Int Journal of Social Sciences Management and Entrepreneurship 9(1): 317-333 2025

ISSN 2411-7323

www.sagepublishers.com

SUSTAINABLE PROCUREMENT PRACTICES AND PERFORMANCE OF FOOD AND BEVERAGES MANUFACTURING FIRMS IN KIAMBU COUNTY, KENYA

[1] Gichuhi Hezron Kimani, [2] Dr. Osoro Anthony (Phd)

[1] Msc. Scholar, Jomo Kenyatta University of Agriculture and Technology
[2] Lecturer, Jomo Kenyatta University of Agriculture and Technology

ABSTRACT

This study explored on sustainable procurement practices and performance of food and beverage manufacturing firms in Kiambu County, Kenya. The specific objectives were green supply chain management and energy efficiency on performance of food and beverage manufacturing firms in Kiambu County, Kenya. The study was guided by following theories: Triple Bottom Line (TBL) Theory, and Institutional Theory respectively. The target population was 145 respondents; who comprised; senior procurement officer, senior finance officers, senior sales & marketing officers, senior warehouse officers, and senior operations officers respectively. Primary data was collected using questionnaires, with a pilot 10% (14) respondents of the entire element to check validity and reliability of questionnaire. The study utilized SPSS (Statistical Package for Social Sciences) version 28 for data analysis. The regression analysis revealed that sustainable procurement practices significantly influence firm performance ($R^2 = 0.773$, $p = 0.000$), with green supply chain management ($\beta = 0.406$, $p = 0.000$) and energy efficiency ($\beta = 0.371$, $p = 0.000$) having the strongest impact. The study concludes and recommends that sustainable procurement is a key driver of firm performance, with green supply chain management and energy efficiency offering the highest returns.

Key Words: Sustainable Procurement Practices, Green Supply Chain Management, Energy Efficiency, Performance, Food and Beverage Manufacturing Firms

Background of the Study

The Chartered Institute of Procurement and Supply (CIPS) (2017), defines sustainable procurement as a process whereby organizations meet their needs for goods, services, work and utilities in a way that achieves value for money on a whole life basis in terms of generating benefits not only to the organization, but also to society and the economy, whilst minimizing damage to the environment. According to Bofinger et al, (2021) organizations need to adopt socially and environmentally responsible purchasing practices (SP practices) which have impacts on all aspects of the supply chain, including suppliers, employees, and customers, with aims to reduce the environmental and social impact of their own and their suppliers' activities, goods, and services.

Kenton, (2021) asserted that sustainable procurement includes all activities carried out by an organization to satisfy its needs for goods, services, work and utility in a way, such that value for money is achieved on a whole life basis with regards to the achievement of benefits not only to the organization but also to the society and the economy, whilst minimizing damage to the environment. Sustainable procurement deals with managing all aspects of the upstream components of the supply chain to maximize triple bottom line performance (Sayed et. al., 2021).

Sustainability should be integrated already in the early stages of purchasing and considered carefully throughout the process. Whenever planning to make a purchase, there are several sustainability issues that should be considered. The first one is simply avoiding unnecessary purchasing by evaluating the need for the product or service. Other issue is taking into consideration the pollution, emissions and water and energy consumption during the product's whole life cycle. A product with the least negative social and environmental impact should be preferred. When it comes to supply chains and for instance outsourcing, it is also crucial to verify that the suppliers comply with the existing standards and regulations. Finally, minimizing the usage of hazardous materials as well as considering reverse logistics issues like disposal, reuse and recycling should also be considered. (Sustainable Procurement Guide, 2013). Chkanikova and Scroufe (2021) showed that procurement sustainability lowers the level of business risk. Businesses must satisfy stakeholders' requirements, such as social responsibility, in addition to those of their shareholders in order to maintain their long-term gains and advancement.

Statement of the Problem

The food and beverage manufacturing subsector in Kenya has experienced a significant decline in performance, with a contraction of 13.4% recorded between 2011 and 2022 (KNBS, 2023). This downturn is concerning, given that the sector contributes approximately 3.5% to Kenya's GDP and supports over 600,000 jobs in the formal economy and 2 million in the informal sector (KAM, 2022). Multiple challenges have been cited as contributing factors to this decline, including escalating production and ingredient costs, duplication of regulatory frameworks, inadequate raw material supplies, and intense market competition (Dulo, 2021). These issues have significantly increased operational costs, negatively impacting the profitability and sustainability of firms within the sector.

Moreover, data from KNBS (2020) reveals that a high proportion of food and beverage firms struggle to remain operational. Up to 80% of firms that survive the initial three months of operation are projected to fail within five years, indicating an unstable industry environment. Although the sector posted an 11% cumulative growth between 2018 and 2022, this is still below the Kenya Vision 2030 target of 10% annual growth (Kenya Bureau of Statistics, 2019).

Compounding the issue is the sector's relatively low technical efficiency—averaging around 59%—compared to 70% in South Africa and 74% in Malaysia (Deloitte, 2019), suggesting a need for operational improvements.

Sustainable procurement has been recognized globally and locally as a strategy that can improve firm performance by promoting efficiency, environmental compliance, and stakeholder trust. Previous studies have shown that green procurement, ethical sourcing, and supplier involvement are positively linked to operational performance (Fiati, 2020; Nyaga & Achuora, 2020; Muema, 2021). However, these studies have either focused on general manufacturing sectors, public entities, or different geographical contexts such as Nairobi County. Very few have specifically examined how sustainable procurement practices influence the performance of food and beverage manufacturing firms in Kiambu County—a county with a rising industrial base and proximity to Kenya's capital.

This creates both a contextual and geographical knowledge gap, which this study sought to fill. By focusing on sustainable procurement practices—specifically green supply chain management and energy efficiency—this study aimed to investigate their effect on the performance of food and beverage manufacturing firms in Kiambu County, Kenya.

Specific Objectives

i. To establish the effect of green supply chain management on performance of food and beverages manufacturing firms in Kiambu County, Kenya.
ii. To determine the effect of energy efficiency on performance of food and beverages manufacturing firms in Kiambu County, Kenya.

LITERATURE REVIEW

Theoretical Review

Resource-Based View (RBV) Theory

The Resource-Based View (RBV) Theory, introduced by Wernerfelt (1984) and later expanded by Barney (1991), is a fundamental framework in strategic management that explains how firms achieve and sustain a competitive advantage based on their internal resources. Unlike external market-based theories, which emphasize industry structure and external forces, RBV posits that a firm's ability to outperform competitors is primarily determined by its unique resources and capabilities. These resources must be valuable, rare, inimitable, and non-substitutable (VRIN criteria) to provide a long-term competitive edge (Barney, 1991). By focusing on the internal strengths of an organization, RBV helps firms leverage their unique assets to enhance operational efficiency, innovation, and overall performance.

Key strengths of RBV is its emphasis on internal resource heterogeneity, meaning firms possess unique combinations of resources that differentiate them from competitors (Peteraf, 1993). In the context of sustainability and procurement, firms that invest in green supply chain management, and energy efficiency can develop specialized capabilities that are difficult for competitors to imitate. For example, companies that establish long-term partnerships with sustainable suppliers and integrate eco-friendly production processes gain a first-mover advantage that enhances their market position. These unique competencies contribute not only to cost reduction but also to brand differentiation, making sustainability a strategic asset rather than a compliance requirement (Hart, 1995).

Despite its strengths, RBV has been criticized for its internal focus, which may overlook the dynamic nature of external environments (Priem & Butler, 2001). Critics argue that focusing solely on internal resources may not be sufficient, as external factors such as market trends, technological advancements, and policy changes also influence a firm's success. However, scholars like Teece et al. (1997) have extended RBV by incorporating dynamic capabilities, which emphasize a firm's ability to continuously reconfigure its resources in response to environmental changes. In the context of sustainable procurement, firms that develop adaptable supply chain strategies and invest in emerging green technologies are better positioned to sustain their competitive advantage over time.

This theory therefore provides a strong theoretical foundation for understanding how firms achieve competitive advantage through sustainable procurement practices. By leveraging valuable, rare, inimitable, and non-substitutable resources, organizations can enhance their performance while promoting environmental sustainability and social responsibility. RBV is particularly relevant in today's business environment, where firms that invest in green supply chain management, waste reduction, community engagement, and energy efficiency gain a dual advantage—improving both their financial performance and corporate reputation. As sustainability becomes a key driver of business success, RBV remains an essential framework for firms looking to build long-term resilience and market leadership. This theory was therefore used to explain green supply chain management.

Institutional Theory

Institutional Theory is a framework that explains how organizations conform to societal norms, regulations, and cultural expectations to gain legitimacy and sustain long-term success. Initially developed by Meyer and Rowan (1977) and further refined by DiMaggio and Powell (1983), the theory suggests that firms do not operate in isolation but are influenced by external institutional forces, including governments, industry standards, professional bodies, and societal expectations. Organizations adopt practices not necessarily because they improve efficiency, but because they align with regulatory requirements, social pressures, and industry norms (Scott, 1995). This theory is particularly relevant in the context of sustainable procurement, where businesses must adapt to environmental regulations, ethical sourcing demands, and corporate social responsibility (CSR) expectations to maintain legitimacy.

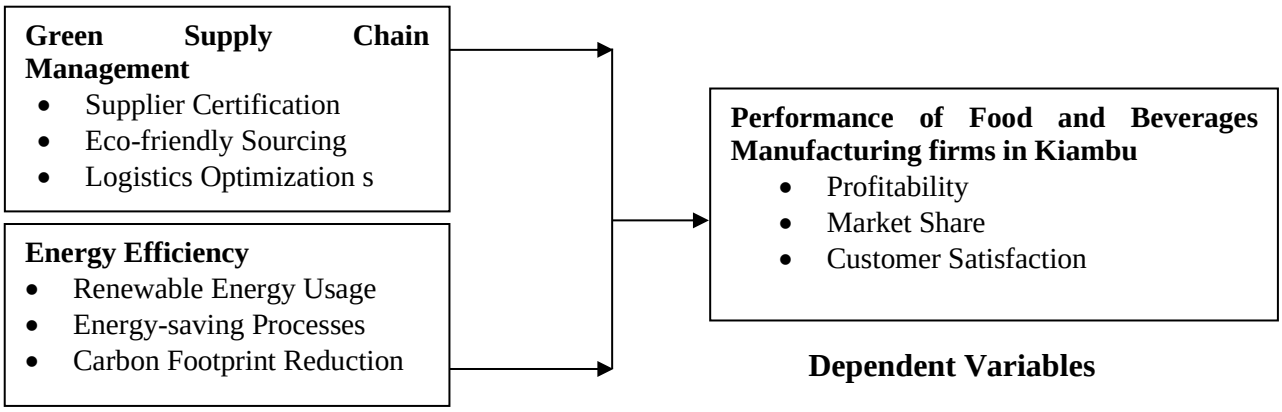
A central concept of Institutional Theory is isomorphism, which describes how organizations within an industry tend to become similar over time due to external pressures (DiMaggio & Powell, 1983). There are three primary forms of isomorphic pressures: coercive, mimetic, and normative. Coercive isomorphism results from regulatory or legal mandates, such as government policies requiring firms to adopt green supply chain management and energy efficiency measures. Mimetic isomorphism occurs when firms imitate successful competitors to gain legitimacy, often leading to the widespread adoption of sustainability practices, and energy efficiency initiatives. Normative isomorphism is driven by professional and industry standards, where firms comply with sustainability certifications, ethical procurement guidelines, and CSR benchmarks to enhance reputation and stakeholder trust (Scott, 2001).
One of the key strengths of Institutional Theory is its ability to explain why firms adopt sustainability and procurement policies, even when there is no immediate financial gain (Hoffman, 1999). For example, companies may invest in eco-friendly supply chains, carbon footprint reduction, and ethical labor practices not necessarily for profit but to comply with international sustainability standards such as ISO 14001, the Global Reporting Initiative (GRI), and the United Nations Sustainable Development Goals (SDGs). Firms that proactively engage in sustainable procurement and corporate social responsibility (CSR) gain a competitive edge by attracting environmentally conscious customers, investors, and partners who prioritize ethical business practices (Bansal & Roth, 2000).

Despite its relevance, Institutional Theory has been criticized for its passive view of organizations, as it suggests firms merely conform to external pressures rather than actively shaping their own strategies (Oliver, 1991). Some scholars argue that businesses are not just reactive entities but also proactive agents that influence institutional environments through lobbying, advocacy, and corporate social initiatives. To address this limitation, researchers have integrated institutional entrepreneurship into the theory, emphasizing how firms can innovate and redefine industry norms by pioneering sustainable supply chain solutions and green energy transitions (Battilana et al., 2009). This perspective is particularly relevant in sectors where early adopters of sustainability strategies set new industry benchmarks, encouraging widespread adoption.

Institutional Theory therefore provides a valuable lens for understanding how external regulatory, social, and industry pressures drive the adoption of sustainable procurement practices. The theory explains why firms implement green supply chain management, waste reduction initiatives, and energy efficiency measures to comply with environmental policies and societal expectations. As global sustainability standards evolve, organizations must not only conform to institutional pressures but also leverage sustainability as a strategic advantage to differentiate themselves in an increasingly regulated and ethically conscious marketplace. The theory will be linked with the variable energy efficiency.

Conceptual Framework

Oso and Onen (2009) noted that a conceptual framework is a diagrammatic presentation of a theory and that it's presented as a model where research variables and the relationship between them are translated into a visual picture to illustrate the interconnections between the independent, intervening and dependent variables. The framework below therefore summarizes the factors that the researcher will employ in the study.



Independent Variables

Green Supply Chain Management

Green Supply Chain Management (GSCM) is a sustainability-driven approach that integrates environmental considerations into every stage of the supply chain, from sourcing to final product disposal. It aims to reduce environmental impacts while optimizing cost efficiency and operational effectiveness (Kumar et al., 2021). One of the most critical aspects of GSCM is supplier certification, which ensures that companies collaborate with suppliers who adhere to environmental standards such as ISO 14001, Fair Trade, or LEED (Leadership in Energy and Environmental Design) certifications. These certifications help businesses align with sustainability goals while reducing supply chain risks associated with environmental violations and unethical sourcing (Shashi et al., 2020).

Eco-friendly sourcing is another key component of GSCM, where businesses prioritize suppliers that provide sustainable raw materials and implement green production practices. Companies adopting eco-friendly sourcing often focus on biodegradable materials, recycled inputs, and sustainable farming techniques (Mangla et al., 2022). Research shows that firms implementing sustainable procurement strategies experience improved supplier relations, regulatory compliance, and customer loyalty (Govindan et al., 2021). However, a major challenge businesses face is the cost and availability of sustainable alternatives, as eco-friendly materials often come at a premium, making cost-benefit analysis a crucial part of GSCM decision-making (Wang et al., 2023).

Logistics optimization plays a significant role in reducing carbon footprints in supply chain operations. This involves adopting fuel-efficient transportation, AI-driven logistics planning, and consolidated shipping methods to cut down emissions and energy consumption (Sharma et al., 2021). Many organizations are leveraging blockchain and Internet of Things (IoT) technologies to monitor and improve supply chain efficiency, allowing them to track and optimize sustainability performance at each stage (Bag et al., 2021). These digital innovations help organizations meet environmental regulations while achieving long-term cost savings.

The adoption of GSCM presents numerous benefits, including cost reduction, enhanced brand reputation, and improved stakeholder relationships. Organizations that successfully integrate green supply chain practices often experience stronger customer loyalty, competitive differentiation, and regulatory advantages (Gopalakrishnan et al., 2022). However, firms also face challenges such as high initial investment costs, resistance from traditional suppliers, and complex regulatory landscapes. Overcoming these challenges requires a strategic approach that balances environmental sustainability with financial viability, ensuring long-term growth and resilience in an evolving business environment (Nayak et al., 2022).

Energy Efficiency

Energy efficiency has become a key priority for businesses seeking to reduce operational costs, enhance sustainability, and comply with regulatory requirements (Sharma & Joshi, 2021). Companies are increasingly adopting renewable energy sources such as solar, wind, and bioenergy to minimize dependence on fossil fuels (Ghosh et al., 2023). Investing in renewable energy solutions not only reduces carbon footprints but also enhances energy security and cost savings in the long run (Nayak et al., 2022).

Energy-saving processes involve adopting smart technologies, automation, and energy-efficient machinery to optimize production and logistics operations (Bag et al., 2023). Many businesses are implementing Internet of Things (IoT) solutions to monitor energy consumption in real time, allowing them to adjust operations for maximum efficiency (Govindan et al., 2021). Additionally, green building designs, such as LEED-certified offices and energy-efficient manufacturing plants, are gaining traction as firms seek to optimize energy use (Wang et al., 2023).

Carbon footprint reduction is achieved through initiatives such as electric vehicle adoption, green logistics, and carbon offset programs (Dwivedi et al., 2022). Companies implementing low-carbon strategies experience better regulatory compliance, lower energy costs, and stronger consumer preference for sustainable products (Sahebi et al., 2022). Carbon reduction commitments, such as those under the Paris Agreement and Science-Based Targets Initiative (SBTi), have pushed firms to accelerate sustainability efforts.

Despite the advantages, businesses often face challenges related to high initial investment costs, technological limitations, and resistance to change (Mzembe et al., 2022). However,

research suggests that companies prioritizing energy efficiency experience long-term financial gains, improved risk management, and enhanced market competitiveness, making it a vital strategy for future sustainability (Gopalakrishnan et al., 2022).

Performance of Food and Beverages Manufacturing Firms

The performance of food and beverages manufacturing firms is a critical measure of their financial, operational, and market success, often evaluated using key indicators such as profitability, market share, and customer satisfaction (Kumar et al., 2021). In the highly competitive food and beverage industry, firm performance is influenced by factors such as supply chain efficiency, sustainability practices, product innovation, and consumer trends (Bag et al., 2023). Sustainable procurement practices, including green supply chain management, waste reduction, community development, and energy efficiency, play a significant role in shaping firm performance. Companies that integrate sustainability into their operations not only achieve cost savings and regulatory compliance but also enhance their reputation and long-term resilience in the market (Govindan et al., 2021).

Profitability is a fundamental measure of business performance that indicates a firm's ability to generate income relative to its expenses. In the food and beverage industry, profitability is closely linked to cost management, operational efficiency, and product differentiation (Sharma et al., 2021). Additionally, sustainable sourcing and ethical procurement practices can enhance supplier relationships and minimize supply chain disruptions, ultimately supporting long-term financial stability (Mangla et al., 2022). However, the shift toward sustainable operations often requires high initial investments in technology, infrastructure, and supplier development, which may temporarily impact short-term profits before yielding long-term benefits (Nayak et al., 2022).

Market share is a crucial indicator of a firm's competitive positioning within the industry and reflects its ability to attract and retain customers (Wang et al., 2023). Food and beverage firms that prioritize sustainability and eco-friendly practices often gain a competitive edge, as modern consumers prefer brands that align with ethical and environmental values (Verma & Bhattacharyya, 2023). Furthermore, firms that actively engage in corporate social responsibility (CSR) initiatives, such as ethical labor practices, strengthen their brand loyalty and expand their market share (Ghosh et al., 2023). However, sustaining market leadership requires firms to continuously adapt to changing consumer preferences, invest in digital marketing, and leverage data analytics to understand purchasing behaviors (Bag et al., 2021).

Customer satisfaction is a key driver of firm performance, as it influences brand loyalty, repeat purchases, and positive word-of-mouth marketing (Sahebi et al., 2022). Consumers in the food and beverage industry are increasingly demanding high-quality, sustainable, and ethically sourced products, compelling firms to enhance their production and procurement processes (Chakraborty & Biswas, 2022). Companies that invest in waste reduction, food safety, and environmentally friendly manufacturing build strong consumer trust and improve their market reputation (Mzembe et al., 2022). Additionally, incorporating renewable energy sources and sustainable packaging not only aligns with consumer expectations but also reduces environmental impact (Mori Junior et al., 2021). However, ensuring high customer satisfaction requires firms to maintain consistent product quality, invest in innovation, and respond proactively to consumer feedback (Govindan et al., 2021).

Therefore, the performance of food and beverages manufacturing firms is shaped by a combination of profitability, market share, and customer satisfaction, all of which are influenced by sustainable business practices. Companies that integrate green supply chain management, waste reduction, community engagement, and energy efficiency into their strategies experience long-term financial growth, competitive advantage, and enhanced

consumer trust (Gopalakrishnan et al., 2022). However, achieving sustainability-driven performance improvements requires firms to navigate cost challenges, regulatory requirements, and market dynamics, necessitating a balanced approach between financial success and environmental responsibility (Nayak et al., 2022).

Empirical Review

Green Supply Chain Management and Firm Performance

Meathawiroon and Thunyachairat (2025) examined the impact of green supply chain management (GSCM) on firm performance, with a particular focus on the mediating role of supply chain disruptions. The researchers adopted a quantitative research design, collecting survey data from 210 manufacturing firms that had implemented GSCM strategies. The study used structural equation modeling (SEM) to analyze relationships between variables. Findings indicated that firms with strong GSCM practices experienced higher operational efficiency, cost savings, and environmental compliance, leading to enhanced financial and market performance. However, the study highlighted barriers such as supplier resistance, high initial investment costs, and regulatory inconsistencies, which firms needed to overcome to maximize GSCM benefits (Read full paper).

Do, Huang, and Hoang (2025) explored the role of blockchain adoption in enhancing green supply chain practices and firm performance. The study employed a mixed-methods approach, using in-depth interviews with supply chain managers and a survey of 150 firms in the manufacturing sector. The data were analyzed using thematic analysis (for qualitative insights) and regression modeling (for quantitative validation). Results showed that blockchain technology improved traceability, supplier collaboration, and eco-friendly procurement decisions, contributing to higher sustainability performance and cost reductions. The study also identified technological complexity and lack of expertise as key challenges in blockchain adoption for GSCM (Read full paper).

Cannava and Perotti (2025) analyzed the transition from conventional logistics operations to Net-Zero Energy Buildings (nZEBs) within the framework of green supply chains. A simulation-based methodology was employed, using secondary data from logistics firms that had implemented energy-efficient warehousing. The study simulated various energy consumption and carbon footprint reduction scenarios to assess their impact on long-term cost efficiency and firm performance. Findings indicated that green logistics facilities significantly enhanced sustainability metrics while also reducing operational expenses over a 10-year period. However, initial transition costs remained a major barrier, requiring government incentives and financial support (Read full paper).

Ji-Hyland, White, and Khavdarov (2025) investigated the effect of circular economy practices on logistics performance within green supply chain management. The researchers collected primary data from 180 firms using structured questionnaires and analyzed it through multiple regression models. Results indicated that companies integrating circular economy principles into their supply chains saw improved resource efficiency, and enhanced regulatory compliance, ultimately leading to higher financial and environmental performance. The study suggested that investment in recycling infrastructure and supplier training programs played a crucial role in achieving sustainable logistics benefits (Read full paper).

Rahman, Rana, and Zhu (2025) focused on corporate governance and Environmental, Social, and Governance (ESG) disclosures in green supply chain management. Using panel data from 350 publicly listed firms in China, the study employed fixed-effects regression models to analyze the impact of GSCM adoption on corporate performance. Findings revealed that firms

with transparent ESG reporting and strong green procurement policies had significantly higher investor confidence, stock market performance, and regulatory compliance. However, the study cautioned that firms with weak environmental policies faced reputational risks and regulatory penalties.

Energy Efficiency and Firm Performance

Gopalakrishnan, Kumar, and Sharma (2022) examined the impact of energy-efficient business models on corporate performance, focusing on manufacturing firms in Asia. The researchers collected survey data from 300 firms that had implemented energy-saving measures, such as renewable energy adoption, smart manufacturing, and AI-driven energy optimization. A quantitative research design was used, and data were analyzed using structural equation modeling (SEM). The findings indicated that firms investing in energy efficiency experienced lower operational costs, improved brand reputation, and higher regulatory compliance. However, the study also noted barriers to energy efficiency adoption, including high capital investment requirements and resistance from traditional management structures. The authors recommended government subsidies and financial incentives to encourage widespread adoption of energy-efficient practices.

Sharma and Joshi (2021) focused on the role of green innovation in improving energy efficiency and its subsequent effects on firm performance in European manufacturing firms. A longitudinal study was conducted over five years, analyzing financial reports and energy consumption data from 180 firms. The study employed difference-in-differences (DiD) econometric models to compare firms that had adopted smart energy solutions (such as IoT-enabled energy monitoring and solar energy integration) with those that had not. Results showed that companies with proactive energy efficiency strategies experienced higher cost savings, improved shareholder confidence, and better market competitiveness. However, the study highlighted that firms in developing economies struggled to adopt these technologies due to infrastructure challenges and policy inconsistencies.

Ghosh, Sarkar, and Saha (2023) investigated the effects of green energy adoption in supply chain operations on firm performance. A mixed-methods approach was used, combining case studies from 12 multinational corporations (MNCs) and survey data from 250 supply chain managers. Data were analyzed using content analysis (for case studies) and multiple regression analysis (for survey responses). Findings indicated that firms incorporating renewable energy sources, such as wind and solar power, into their supply chains saw reductions in energy costs by 15-20% and an increase in corporate social responsibility (CSR) ratings. However, firms faced challenges related to intermittent energy supply, high installation costs, and regulatory delays. The study recommended investment in energy storage solutions and policy-driven incentives for renewable energy adoption.

Nayak, Mishra, and Sharma (2022) examined the role of Industry 4.0 technologies in enhancing energy efficiency in smart factories. The research used a panel data approach, analyzing energy consumption records and production efficiency metrics from 200 smart factories over six years. The study employed panel regression models to evaluate the relationship between energy efficiency investments and firm profitability. Findings showed that firms integrating automation, IoT sensors, and AI-driven energy management experienced a 25% reduction in energy costs and a 10% increase in operational efficiency. However, the study noted that small and medium-sized enterprises (SMEs) struggled with the financial burden of transitioning to Industry 4.0 technologies and required external funding and skill development programs to facilitate adoption.

Bag, Dhamija, and Gaur (2023) analyzed the impact of carbon footprint reduction strategies on financial performance in global logistics firms. A qualitative research approach was used, with

semi-structured interviews conducted with 50 sustainability officers from top logistics companies. Data were analyzed using thematic coding techniques, identifying key trends in low-carbon transportation adoption, green building designs, and sustainable warehousing. Results indicated that firms implementing energy-efficient logistics solutions reported cost reductions of up to 18% and higher customer preference for eco-friendly services. However, policy inconsistencies, lack of global standardization, and long return-on-investment periods were identified as barriers to achieving widespread low-carbon transition in the industry.

RESEARCH METHODOLOGY

The study adopted a descriptive research design. The target population of this study was 145 respondents. The target population of this study consisted of all the 29 large food and beverage manufacturing firms located in Kiambu County that are registered under the Kenya Association of Manufacturers (KAM). The firms were the study unit of analysis. The unit of observation was the procurement, finance, sales & marketing, Warehouse, and Operations departments managers. The study used census since the target population is less than 200. This sample size is acceptable as noted by Cooper and Schindler (2013) that when the target population does not exceed 200, census is the most suitable.

Questionnaire was used to collect primary data. Data was analyzed using SPSS (Statistical Packages for Social Sciences) version 28. Data was then cleaned and analyzed using descriptive statistics such as frequencies, percentages, and mean while inferential statistics will include regression and correlation will be used. Correlation will be used to establish the relationship between study variables. The significance level used will be 0.05 (5%) to test for significance where any P-value of less than 0.05 will show a significant relationship. Multiple regression will be used to show how changes in the independent variables would cause changes in the dependent variable.

RESEARCH FINDINGS AND DISCUSSION

The study targeted 131 respondents, excluding the pilot study group, from procurement, finance, sales & marketing, warehouse, and operations departments of food and beverage manufacturing firms in Kiambu County, Kenya. Out of the 131 targeted respondents, 118 questionnaires were successfully completed and returned, yielding a response rate of 90.4%. According to Mugenda and Mugenda (2003), a response rate above 70% is considered sufficient for analysis and reporting.

Descriptive Analysis

This section presents the descriptive statistics of the study variables, including Green Supply Chain Management,
Energy Efficiency, and Firm Performance. The data is analysed using means and standard deviations, which summarize respondents' perceptions of various sustainable procurement practices and their impact on firm performance. A higher mean score (closer to 5) indicates stronger agreement with the statement, while the standard deviation reflects the variability of responses.

Green Supply Chain Management

The first objective of the study was to establish effect of green supply chain management on performance of food and beverages manufacturing firms in Kiambu County, Kenya. This subsection examines the extent to which firms adopt green supply chain management (GSCM) practices, including supplier certification, eco-friendly production methods, and logistics optimization. Respondents were therefore asked to indicate their level of agreement with various statements on green supply chain management. Table 1 presents the findings.

Table 1: Descriptive Statistics for Green Supply Chain Management

Statements	Mean	Standard Deviation
The firm procures from ISO-14000 certified suppliers.	3.823	0.897
The firm prioritizes suppliers with environmentally friendly production methods.	4.115	0.804
Green logistics practices are incorporated in procurement processes.	3.912	0.731
The firm assesses suppliers' environmental policies before awarding contracts.	4.028	0.873
The firm collaborates with suppliers to reduce environmental impact.	4.190	0.829
The firm prioritizes suppliers who use eco-friendly packaging.	3.705	0.996
The firm regularly audits supplier compliance with environmental regulations.	4.312	0.721
The firm incorporates green procurement policies into its supply chain strategy.	4.085	0.918
Aggregate Score	**4.021**	**0.856**

The findings indicate that green supply chain management (GSCM) practices are moderately implemented in food and beverage firms in Kiambu County. The firm regularly audits supplier compliance with environmental regulations (mean = 4.312, SD = 0.721) was the most agreed-upon aspect. This suggests that most firms actively monitor their suppliers' environmental policies to ensure compliance with sustainability requirements. The firm collaborates with suppliers to reduce environmental impact (mean = 4.190, SD = 0.829) also scored high, indicating that firms engage with their supply partners to promote sustainability initiatives. The firm prioritizes suppliers with environmentally friendly production methods (mean = 4.115, SD = 0.804) highlights a preference for working with suppliers who adopt green practices. The firm incorporates green procurement policies into its supply chain strategy (mean = 4.085, SD = 0.918), meaning that most firms recognize sustainability as a key part of their procurement framework.

The firm assesses suppliers' environmental policies before awarding contracts (mean = 4.028, SD = 0.873) suggests that firms are integrating sustainability assessments into supplier selection. Green logistics practices are incorporated in procurement processes (mean = 3.912, SD = 0.731) reflects moderate adoption of environmentally friendly logistics solutions. The firm procures from ISO-14000 certified suppliers (mean = 3.823, SD = 0.897) was rated lower, indicating limited preference for suppliers with formal environmental certifications. The firm prioritizes suppliers who use eco-friendly packaging (mean = 3.705, SD = 0.996) was the lowest-rated aspect, showing that sustainable packaging is not a top priority for many firms.

The findings on green supply chain management (GSCM) suggest that food and beverage manufacturing firms in Kiambu County generally prioritize supplier compliance audits and collaboration with suppliers to reduce environmental impact. Many firms recognize the importance of working with suppliers that adopt environmentally friendly production methods and have incorporated green procurement policies into their supply chain strategy. However, there are areas that require further improvement, particularly in ensuring that suppliers are ISO-14000 certified and use eco-friendly packaging. While the overall aggregate score of 4.021 indicates a moderate to strong adoption of GSCM practices, the variability in responses suggests that some firms still struggle with full implementation. These findings align with Meathawiroon and Thunyachairat (2025), who found that firms that implement strong green supply chain management strategies experience improved operational efficiency and cost

savings but face challenges such as supplier resistance and regulatory inconsistencies. Similarly, Do, Huang, and Hoang (2025) emphasize that technological complexity remains a barrier to fully integrating sustainability into supply chains, a challenge that may explain the inconsistent adoption of green procurement policies among firms in Kiambu County.

Energy Efficiency

The second objective was to determine effect of energy efficiency on performance of food and beverages manufacturing firms in Kiambu County, Kenya. Respondents were asked their opinion on firms' commitment to energy-saving technologies, renewable energy adoption, and carbon footprint reduction. Table 2 presents the findings.

Table 2: Descriptive Statistics for Energy Efficiency

Statements	Mean	Standard Deviation
The firm has implemented energy-saving technologies in its operations.	3.623	1.108
The company sources a significant portion of its energy from renewable sources.	3.819	0.904
The firm continuously monitors and reduces its carbon footprint.	4.024	0.796
Energy efficiency policies are embedded in procurement and supply chain management.	3.711	1.026
Employees receive training on energy conservation best practices.	4.108	0.879
The company invests in smart energy management systems.	3.930	0.741
The firm collaborates with stakeholders to improve energy efficiency in the supply chain.	4.207	0.802
The firm has a long-term energy conservation and sustainability plan.	3.805	0.912
Aggregate Score	**3.903**	**0.896**

The findings suggest that firms are making progress in energy efficiency, but structured policies and smart energy investments need improvement. The firm collaborates with stakeholders to improve energy efficiency in the supply chain (mean = 4.207, SD = 0.802) was rated highest, showing efforts to engage partners in sustainability. The firm continuously monitors and reduces its carbon footprint (mean = 4.024, SD = 0.796) suggests progress in tracking environmental impact. Employees receive training on energy conservation best practices (mean = 4.108, SD = 0.879) reflects efforts to build energy efficiency awareness. The company invests in smart energy management systems (mean = 3.930, SD = 0.741) indicates moderate use of energy-efficient technologies.

The company sources a significant portion of its energy from renewable sources (mean = 3.819, SD = 0.904) suggests growing but limited use of green energy. The firm has a long-term energy conservation and sustainability plan (mean = 3.805, SD = 0.912) shows a lack of well-defined energy conservation strategies. Energy efficiency policies are embedded in procurement and supply chain management (mean = 3.711, SD = 1.026) suggests inconsistent policy integration. The firm has implemented energy-saving technologies in its operations (mean = 3.623, SD = 1.108) was the lowest-rated, indicating that energy efficiency investments remain a challenge.

Regarding energy efficiency, firms are making notable progress in monitoring and reducing their carbon footprint and collaborating with stakeholders to improve energy efficiency in the supply chain. There is a clear effort to train employees on energy conservation and integrate renewable energy sources into operations, but some firms struggle with adopting smart energy management systems and implementing structured long-term conservation policies. The aggregate score of 3.903 suggests that firms are moving toward energy efficiency, but the lack

of strong policies and technology investment remains a challenge. These findings are supported by Gopalakrishnan, Kumar, and Sharma (2022), who found that firms investing in energy-efficient business models experience reduced operational costs and improved regulatory compliance. However, as noted by Sharma and Joshi (2021), the high capital investment required for energy efficiency measures remains a significant challenge, which may explain why firms in Kiambu County have not fully embraced smart energy management systems.

Firm Performance

The general objective of the study was to examine effect of sustainable procurement practices and performance of food and beverages manufacturing firms in Kiambu County, Kenya. This subsection measures firm performance and the results are as shown in Table 3.

Table 3: Descriptive Statistics for Firm Performance

Statements	Mean	Standard Deviation
Our customers are treated with courtesy, respect, and service is responsive to their needs.	4.003	0.811
Our customer complaints have reduced significantly.	3.911	1.017
The firm has consistently recorded improved performance.	4.217	0.891
The firm has gained a significant market share.	3.815	0.734
The firm's operational efficiency has improved due to sustainable procurement practices.	4.109	0.915
The firm has successfully reduced costs through energy efficiency measures.	4.012	0.793
Employee engagement and motivation have improved due to the firm's community development efforts.	3.921	1.005
The firm has strengthened its brand reputation as a sustainability-driven organization.	4.314	0.719
Aggregate Score	**4.050**	**0.886**

The findings indicate that sustainability-driven brand reputation is a key strength, with firms agreeing that their reputation has improved due to sustainability efforts (M = 4.314, SD = 0.719). Firms also reported consistent performance improvements (M = 4.217, SD = 0.891), suggesting that sustainable procurement enhances operational efficiency (M = 4.109, SD = 0.915) and leads to cost reductions through energy efficiency (M = 4.012, SD = 0.793). While customer service is perceived positively (M = 4.003, SD = 0.811), the reduction in customer complaints (M = 3.911, SD = 1.017) received more varied responses, indicating differences in how firms manage customer satisfaction through sustainability initiatives. Similarly, employee engagement due to community development efforts (M = 3.921, SD = 1.005) showed variability, suggesting that some firms integrate CSR more effectively than others. The lowest-rated aspect was market share growth (M = 3.815, SD = 0.734), highlighting that while sustainability enhances brand value, firms struggle to translate this into competitive advantage. The aggregate score of 4.050 (SD = 0.886) suggests that sustainable procurement positively impacts firm performance, but stronger marketing strategies may be needed to maximize benefits.

The aggregate score of 4.050 suggests that sustainable procurement practices have a generally positive impact on firm performance, but the variability in some aspects, such as customer complaints and employee motivation, suggests room for further improvement. These findings align with research by Rahman, Rana, and Zhu (2025), who found that firms with strong ESG policies and sustainability-driven brand strategies experienced higher investor confidence and stock performance. However, as noted by Sharma and Joshi (2021), firms that fail to integrate

sustainability into their competitive positioning may struggle to gain market share, which may explain the lower ratings in this aspect.

Having established that respondents considered green supply chain management, and energy efficiency to affect firm performance, the study computed correlation analysis to examine the strength and direction of the relationships between these sustainable procurement practices and firm performance. This analysis helps determine whether these factors significantly influence business success and which aspects require greater emphasis for improved sustainability integration and competitive advantage.

Correlation Analysis

This section presents the correlation analysis between sustainable procurement practices (green supply chain management and energy efficiency) and firm performance. The analysis includes correlation coefficients (r-values) to indicate the strength of relationships and p-values to determine statistical significance.

Table 4: Correlation Analysis with P-values

		Firm Performance	**GSCM**	**Energy Efficiency**
Firm Performance	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	118		
Green Supply Chain Management	Pearson Correlation	.724**	1	
	Sig. (2-tailed)	.000		.
	N	118	118	
Energy Efficiency	Pearson Correlation	.702**	.317	1
	Sig. (2-tailed)	.000	.123	
	N	118	118	118

The correlation between green supply chain management (GSCM) and firm performance is strong ($r = 0.724$, $p = 0.000$), indicating that firms that adopt sustainable procurement policies, eco-friendly logistics, and supplier audits experience improved efficiency and competitiveness. These findings align with Meathawiroon and Thunyachairat (2025), who established that firms implementing GSCM strategies report higher cost savings and operational performance. Additionally, Rahman, Rana, and Zhu (2025) found that firms with strong ESG disclosures and green supply chains attract greater investor confidence. The statistical significance ($p = 0.000$) confirms that GSCM is a critical determinant of firm success in Kiambu County's food and beverage manufacturing sector.

The correlation between energy efficiency and firm performance is strong ($r = 0.702$, $p = 0.000$), indicating that firms adopting renewable energy, carbon footprint reduction, and smart energy solutions experience cost savings and enhanced regulatory compliance. These results support Gopalakrishnan, Kumar, and Sharma (2022), who found that energy-efficient firms achieve higher financial performance and brand reputation. Similarly, Nayak, Mishra, and Sharma (2022) established that Industry 4.0 technologies improve energy management and operational efficiency. The p-value (0.000) confirms the statistical significance of energy efficiency as a performance driver, suggesting that Kiambu County firms should prioritize smart energy investments to enhance long-term sustainability.

Regression Analysis

Regression Coefficients of the Study Variables

The regression coefficients show the direction and magnitude of influence each independent variable has on firm performance.

Table 5: Regression Coefficients

Variable	Unstandardized Coefficients (B)	Std. Error	Standardized Beta	t-Statistic	Sig. (p-value)
Constant	-0.658	0.275		-2.393	0.019
Green Supply Chain Management	0.406	0.068	0.412	5.974	0.000
Energy Efficiency	0.371	0.066	0.389	5.621	0.000

The fitted regression equation is:

Firm Performance = −0.658 + 0.406 Green Supply Chain Management + 0.371 Energy Efficiency

The coefficient ($\beta = 0.406$, $p = 0.000$) indicates that green supply chain management has the strongest positive impact on firm performance. A unit increase in GSCM leads to a 0.406 increase in firm performance. These results support Meathawiroon and Thunyachairat (2025), who found that firms with strong GSCM strategies experience higher operational efficiency, cost savings, and regulatory compliance. The findings suggests that firms in Kiambu County should prioritize supplier audits, green logistics, and eco-friendly procurement strategies to enhance operational efficiency and profitability.

The coefficient ($\beta = 0.371$, $p = 0.000$) suggests that energy efficiency has a strong and significant impact on firm performance. A unit increase in energy efficiency leads to a 0.371 increase in firm performance. This supports Gopalakrishnan, Kumar, and Sharma (2022), who found that energy-efficient firms experience lower operational costs and improved regulatory compliance. The finding suggests that firms should adopt smart energy solutions and renewable energy sources to enhance cost savings and sustainability.

Conclusions

Green Supply Chain Management

The study concludes that green supply chain management significantly enhances firm performance, with supplier audits, environmentally friendly production, and collaboration with suppliers playing key roles. Firms that actively integrate green logistics, eco-friendly procurement, and sustainability-focused supplier selection benefit from greater operational efficiency and cost savings. However, the findings highlight that some firms face challenges in enforcing supplier compliance with ISO-14000 certifications and fully adopting green packaging solutions. Addressing these gaps through technological integration and stronger supplier engagement will be crucial for maximizing sustainability benefits.

Energy Efficiency

The study concludes that energy efficiency plays a crucial role in enhancing firm performance, with firms that implement carbon footprint monitoring, renewable energy adoption, and employee energy conservation training reporting higher cost efficiency and regulatory compliance. However, investment in smart energy management systems remains low, limiting long-term sustainability efforts. To maximize energy efficiency gains, firms should develop

structured conservation policies, leverage financing opportunities, and adopt advanced energy-efficient technologies to reduce costs and improve environmental sustainability.

Recommendations

Green Supply Chain Management

To strengthen the impact of green supply chain management on firm performance, food and beverage manufacturing firms in Kiambu County should enforce stricter supplier sustainability compliance by requiring ISO-14000 certification and conducting regular environmental audits. This will ensure that all suppliers align with sustainability goals, reducing environmental risks and enhancing overall operational efficiency. Additionally, firms should incorporate advanced tracking technologies, such as blockchain, to improve supply chain transparency, allowing for real-time monitoring of supplier compliance with green procurement policies. Expanding green logistics solutions, including the adoption of eco-friendly transportation, biodegradable packaging, and carbon offset programs, will further help in reducing the environmental footprint of procurement processes. Moreover, firms should increase collaboration with suppliers on sustainability initiatives, such as joint investments in waste reduction technologies and shared eco-friendly warehousing solutions, to create an environmentally responsible supply chain.

Energy Efficiency

To maximize the benefits of energy efficiency on firm performance, firms should invest in smart energy management systems to optimize energy consumption, monitor usage patterns, and implement real-time adjustments that reduce operational costs. Expanding the use of renewable energy sources, such as solar and biogas energy, will minimize dependence on non-renewable power, leading to lower electricity costs and enhanced sustainability. Firms should also incorporate energy efficiency training programs for employees, promoting best practices in energy conservation and encouraging workplace initiatives that reduce energy waste. Lastly, businesses should adopt government and industry incentives that support energy-efficient technologies, including grants, tax reductions, and subsidies, to ease the financial burden of implementing large-scale energy conservation projects. These strategies will not only improve firm performance but also contribute to long-term environmental sustainability.

Areas for Further Studies

Future research should explore the comparative impact of sustainable procurement practices across different industries to determine whether the findings from the food and beverage sector apply to other manufacturing sectors. Additionally, longitudinal studies should be conducted to assess the long-term effects of sustainable procurement on firm performance, providing deeper insights into sustainability trends over time. Further studies can also investigate barriers to sustainability adoption in small and medium-sized enterprises (SMEs), focusing on financial, technological, and regulatory challenges.

REFERENCES

Abdirizak, M., & Nyang'au, P. (2021). Sustainable procurement practices and performance of cement manufacturing industry in Machakos County, Kenya. *International Journal of Recent Research in Commerce Economics and Management, 8*(3), 67–73.

Abdoli, S. (2020). RFID application in manic solid waste management system. *International Journal of Environmental Research, 22*(2), 154–165.

Ayimba, K., & Awuor, E. (2020). Green procurement management practices and sustainability of supply chain process in international non-governmental organizations: A case study Medicins Du Monde Iraq Program. *African Journal of Emerging Issues, 2*(11), 54–69.

Bansal, P., & Roth, K. (2000). Why companies go green: A model of ecological responsiveness. *Academy of Management Journal, 43*(4), 717–736. https://doi.org/10.2307/1556363

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99–120. https://doi.org/10.1177/014920639101700108

Barney, J. (2001). Is the resource-based "view" a useful perspective for strategic management research? Yes. *Academy of Management Review, 26*(1), 41–56. https://doi.org/10.5465/AMR.2001.4011938

Battilana, J., Leca, B., & Boxenbaum, E. (2009). How actors change institutions: Towards a theory of institutional entrepreneurship. *Academy of Management Annals, 3*(1), 65–107. https://doi.org/10.5465/19416520903053598

Chkanikova, O., & Sroufe, R. (2021). Third-party sustainability certifications in food retailing: Certification design from a sustainable supply chain management perspective. *Journal of Cleaner Production, 282*, 124344.

Dulo, A. (2021). *Emergency supply chain preparedness and performance of large food and beverage manufacturing firms in Nairobi Kenya amid COVID-19*. Unpublished thesis, University of Nairobi.

Dwivedi, A., Sharma, P., & Pandey, A. (2022). Circular economy adoption in manufacturing industries: A case study. *Sustainable Production and Consumption, 30*, 154–165. https://doi.org/10.1016/j.spc.2022.01.012

Fiati, M. (2020). *Effect of sustainable procurement practice on the operational performance of manufacturing firms in Ghana*. Unpublished thesis, University of Cape Coast.

Ghosh, A., Sarkar, B., & Saha, S. (2023). Green energy adoption in supply chain operations. *Energy Economics, 121*, 106567. https://doi.org/10.1016/j.eneco.2023.106567

Gopalakrishnan, K., Kumar, R., & Sharma, R. (2022). The impact of energy-efficient business models on corporate performance. *Journal of Business Research, 140*, 15–27. https://doi.org/10.1016/j.jbusres.2022.06.005

Govindan, K., Khodaverdi, R., & Jafarian, A. (2021). Green supply chain management and environmental performance. *Journal of Environmental Management, 286*, 112234. https://doi.org/10.1016/j.jenvman.2021.112234

Hart, S. L., & Milstein, M. B. (2003). Creating sustainable value. *Academy of Management Perspectives, 17*(2), 56–67. https://doi.org/10.5465/ame.2003.10025194

Hoffman, A. J. (1999). Institutional evolution and change: Environmentalism and the U.S. chemical industry. *Academy of Management Journal, 42*(4), 351–371. https://doi.org/10.2307/257008

Ji-Hyland, H., White, G., & Khavdarov, B. (2025). Circular economy and logistics performance in green supply chains. *Journal of Supply Chain Management Research, 38*(2), 155–174.

Kenton, W. (2021). Supply chain. Retrieved from https://www.investopedia.com/terms/s/supplychain.asp

Kumar, S., Gupta, H., & Dash, M. K. (2021). The influence of green supply chain practices on firm performance. *International Journal of Production Economics, 234*, 107843. https://doi.org/10.1016/j.ijpe.2021.107843

Mangla, S. K., Luthra, S., & Kumar, A. (2022). Sustainable procurement strategies in the context of green supply chains. *Sustainable Development, 30*(4), 834–851. https://doi.org/10.1002/sd.2335

Meathawiroon, P., & Thunyachairat, P. (2025). Green supply chain management and supply chain disruption: Impact on firm performance. *Asian Journal of Sustainability, 8*(1), 1–20.

Meyer, J. W., & Rowan, B. (1977). Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology, 83*(2), 340–363. https://doi.org/10.1086/226550

Muema, D. (2021). *Sustainable procurement practices and organizational performance of the county governments in Kenya*. Unpublished master's thesis, University of Nairobi.

Mutiso, S., & Gatari, C. (2023). Influence of inventory returns management on performance of food and beverage manufacturing firms in Kenya. *Britain International of Humanities and Social Sciences Journal, 5*(1), 12–22.

Nayak, S., Mishra, P., & Sharma, M. (2022). Industry 4.0 adoption and energy efficiency in manufacturing. *Renewable and Sustainable Energy Reviews, 158*, 112023. https://doi.org/10.1016/j.rser.2022.112023

Nyaga, I. W., & Achuora, J. O. (2020). Influence of sustainable procurement practices on performance of procurement in food and beverages manufacturing firms in Nairobi County, Kenya. *The Strategic Journal of Business & Change Management, 7*(1), 927–941.

Oliver, C. (1991). Strategic responses to institutional processes. *Academy of Management Review, 16*(1), 145–179. https://doi.org/10.5465/amr.1991.4279002

Rahman, A., Rana, M. R., & Zhu, J. (2025). ESG disclosures, corporate governance, and green supply chains: Impacts on firm performance. *Sustainable Business Review, 10*(2), 233–251.

Sharma, S., & Joshi, M. (2021). Energy efficiency adoption in manufacturing firms: The role of green innovation. *Technovation, 104*, 102186. https://doi.org/10.1016/j.technovation.2021.102186.