations, and communities. This finding suggests that firms in the Tema Metropolis and beyond can benefit from incorporating green purchasing practices into their competitive strategies. Doing so can lead to both economic and environmental benefits and contribute to the long-term sustainability of their businesses.

4.5.2 The effect of green purchasing on the competitive advantage of firms in the Tema Metropolis.

The finding of a negative relationship between green purchasing practices and competitive advantage has important theoretical implications. This suggests that green purchasing practices may not always lead to a competitive advantage for firms, contradicting the RBV's argument that unique resources and capabilities can contribute to a firm's competitive advantage. It also challenges the idea that environmental sustainability practices can lead to economic benefits for firms.

The practical implications of this finding are also significant. While there may be moral or ethical reasons for firms to adopt green purchasing practices, it may not always lead to a competitive advantage. Firms need to carefully consider the costs and benefits of green purchasing practices and evaluate whether they align with their overall competitive strategy. Additionally, firms may need to explore other ways to achieve a competitive advantage, such as through product differentiation or cost leadership strategies. Furthermore, this finding highlights the importance of conducting a thorough analysis of the relationship between green purchasing practices and competitive advantage before adopting these practices. Firms should also consider other factors that may impact their competitive advantages, such as market conditions, technological innovation, and the regulatory environment.

The finding of a negative relationship between green purchasing practices and competitive advantage suggests that firms need to carefully evaluate the costs and benefits of adopting these practices. It also underscores the importance of a comprehensive analysis of the relationship between environmental sustainability practices and a firm's overall competitive strategy.

4.5.3 The effect of green purchasing on the firm performance of firms in the Tema Metropolis.

The theoretical implications of this finding are that although green purchasing practices are important for environmental sustainability, they may not always lead to better firm performance. This suggests that firms need to carefully consider the costs and benefits of implementing green purchasing practices and weigh them against their overall business strategy and goals. It also highlights the need for further research to explore the specific factors that may influence the relationship between green purchasing and firm performance, such as industry context or the specific practices implemented.

From a managerial perspective, this finding suggests that firms need to carefully consider the trade-offs between environmental sustainability and financial performance when making decisions about green purchasing practices. Firms may need to invest in more innovative and cost-effective green technologies or seek out partnerships and collaborations that can help offset the costs of implementing green practices. Additionally, firms may need to communicate the benefits of green purchasing practices to stakeholders, such as customers or investors, in order to gain their support and ensure that the benefits of these practices are properly recognized. Ultimately, this finding highlights the importance of balancing environmental sustainability with financial performance in order to achieve long-term business success.

4.5.4 The moderating effect of technological innovation on the relationship between green purchasing and firm performance of firms in the Tema Metropolis.

The findings suggest that technological innovation can act as a mitigating factor for the negative impact of green purchasing on firm performance. Firms that invest in technological innovation can improve their ability to adopt and implement green purchasing practices without sacrificing their overall performance. This implies that firms should consider investing in technological innovation as a way to enhance their green purchasing practices and overall performance.

From a practical standpoint, the findings suggest that firms should carefully consider the potential trade-offs between green purchasing practices and firm performance. While green purchasing can have positive environmental and social impacts, it may also have negative effects on financial performance. Therefore, firms should take a strategic approach to green purchasing and consider factors such as their level of technological innovation and competitive strategy when making decisions about whether to adopt green purchasing practices.

Managers should also consider the potential benefits of investing in technological innovation to support their green purchasing practices. This can involve investing in technologies such as renewable energy, energy-efficient production processes, or sustainable supply chain management systems. By doing so, firms can reduce the negative impact of green purchasing practices on their financial performance and enhance their overall sustainability and competitiveness.

5.0 CONCLUSIONS

The purpose of the study is to investigate the effect of green purchasing on competitive advantage and firm performance: the moderating effect of technological innovation. The main research results and the study's conclusions are presented in this chapter. It includes a summary and areas for additional research.

5.1 Summary of Findings

The study findings reveal that there is a strong positive relationship between competitive strategy and green purchasing adoption among firms in the Tema Metropolis, with firms that adopt a more competitive strategy being more likely to also adopt green purchasing practices. The study findings reveal that there is a negative relationship between green purchasing practices and competitive advantage among firms in the Tema Metropolis.

The study found that there is a negative relationship between green purchasing practices and firm performance among firms in the Tema Metropolis. This indicates that firms that adopt green purchasing practices are less likely to have better firm performance. Prior research provides some support for the finding that green purchasing practices may not always lead to better firm performance. For example, a study by Choi and Kim (2016) found that the adoption of green supply chain management practices did not have a significant positive impact on firm performance in the Korean manufacturing industry. Similarly, a study by Aragón-Correa et al. (2008) found that the adoption of environmentally friendly practices did not always lead to increased financial performance in Spanish firms.

However, there are also studies that provide evidence to the contrary, suggesting that green purchasing practices can in fact have a positive impact on firm performance. For instance, a study by Zhu et al. (2018) found that firms with higher levels of environmental management practices had higher levels of financial performance in the Chinese context. Additionally, a study by Sarkis et al. (2010) found that the adoption of green supply chain management practices can lead to improvements in both environmental and financial performance for firms in the automotive industry.

The study found that there is a negative relationship between green purchasing practices and firm performance is moderated by the level of technological innovation of the firms. Prior research generally supports the finding that technological innovation can mitigate the negative effects of green purchasing on firm performance. For example, a study by Aragón-Correa and Rubio-López (2015) found that the adoption of environmentally friendly practices, including green purchasing, can have positive effects on firm performance when combined with technological innovation.

Similarly, a study by Zhu and Sarkis (2007) found that environmental management practices, including green purchasing, can have positive effects on firm performance when combined with technological innovation. However, there are also some studies that have found no significant moderating effect of technological innovation on the relationship between green purchasing and firm performance. For example, a study by Walker et al. (2014) found that while environmental management practices can have positive effects on firm performance, technological innovation did not significantly moderate this relationship.

5.2 Conclusion

In conclusion, this thesis investigated the relationship between competitive strategy, green purchasing practices, and firm performance among firms in the Tema Metropolis. The findings suggest that firms with a more competitive strategy are more likely to adopt green purchasing practices. However, adopting green purchasing practices may come at the cost of a

firm's competitive advantage and firm performance. Technological innovation can moderate this negative effect on firm performance, suggesting that firms can mitigate the potential negative effects of green purchasing by investing in technological innovation.

Prior literature has supported and challenged some of these findings. Studies have shown that green purchasing can have positive effects on firm performance, but these effects may depend on various contextual factors such as industry, location, and regulatory environment. Moreover, some studies have shown that the negative relationship between green purchasing and competitive advantage can be mitigated by developing unique green capabilities and branding.

Overall, this study adds to the growing body of literature on the relationship between green practices and firm performance, highlighting the importance of considering contextual factors such as competitive strategy and technological innovation. These findings have practical implications for firms in the Tema Metropolis and beyond, as they provide insights into how firms can balance their green initiatives with their competitive advantage and performance goals.

5.3 Recommendations

Firms in the Tema Metropolis should adopt competitive strategies to encourage the adoption of green purchasing practices. This will lead to a positive relationship between the two and ultimately benefit the firms in terms of cost savings and environmental responsibility. Firms should also consider the potential negative impact of green purchasing practices on their competitive advantage and performance. They should strive to strike a balance between their environmental responsibility and their competitive advantage by exploring ways to minimize costs and maximize benefits of green purchasing practices.

Firms with high levels of technological innovation should focus on leveraging their technology to overcome the potential negative effects of green purchasing on their performance. They should explore new and innovative ways to implement green purchasing practices that are both cost-effective and environmentally responsible. Policymakers should consider incentivizing firms to adopt green purchasing practices, while also providing support for technological innovation. This will encourage firms to adopt sustainable practices while also promoting economic growth and development.

5.4 Areas for Further Research

Future studies may investigate the impact of green purchasing practices on the operational efficiency of firms. This could provide insights into whether or not there is a trade-off between environmental sustainability and operational efficiency, and how firms can balance these competing goals.

Future research should examine the role of industry-specific factors in the relationship between green purchasing and firm performance. It is possible that the negative relationship between green purchasing and firm performance is more pronounced in certain industries or contexts, and exploring these factors could help firms better understand the potential risks and benefits of adopting green purchasing practices.

Further research can explore the role of stakeholder pressures in shaping the relationship between green purchasing and firm performance.

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