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ORIGINAL CONTRIBUTION

Antecedents of Urban Sustainability and Firm Performance: Moderating Role of Conservation Innovation

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Abstract— This study examines into how conservation innovation affects the relationship between firm performance and urban sustainability in Sri Lankan SMEs. Given the growing emphasis on environmental sustainability around the world, this study aims to comprehend how sustainability affects the performance of enterprises focusing to gain a competitive advantage. A structured questionnaire was circulated to mid-level and senior managers of 16 small and medium-sized enterprises in Sri Lanka, and 315 responses were obtained for analysis as part of the quantitative study design. The study examined the suggested hypotheses based on resource-based theory using SmartPLS 3.0 for data analysis. The results show a strong positive relationship between firm performance and urban sustainability, underscoring the need of incorporating urban sustainability. However, the relationship between urban sustainability and performance outcomes is greatly moderated by conservation innovation, even if it has a direct impact on firm performance. These results imply that, even in the absence of a moderating influence from conservation innovation, SMEs in Sri Lanka can enhance performance by embracing urban sustainability. In order to serve the larger objective of urban sustainability in Sri Lanka, the study ends by providing practical suggestions for business professionals and politicians to promote firm urban sustainability.

Index Terms— Brand trust, Eco-labeling claims, Competitive advantage, Urban sustainability, Conservation innovation, Firm performance

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Introduction

In recent years, worldwide markets and the need to address environmental issues have made sustainability a crucial concern for organisations (Mathushan & Shantha, 2024). Businesses are becoming more aware of how important it is to include urban sustainability into their offerings in order to improve their overall performance and competitiveness in the market, as well as to lessen adverse environmental effects. A wide range of environmental, social, and economic elements that support eco-labelling and brand trust are included in the idea of sustainability (Chopra, Singh, Debnath, & Quttainah, 2024). Businesses face new problems every day in the quickly changing world of today, where trends, technologies, and societies are changing at a rapid pace.

Businesses who can quickly adopt changes are the ones that flourish in this environment. However, flexibility has become the new competitive advantage according to Shafiq, Ziaullah, Siddique, Bilal, and Ramzan (2023). Another component of being adopt the change

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is known as customer needs. Understandings that requirements of future generations is extremely critical, especially in the light of their importance. Many business understand that climate change is an important part for greenhouse gasses and implement sustainable practices (Al Naqbia, Alshuridehb, AlHamadc, & Al, 2020; Miller, Schuurman, Symstad, Runyon, & Robb, 2022). Furthermore, competitive advantage may threatened and challenges of achievement the environmental targets about their advantages.

Additionally, Guo, Cheng, and Liu (2020) investigating the difficulties about business encounter when trying to reconcile urban sustainability, eco-labeling claims, while these expenditures can provide competitive advantages, the initial cost could be deliberated. The evolution demonstrates the growing recognition how business overall goal and operational processes need to align with sustainable plans (Sigurdsson et al., 2022). As, environmental issues has increasingly aware the world become as a result of growing environmental pollution. Managers has changed as a result of the environmental conservation movement. Because they wish to be ecologically conscious and benefit from eco-friendly products, consumers are more interested in leading eco-friendly lives (Jóźwik-Pruska, Bobowicz, Hernández, & Szalczyńska, 2022; Kumar, Polonsky, Dwivedi, & Kar, 2021). With an estimated $1 trillion in value, the global textile industry supports over 35 million workers globally and accounts for 7% of all exports (Gorton, Tocco, Yeh, & Hartmann, 2021). By lessening the information imbalance between vendors and customers on a product or service's environmental features, eco-labelling aims to solve this issue and make it simpler for consumers to consider environmental issues when making purchases (Chi, 2021).

In the meantime, consumers' decisions about SMEs are heavily influenced by trust (Alessia, 2023). Both developed and emerging nations experience a decline in customer trust in SMEs. For example, the United States recorded a decline in consumer trust in SMEs from 54% in 2020 to 45% in 2024. Trust between the two parties is essential to a successful partnership. Regarding how trust affects business dealings, the trust construct was a crucial element in forecasting the expectations and perceptions of customers (Huo, Hameed, Zhang, Bin Mohd Ali, & Nik Hashim, 2022). Brand trust is the willingness of consumers to believe that a brand will fulfil its promises. Trust arises whenever one party has confidence in the caliber and dependability of an exchange relationship (Akoglu & Özbek, 2021). In this context, the idea of brand trust which Pandiangan, Masiyono, and Dwi Atmogo (2021) define as "the willingness to rely on a product, service, or brand based on perceptions of its credibility, benevolence, and competence in firm performance" is essential. According to Gorton et al. (2021), brand trust has grown to be a crucial component of improved business performance and sustainability activities. Competitive advantage enables firms to flexibly modify organizational structures and processes in response to changing conditions (Bernarto et al., 2020; Puspaningrum, 2020). Information exchange and collaboration across departments and stakeholders are necessary to promote innovation and brake down soil.

According to Vujanović, Besagni, Duić, and Markides (2023), innovation is the foundation of economic development in modern economy and has a major impact on economic growth. Innovation has become an essential component of business strategies that help to achieve a competitive advantage by increasing market share, entering new markets and aiming for positive customer reputation (Adom, Donkor, & Asante, 2023; Al Naqbia et al., 2020; Distanont, 2020; Farida & Setiawan, 2022). However, the company's strategic focus to overcome challenges and attain a long competitive advantage is fueled by innovation (Aidara et al., 2021; Knudsen, Lien, Timmermans, Belik, & Pandey, 2021; Prasanna et al., 2021). Currently, a large number of enterprises are funding research and innovation (Al Naqbia et al., 2020; Bernarto et al., 2020; Distanont, 2020; Iacona et al., 2019). Green, eco-friendly, and sustainable products have become increasingly popular as a result of consumer desire for environmental responsibility.

Despite extensive labelling efforts, consumers usually feel perplexed about the actual environmental qualities of these products (Devireddy, 2024). The impacts of eco-label claims, especially in the manufacturing sector, have received less attention than consumer attitudes and incentives towards eco-friendly products. Customers' desire for dependability and openness drives the investigation of claims that vary in quality, specificity, and familiarity. One crucial tool in green marketing communication is eco-labeling, which draws attention to product attributes for consumers Guo et al. (2020). In an attempt to provide helpful information, these statements draw attention to the presence or absence of specific attributes or substances. The reliability of eco-label statements varies, though; particular assertions are believed to be more objective and instructional, whereas generic claims may be perceived as subjective and possibly undermine trust (Kumar et al., 2021). Eco-labels significantly affect consumer views and directly affect a company's performance in the marketplace. Several factors influence a company's success and evolve over time, including competitive advantages, eco-labeling claims, brand trust, sustainable strategies, and conservation innovation (Distanont, 2020; Mushi, 2025; Vujanović et al., 2023).

The aim of this study is to investigate the influences of urban sustainability, eco-labeling and competitive advantage on firm performance, these links associated with research framework and hypothesis which are developed in next section. Section 2 of this study starts with a thorough analysis of literature of variables, and Section 3 describes the methodology of the study, including information on the sample, data sources, and measurement scales. The analysis of variables with descriptive statistics, measurement and structural tables are examined in section 4. Section 5 comes to a close with a discussion of the comparison of past studies, practical implications, limitations of study, and recommendations for further research. This study improves our knowledge of how conservation innovation affect firm performance in the particular economic setting of Sri Lankan SMEs.

Literature Review

Firm performance

Prior research published in the literature was primarily from affluent nations such as the United States, Sri Lanka, and Australia (N. Deyshappriya & Nawarathna, 2020; R. Deyshappriya & Banagala, 2021; Prasanna et al., 2021). It is clear that in recent decades, there has been a movement towards emerging markets, such those in south Asia. Likewise, the majority of the published literature has focused on one or a small number of firm performance factors. Although the extent of the scale is limited, study has also been done on the general performance of the company. This study goes one step further by thoroughly examining the many functional dimensions as well as the impact of brand trust on the overall success of the company in all respects. Assessing firm performance is a contentious topic, according to Sriyani (2022). Conventional economic theories have long regarded market power and industry structure as the two primary factors that significantly influence firm performance (Mathushan & Shantha, 2024). Firm performance describes as "the ability to measure organisational effectiveness, productivity, profitability, quality, continuous improvement, work quality, and social responsibility as leading indicators for performance" (Mushi, 2025). According to Chopra et al. (2024), firm performance and urban sustainability are strongly impacted by competitive advantage, eco-labelling, and brand trust. These results highlight how crucial it is to develop strong brand trust through sustainable practices, as this can improve firm performance. According to Aidara et al. (2021), a competitive edge improves a company's performance, even while independent directors' and commissaries' individual contributions are negligible. This observation pertains to RBT, which emphasises how crucial governance frameworks are in bringing management's and shareholders' interests into line and consequently determining performance results. By demonstrating that investments in eco-packaging result in observable advantages, Al Naqbia et al. (2020) and N. Deyshappriya and Nawarathna (2020) argument that green packaging is a vital resource. This enhances the nation that sustainability-resources can focused on companies competitive advantage and demand eco-friendly products. Tuan, Nhan, Giang, and Ngoc (2016), states that innovation mediates the relationship among eco-friendly product and digital financial innovation through firm performance. This suggested that how innovation is becoming more and more crucial for improving market performance and operational efficiency, both are important for long-term competitive advantage in modern world (R. Deyshappriya & Banagala, 2021). The idea of urban sustainability who put probably going to do better for social and economic organization. Green marketing dramatically improves the environmental consciousness and performance, according to Farida and Setiawan (2022). There is still a gap in literature or past studies how firm performance and urban sustainability links together (Aidara et al., 2021; R. Deyshappriya & Banagala, 2021; Varadarajan, 2020; Zhou & Li, 2020).

Brand trust and urban sustainability

Brand trust has a significant impact on consumer behaviour, particularly in relation to sustainability initiatives. Alessia (2023) has demonstrated that green marketing, service quality, and brand reputation significantly improve brand trust and purchase decisions. The brand quality theory, which maintains that a high reputation for a brand boosts customer loyalty and trust, which in turn drives consumer behaviour, can be used to explain this relationship. Green marketing has a significant impact on green outcomes including green advertising, brand loyalty, brand equity and brand innovativeness (Pandiangan et al., 2021). Planned behaviour theory, which holds that customer intentions to make more purchases are impacted by their brand attitude, and beliefs to behavioural control over sustainable practices. According to Gorton et al. (2021), green labeling has a negative effect on customer intentions to buy and their green business, especially among who are more environmentally conscious. The RBT, which holds that consumers use signals (such brand statements) to assess a brand credibility. Akoglu and Özbek (2021), the relationship between eco-trust and marketing mix. This implies that advertising efforts that highlight eco-friendly attributes must also be seen as authentic in order to successfully win over customer trust. Puspaningrum (2020), emphasised that green satisfaction promotes green trust, green brand image and green brand equity in the context of organic products in Zimbabwe, suggesting that green brand image has a beneficial impact on green trust. Resource-based theory, which holds that a positive brand image can increase consumer trust and loyalty. According to Bernarto et al. (2020) and Shafiq et al. (2023), perceived greenwashing has detrimental effect on brand trust through sustainability, both directly and indirectly.

According to Shafiq et al. (2023), consumer environmental values and brand loyalty, are significantly relationship, with green image brand image acting as mediating factor. This emphasises how critical it is to align values with brand messaging in order to build trust and loyalty. Consumer intention to purchase are influenced by their faith in green brands, which is enhanced by urban sustainability, integrity, non-deception and green reputation, according to Huo et al. (2022). This supports the idea that building trust requires candid communication about environmental initiatives. Gorton et al. (2021) found that excessive product packaging is a predictor of greenwashing and green confusion and greenwashing has detrimental effect on customer trust in green brands. However, the inverse relationship is moderated by brand credibility, including that a strong brand might lessen the harm that greenwashing effect brand equity. According to Puspaningrum (2020), a brand image is crucial for fostering customer loyalty since it directly effects green brand attitude, love and trust. Alessia (2023) states that brand image, which fluctuates depending on compulsion and unpredictability, mediates the relationship brand

trust and urban sustainability. Overall, these research demonstrate the strong relationship between green brand equity, green marketing and brand trust (Bernarto et al., 2020; Puspaningrum, 2020). If excessive product packaging is not accomplished by strong brand credibility, it might result in greenwashing and misunderstandings, which will weaken green brand equity. Having a favourable green brand image and trust is essential for promoting brand love, word-of-mouth, and green purchasing intention (Akoglu & Özbek, 2021; Gorton et al., 2021; Pandiangan et al., 2021). These results allow for the formulation of the following hypothesis:

H1: There is significant relationship between brand trust and urban sustainability.

Eco-labeling claims and urban sustainability

Eco-labeling claims are essential to sustainability efforts since they serve as important cues to buyers eco-friendly goods. Three aspects of customer views of eco-friendly packaging were highlighted by Guo et al. (2020): market appeal, production technology, and packaging materials. Consumers tend to associate eco-friendly packaging with attributes like recyclable and biodegradable materials, as well as consumer-friendly components like eye-catching designs and reasonable costs. According to this hypothesis, eco-labels influence consumers' perceptions and purchasing decisions by serving as indicators of a product's environmental quality. Song, Qin, and Qin (2020) assert that green marketing and sustainable advertising significantly and favourably influence consumers' intentions and behaviours when they make eco-friendly purchases. Nonetheless, they pointed out that eco-labeling and eco-packaging only have a favourable effect on consumer's intents to make green purchases. According to Chi (2021), eco-labeling mediates the success of new items in manufacturing firms rather directly affecting urban sustainability. Gorton et al. (2021), is a critical resource that in order for business to maintain competitive advantage in quickly evolving situation, innovation is a vital resource that they must constantly create and adjust to. By highlighting the environmental advantages of new products, eco-labeling can assist direct the market and raise the perceived value of those products in this context. According to Kumar et al. (2021), customer understating moderates the relationship between green brand trust and influences on urban sustainability through firm performance. According to Jóźwik-Pruska et al. (2022), discovered that trustworthy eco-labels improves customers association to green information, suggesting that consumers are more inclining to believed and act upon information by eco-labels.

This emphasis how crucial it is to follow strict guidelines for accuracy and openness in eco-labeling to draw in customers. All of these studies emphases the importance of green marketing and advertising in promoting green purchasing intents and behaviours, even though customers perceptions of eco-friendly packaging are mostly restricted to materials and market appeal (Jóźwik-Pruska et al., 2022; Kumar et al., 2021; Sigurdsson et al., 2022). There are several important gaps in literature on eco-labeling and urban sustainability (Chi, 2021; Gorton et al., 2021). According to Jiang et al. (2021), the main factors influencing customers opinions on eco-friendly packaging are primarily limited to material quality. To figure out how customer education and awareness initiatives that could improve knowledge of eco-labeling and their sustainability advantage. Although Haldorai and Ramu (2021), discovered that eco-packaging had a favourable effect on purchase intention, more study is required to determine the precise circumstances in which eco-labeling influences customer purchasing decisions. Studies should examine the effect of various eco-label formats and their exposers on urban sustainability by (Rodrigues & Franco, 2020). The following hypothesis can be developed in light of these findings:

H2: There is significant relationship between eco-labeling claims and urban sustainability.

Competitive advantage and urban sustainability

Businesses are realizing more and more that incorporating sustainability efforts into their operations can provide them a competitive advantage. Sigurdsson et al. (2022), claims that by including environmental issues into their marketing approach, green marketing gives business a competitive advantage. This strategy encourages more ecologically friendly production methods, differentiation and operational efficiency. Adopting sustainable urban practices draws in eco-aware customers which eventually boost revenue. Green marketing not only improves a company reputation but also positions the brand as socially and environmentally conscious to adopt sustainable behaviours. Competitive intelligence is a strategic marketing tool that helps businesses stands out from the competition and take the lead in sustainability by Farida and Setiawan (2022). This highlights the significance of resource-based view, which holds that one can gain a competitive advantage by utilizing special resources and skills, such as effective green marketing techniques. Prasanna et al. (2021), highlighted the importance of integrating commercial operations with strategic environmental efforts by pointing out that companies with a strong organizational environmental marketing focus saw growth in their market share. Because it guarantees that urban sustainability is integrated throughout the entire organization, internal alignment is essential for businesses looking to expand their market share through successful marketing initiatives. Although green innovation has little direct effect on purchasing intentions, Knudsen et al. (2021) discovered that green competitive advantage significantly influenced them. Eco-friendly practices, particularly in the context of green tourism, may have negative environmental effects for SMEs (Aidara et al., 2021). Businesses must integrate sustainability measures with possible environmental impacts if they hope to maintain competitive advantage. Rodrigues and Franco (2020), examined that literature on green

innovation strategies, concentrating on the way in which internal and external factors impact on sustainable competitive advantage. The study investigated that organisational green learning and green technology turbulence play a significant part in green innovation to improve competitive advantage. This highlights the significance of dynamic capabilities, which focuses on how businesses may innovative and develop the ability to adjust to changing environments. According to all of these studies shows urban sustainability enhances company performance and operational efficiency while also improving market positioning and competitiveness (Distanont, 2020; Hagiu & Wright, 2020; Hussain, Mu, Mohiuddin, Danish, & Sair, 2020). The following hypothesis can be developed in light of these findings:

H3: There is significant relationship between competitive advantage and urban sustainability.

Urban sustainability and firm performance

Urban sustainability capacity to combine economic, social and environmental factors to improve business performance is increasingly acknowledged. Real marketing techniques highlight the significance of their relationship. Sharifi (2021), highlights the attention between actual and project based adoption of green marketing with water contamination and waste management. This discrepancy emphasises how challenging it is for companies to implement sustainable policies and how important it is to align marketing strategies with sustainability goals. According to Knudsen et al. (2021), green marketing strategies positively influence purchase decisions, bolstering the notion that effective communication of sustainability activities can enhance economic success. Jiang et al. (2021) investigated that women are inclined to purchase sustainable items regardless of their level of education, and young people are very interested in environmental protection.

Haldorai and Ramu (2021) states that how crucial government regulations are in influencing corporate sustainability initiatives. Cugurullo, Acheampong, Gueriau, and Dusparic (2021), investigated that green marketing components such as green production, supply chains, design, and goods significantly support sustainable development. According to Arku and Marais (2021), green marketplace strategies should focus on reverse logistics or circular economy ideas in order to reduce environmental harm during commercialization and safeguard finite resources. Rodrigues and Franco (2020) investigated significant discrepancies between industrial enterprises' actual and expected adoption of green marketing, particularly in the areas of waste management and water pollution prevention. Merino-Saum, Halla, Superti, Boesch, and Binder (2020) states that despite rapid socioeconomic development and technological advancements, social-level performance has minimal impact on green marketing strategies in the ready-made apparel industry. This demonstrates how important it is to close the gap between the anticipated and actual adoption of green practices, especially in economic sectors that significantly impact the environment. These studies jointly demonstrate how green marketing and laws help urban sustainability, while also emphasising the need for businesses to adopt holistic strategies that incorporate recycling, fair pricing, and effective social media use while addressing the gaps in SMEs (N. Deyshappriya & Nawarathna, 2020; R. Deyshappriya & Banagala, 2021; Prasanna et al., 2021). The following hypothesis can be developed in light of these findings:

H4: There is significant relationship between urban sustainability and firm performance.

Mediating role of urban sustainability

Although Mathushan and Shantha (2024), identify a number of characteristics that influence brand trust, it has not been sufficiently investigated how urban sustainability specifically shape these associations. Furthermore, more research is necessary to determine how SMEs affects the trustworthiness of brands. Even while research like Shafiq et al. (2023) have addressed the detrimental effects of greenwashing, little is known about how various forms of SMEs such as false statements versus honest errors affect customer trust in different ways. This distinction is essential for brands trying to deal with the difficulties brought on by growing consumer mistrust. Urban sustainability initiatives require an understanding of how cultural and contextual factors impact how eco-labels are perceived and how effective they are in various markets. The literature hasn't done enough to explore how consumers' belief in eco-labels is affected by perceived greenwashing (Adom et al., 2023; Sharifi, 2021). Future studies ought to examine at how consumers, especially in SMEs, distinguish between sincere eco-labeling claims and urban sustainability. Businesses aiming to preserve their trust must be aware of the repercussions of making false environmental claims. Although Sigurdsson et al. (2022) sustainability the importance of competitive intelligence, little is known about how outside variables like shifting laws, shifting consumer demands, and advances in technology impact firms sustainability plans and the resulting competitive advantages. The majority of study has been done on individual industries, with little attention paid to how competitive advantages and sustainability strategies appear in different settings, especially in emerging economies. More extensive research may yield information applicable to a wider range of sectors and regions. The concept of urban sustainability in nations is somewhat contentious, multidimensional, intricate, and scattered due to the several notions involved (Jiang et al., 2021; Knudsen et al., 2021; Sharifi, 2021). As a result, when considered holistically, urban sustainability encompasses the physical, socioeconomic, and cultural aspects (Arku & Marais, 2021; Cugurullo et al., 2021; Haldorai & Ramu, 2021), enabling cities to be creative, demonstrating a balance between conserving the environment and cooperation, between business growth and urban regeneration, and between brand

trust and eco-labelling (Aidara et al., 2021). As a result, cities are sustainable (Hussain et al., 2020; Rodrigues & Franco, 2020). These results allow for the development of the following hypothesis:

H5: There is significant mediating relationship of urban sustainability between (a) brand trust, (b) eco-labeling claims and (c) competitive advantage with urban sustainability.

Moderating role of conservation innovation

Innovation has emerged as a crucial component of business evolution and is seen as a major concern for long-term advancement and firm prosperity. According to Mushi (2025), innovation is a valuable and efficient tool that any company may use to achieve sustainable development, preserve its competitive edge, and gain access to new markets. Previous studies have clearly demonstrated a connection between the adoption of innovation methods and company performance (Mathushan & Shantha, 2024). Additionally, there is a wealth of studies on how innovation affects business growth and performance (Adom et al., 2023; Vujanović et al., 2023). Miller et al. (2022) asserted that firm performance is a multifaceted notion that has implications for growth and profit. Additionally, considering various facets of firm innovativeness, including processes, products, marketing, and organisational structure, innovative performance is the total amount of organisational accomplishments brought about by the enhancement efforts put in place (Farida & Setiawan, 2022). As a result, innovative performance is a complex construct that is based on several performance metrics pertaining to new patents, product announcements, initiatives, procedures, and organisational arrangements (Distanont, 2020; Hussain et al., 2020). SMEs are the driving force behind technical advancement and invention (Al Naqbia et al., 2020; Bernarto et al., 2020). Since the majority of research demonstrate a positive relationship between innovation and firm performance, there is a wealth of empirical evidence about the impact of innovation on firm performance (Iacona et al., 2019; Vujanović et al., 2023). Therefore, the government should promote SMEs to engage in innovation activities in order to achieve higher outcomes in both manufacturing and change, since numerous studies demonstrate the beneficial association between conservation innovation and firm performance (Farida & Setiawan, 2022). Here, eco-labels can be quite helpful. These labels serve as frameworks that validate and communicate certain conservation innovations, so guiding purchase decisions globally. These labels serve as a tool for governments to promote behavioural changes among producers in addition to assisting consumers who want to shop responsibly. Although they are not commonly used in Sri Lanka, eco-labels have never gained much popularity despite their promise given the current climate. According to Jóźwik-Pruska et al. (2022), eco-innovation is particularly important for Small and Medium-Sized Enterprises (SMEs). According to Farida and Setiawan (2022), environmental cooperation greatly enhances Sri Lanka's social and environmental results. This supports the RBT, which holds that partnerships can improve company performance and urban sustainability, by highlighting the significance of teamwork in implementing urban sustainability in small-medium enterprises (Prasanna et al., 2021; Sharifi, 2021). These results allow for the development of the following hypothesis:

H6: There is significant moderating relationship of conservation innovation on urban sustainability and firm performance.

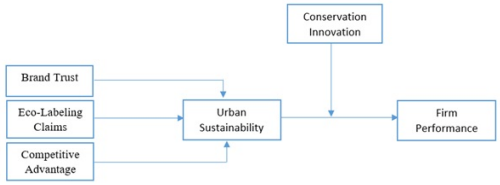

Fig. 1 *Conceptual framework*

In figure 1, brand trust, eco-labeling claims and competitive advantage include as independent variables according to framework, and directly influences on urban sustainability. This means factors like trust on brand, labeling which cannot effect on environment and competitive advantage which shapes the firm performance. Furthermore, conservation innovation moderates the effect on urban sustainability and firm performance. For example, if a company has strong conservation innovation it can enhance firm performance. Similarly, if a company have weak conservation innovation is cannot enhance firm performance.

Research Methodology

Research design

A quantitative examination examining the variables affecting company success is presented in this article. The study chose to collect data using a questionnaire-based approach because it was able to make a thorough analysis of the intricate nature of firm performance. The study's main goal was to evaluate the resource-based hypothesis, which holds that a firm performance is dependent on its uncommon,

valuable, unique, and non-replaceable resources. Therefore, rather than putting forth new theoretical frameworks, the paper uses a logical technique to validate those that already exist. In order to collect empirical data, the study distributed questionnaires to a subset of the public and private industrial businesses using SmartPLS 3.0 software for quantitative analysis. The paper emphasises the fundamental theory's widespread use and relevance in a range of manufacturing sectors. For example, a study by Prasanna et al. (2021) showed a notable rise in the application of marketing research, highlighting its function in areas including firm performance, competitive advantage, eco-labelling, brand trust, conservation innovation, and urban sustainability. According to Mushi (2025), this theoretical framework facilitates research at both the organisational and individual levels of analysis.

Sample selection

Based on strong evidence from earlier research investigating the connection between urban sustainability and firm performance using perspectives from mid-level and senior managers, sample businesses were chosen from Sri Lanka. The selected samples had to fulfil certain requirements, such as being reputable, publicly traded businesses with at than ten years of experience. They had to be from the manufacturing industry and come in a range of forms to allow for in-depth study and improve the research's generalizability. Accessibility and availability of information and resources were crucial, with a preference for publicly traded businesses that generate a lot of public interest. To ensure the diversity and credibility of the data, information about these businesses was collected data from Sri Lankan enterprises. Sixteen different businesses were thus chosen in order to guarantee heterogeneity and optimize variance in the sample.

Data sources

This article collects information from multiple sources using a combination of primary and secondary data. Prior to the start of data collection, this project received ethical approval from the University's Directorate of Research and Postgraduate Studies (DRPS) via its research and ethics committee. At the start of the poll, respondents also provided written agreement to take part in it. The study guaranteed the participants' privacy and confidentiality and properly credited all data sources. Senior and mid-level managers were given questionnaires to complete in order to gather primary data. Only 315 of the 350 surveys that were sent out were returned and examined and 90% percent of people responded. The study intends to examine the relationship between brand trust, eco-labelling, and competitive advantage (independent variables) and firm performance (dependent variable), with urban sustainability acting as a mediating factor and conservation innovation acting as a moderating variable. The "small and medium enterprises," which are represented by mid-level and senior managers from Sri Lanka's public and private sectors, serve as the unit for analysis. To investigate correlations between specific variables, the survey method which is renowned for its flexibility in a range of study contexts was utilised. According to Mushi (2025), surveys are especially useful for testing hypotheses, characterizing populations, creating measuring scales, and proposing methodological advancements in business research. As a result, this study used a cross-sectional quantitative survey method. In comparison to the interview method, the survey approach is not only quick, affordable, and time-saving, but it is also successful in gathering data from bigger sample numbers. During data collecting, respondents' backgrounds were kept confidential. The survey approach makes it easier to gather data, enables researchers to conduct statistical analyses, and checks the instrument's validity and reliability. It is also dependable, viable for big samples, and allows for answers to a large number of questions on a particular subject. The gathered information was thoroughly examined and arranged, and SmartPLS 3.0 was used to analyse the most important data in order to guarantee the validity and dependability of the study results.

Measurement of variables

Firm performance

The study by Mushi (2025), serves as the primary foundation for the measuring of firm performance. Each of the six items on the measure is evaluated on a five-point Likert scale.

Brand trust

The results of Akoglu and Özbek (2021), serves as the foundation for the measuring of brand trust. Six components, which has a Cronbach Alpha of 0.951 and an AVE of 0.834.

Eco-labeling claims

The study by Mushi (2025), serves as the primary foundation for the measuring of eco-labeling claims, which has a Cronbach Alpha of 0.951 and an AVE of 0.834. Each of the six items on the measure is evaluated on a five-point Likert scale.

Competitive advantage

The study by Aidara et al. (2021), serves as the primary foundation for the measuring of competitive advantage, which has a Cronbach Alpha of 0.951 and an AVE of 0.834. Each of the six items on the measure is evaluated on a five-point Likert scale.

Urban sustainability

The study by Rodrigues and Franco (2020), serves as the primary foundation for the measuring of urban sustainability, which has a Cronbach Alpha of 0.951 and an AVE of 0.834. Each of the five items on the measure is evaluated on a five-point Likert scale.

Analysis of Variables

There are two primary reasons why this study uses quantitative data. First, firm performance idea is complex and multi-dimensional. Urban sustainability, eco-labeling and competitive advantage are influences on firm performance, as well as conservational innovation as moderator that can effectively analyzed by quantitative survey. Second, knowledge is required of these variables because they are context specific. Quantitative method use for survey and response to collect internal and external performance of organization. As a result, 16 SMEs had their firm performance and conservation innovation implementation manually evaluated. Six master's students, an associate professor, and a lecturer made up the specialised team that was formed for the assignment legal procedure. The team members, who possess a solid theoretical foundation in conservation innovation and firm performance, convened once a week to guarantee the authenticity and dependability of the tasks. Information from the chosen businesses was continuously incorporated into the assignment scheme during the variable assignment process. After finishing the assignments, the team members would discuss the results, reassess the study values by combining theory and practice, and try to reach an agreement if there was any disagreement. The team completed analysis using SmartPLS 3.0 to ensure objective data on firm performance and, in accordance with these assignment rules, awarded values to each of the 16 organisations about the application of conservation innovation.

Descriptive statistics

The variable firm performance in table 1 had a mean of 3.77 (*SD*=1.192), indicating that respondents gave firm performance a mostly favourable rating, but there was some variation. Conservation innovation had a mean of 4.12 (*SD*=1.298), indicating that respondents gave conservation innovation a mostly favourable rating, but there was some variation. With a mean of 3.58 (*SD* = 1.843), urban sustainability had the highest mean value, suggesting that respondents thought more favourably of it than they did of other characteristics. With a mean score of 3.69 (*D* = 1.429), eco-labeling claims showed comparatively high perceptions, albeit with less variance than urban sustainability. The ratings for brand rust and competitive advantage were moderate, with brand rust having a mean of 4.18 (*SD* = 1.739) and competitive advantage having a mean of 4.43 (*SD* = 1.987). There appears to be some degree of response heterogeneity based on the variation for these variables. Descriptive statistics reveal that while variables like green innovation and brand trust show more moderate ratings, those connected to sustainability and competitive advantage typically have higher mean values.

Table I
Descriptive Statistics

Variables	Mean	Variance	Std. Deviation
Firm Performance	3.77	2.210	1.192
Conservation Innovation	4.12	3.359	1.298
Urban Sustainability	3.58	2.298	1.843
Brand Trust	4.18	3.543	1.739
Eco-Labeling Claims	3.69	2.645	1.429
Competitive Advantage	4.43	3.268	1.987

Measurements model

By evaluating the measurement technique, the quality of the constructions in this paper is evaluated. Assessing the factor loadings is the first step, and then construct validity and reliability are established. Multi-collinearity of the indicators is assessed using the Variance Inflation Factor (VIF) statistic. If the VIF value is less than 5, multi-collinearity is not a major worry, claim (Hair, Sharma, Sarstedt, Ringle, & Liengaard, 2024). The VIF values for the indicators are shown in table 2 each one is below the suggested threshold. Instead of loading onto other study constructions, each item in the table heavily loads upon its parent construct. Consequently, discriminant validity is attained based on the assessment of cross-loadings.

Table II
Multi-collinearity statistics (VIF) and Outer Loading for indicators

Items	VIF	Outer Loading
FP1	2.112	0.818
FP2	1.569	0.789
FP3	1.751	0.777
FP4	1.939	0.842
FP5	1.455	0.837
FP6	3.067	0.852
BT1	2.943	0.870
BT2	3.263	0.800
BT3	3.547	0.714
BT4	1.727	0.789
BT5	2.450	0.836
BT6	3.958	0.792
ELC1	4.429	0.798
ELC2	3.786	0.826
ELC3	2.566	0.835
ELC4	3.878	0.765
ELC5	3.563	0.867
ELC6	3.862	0.889
CA1	3.804	0.821
CA2	3.414	0.838
CA3	1.081	0.792
CA4	1.743	0.772
CA5	1.653	0.828
CA6	1.802	0.765
US1	2.004	0.807
US2	1.254	0.704
US3	2.315	0.700
US4	2.078	0.872
US5	2.646	0.870
CI1	2.716	0.896
CI2	2.847	0.816
CI3	1.989	0.897
CI4	3.420	0.854
CI5	3.240	0.888

Note: "FP= Firm performance, ELC= Eco-labeling claims, BT= Brand Trust, US= Urban Sustainability, CI= Conservation Innovation"

Cronbach's alpha values and composite reliability statistics in Table 3 varied from 0.762 to 0.958 and 0.855 to 0.967, respectively. Construct dependability is confirmed when both of these reliability indicators exceed the required cutoff point of 0.7 (Hair et al., 2024).

Table III
Construct reliability analysis (Cronbach alpha and composite reliability

Variables	Cronbach alpha	Composite reliability
Firm Performance	0.745	0.812
Conservation Innovation	0.859	0.917
Urban Sustainability	0.819	0.876
Brand Trust	0.860	0.899
Eco-Labeling Claims	0.928	0.910
Competitive Advantage	0.976	0.900

Convergent validity is established when items converge to measure the underlying construct in table 4 and the AVE value is greater than or equal to the suggested criterion of 0.50 (Hair et al., 2024). Convergent validity is thus validated.

Table IV
AVE

Variables	AVE
Firm Performance	0.615
Conservation Innovation	0.698
Urban Sustainability	0.716
Brand Trust	0.598
Eco-Labeling Claims	0.661
Competitive Advantage	0.734

The square root of AVE is shown in bold and italics in able 5. Each construct satisfies the Fornell and Lacker criterion for discriminant validity when its square root of AVE is larger than the correlations between it and the others. The square root of AVE for each construct is higher than the correlations between that construct and other components, confirming discriminant validity. This implies that the constructs satisfy the Fornell and Lacker criteria as they are unique and measure many dimensions. According to Fornell and Larcker (1981), the table demonstrates that the constructs' discriminant validity is well-established. This essential step guarantees the model's constructs are distinct and do not overly overlap, enhancing the model's overall validity.

Table V
Discriminant validity

	FP	CA	ELC	BT	US	CI
FP	0.898					
CA	0.765	0.876				
ELC	0.686	0.715	0.896			
BT	0.554	0.654	0.811	0.989		
US	0.497	0.543	0.664	0.816	0.814	
CI	0.566	0.419	0.765	0.754	0.765	0.987

Note: "FP= firm performance, ELC= eco-labeling claims, BT= brand trust, US= urban sustainability, CI= conservation innovation"

Table 6 fulfills the requirements for discriminant validity since the measures of various concepts are either distinct or do not exhibit a strong correlation. Since most HTMT values fall below 0.85, suggesting that the constructs are separate and measure different characteristics, discriminant validity is deemed acceptable for the majority of constructs (Fornell & Larcker, 1981).

Table VI
HTMT

	FP	CA	ELC	BT	US	CI
FP						
CA	0.876					
ELC	0.765	0.896				
BT	0.678	0.787	0.819			
US	0.654	0.754	0.778	0.876		
CI	0.799	0.687	0.498	0.754	0.876	

Structural model

Assessing the suggested relationships to support the hypotheses is the next stage in structural equation modeling.

Hypothesis Testing

The results relating to the direct impact hypotheses are first shown in the table. According to Hypothesis 1, brand trust has a positive significant impact on urban sustainability (b= 0.319, p = 0.000). Therefore, eco-labeling claims have a negative impact on urban sustainability (b = -0.228, p = 0.009) hence H2 was accepted. Hypothesis 3, competitive advantage, has a positive significant impact on urban sustainability (b = 0.287, p = 0.000). Hypothesis 4, urban sustainability, has a positive significant impact on firm performance (b = 0.478, p = 0.000).

Table VII
Direct relationship results.

	Original sample (O)	STDEV	T statistics	P value
H1: Brand Trust ->Urban sustainability	0.319	0.038	5.445	0.000
H2: Eco-Labeling Claims ->Urban sustainability	-0.228	0.053	2.620	0.009
H3: Competitive Advantage ->Urban sustainability	0.287	0.034	7.904	0.000
H4: Urban sustainability ->Firm Performance	0.478	0.036	17.389	0.000

Mediating effect

The structural model is displayed in Figure 2, along with the study's independent variables, dependent variable, mediator, and moderator. According to hypothesis 6, conservation innovation has positive moderating impact on urban sustainability and firm performance (b = 0.613, p = 0.000).

Table VIII
Mediating effect results

	Original sample (O)	STDEV	T statistics	P value
H5a: Brand Trust ->Urban sustainability-> Firm Performance	0.417	0.198	4.317	0.000
H5b: Eco-Labeling Claims ->Urban sustainability	0.643	0.176	5.287	0.000
H5c: Competitive Advantage ->Urban sustainability	-0.389	0.098	13.876	0.000

Moderating effect

The structural model is displayed in Figure 2, along with the study's independent variables, dependent variable, mediator, and moderator. According to hypothesis 6, conservation innovation has positive moderating impact on urban sustainability and firm performance (b = 0.613, p = 0.000).

Table IX
Moderating effect results

	Original sample (O)	STDEV	T statistics	P value
H6: conservation innovation* Urban sustainability-> Firm Performance	0.613	0.195	12.287	0.000

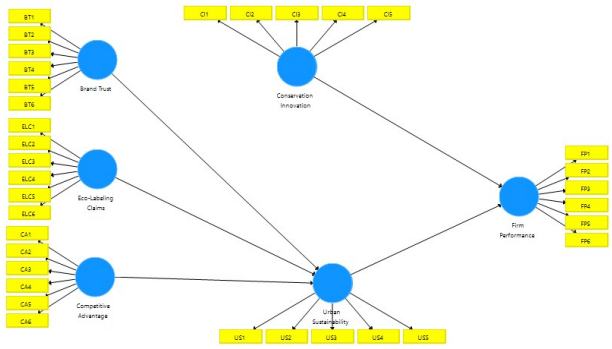

Fig. 2 *Validated model*

Discussion

This study examines how conservation innovation affects the relationship between firm performance in Sri Lankan SMEs and urban sustainability. The results show a significant positive association between firm performance and urban sustainability, which is consistent with earlier research that highlights the advantages of implementing urban sustainability Mushi (2025). Conservation innovation moderates the impact on firm performance with urban sustainability, eco-labeling, and competitive advantage in the context of Sri Lankan SMEs.

Comparison with previous studies

Urban sustainability and firm performance

Our findings support previous studies that demonstrate how urban sustainability enhances business performance. For instance, Sharifi (2021) claims that innovative marketing and urban sustainability significantly enhance market performance. In a similar vein, Haldorai and Ramu (2021) proposed that urban sustainability boosts brand interest and operational effectiveness, both of which improve company performance. These studies highlight the importance of adopting urban sustainability to boost productivity and gain a competitive edge. Our results further corroborate these assertions by demonstrating that companies in Sri Lanka benefit from the adoption of complete urban sustainability. However, a number of external factors, such as market dynamics and legislative frameworks, could influence how well these strategies work by Arku and Marais (2021) and Cugurullo et al. (2021). By highlighting the contextual differences that might be responsible for the conflicting results shown in some other areas, our research lends even more credence to this theory. Enterprises in developed countries, for example, may benefit financially from urban sustainability due to competitive advantage, eco-labeling, and brand trust, but Sri Lankan enterprises may find it challenging to translate these strategies into immediate financial rewards.

Conservation innovation and firm performance

According to Al Naqbia et al. (2020) and Mushi (2025), conservation innovation can boost competitive advantage that can improve firm performance. Eco-labeling, competitive advantage, brand trust and conservation innovation can improve resources of organization, which eventually boot firm performance. The findings show that conservation innovation itself enhances firm performance. Furthermore, our results show how conservation innovation moderates between urban sustainability, eco-labeling, competitive advantage, and firm performance (Al Naqbia et al., 2020). According to Iacona et al. (2019) and Tuan et al. (2016), conservation innovation introduces new technology and practices that improve company performance, hence amplifying the benefits of urban sustainability. The moderating effect in our study may be explained by the unique challenges faced by Sri Lankan companies, such as restricted access to cutting-edge technologies and high implementation costs.

Practical implications for policy and practice

The findings of the research have important implications for business professionals and the Sri Lankan government. The results suggest that businesses can improve their profitability by adopting urban sustainability, notwithstanding the significant moderating effect of conservation innovation. Businesses should focus on adopting urban sustainable practices that reduce waste, boost energy efficiency, and promote eco-friendly products in order to improve operational efficiency and market positioning. The report highlights the need for politicians to provide more backing for conservation innovation. The moderating effect of conservation innovation could be strengthened by offering incentives to businesses that invest in technology that promotes urban sustainability. Furthermore, the obstacles to firm performance adoption that Sri Lankan SMEs experience can be addressed by establishing an innovation ecosystem through collaborations between the public and private sectors. Our findings imply that whereas conservation innovation can directly improve firm performance, it has a less significant moderating effect on the relationship between urban sustainability and firm performance in Sri Lankan SMEs. This disparity can be linked to developing nations' varying adoption stages of conservation innovations. Conservation innovation may not yet fully enhance the impact of urban sustainability in Sri Lankan SMEs because developing nations are still in the early stages of adopting eco-friendly and energy-efficient technologies, according to N. Deyshappriya and Nawarathna (2020) and R. Deyshappriya and Banagala (2021). This study clarifies the Sri Lankan context, where businesses may encounter particular obstacles to the adoption of conservation innovation, such as restricted access to finance, technological infrastructure, and experienced labor, despite the fact that many studies concentrate on industrialized nations.

Limitations and future research directions

This study has limitations, even if it offers insightful information. First, with only 16 SMEs in Sri Lanka, the sample size is tiny and could not be entirely representative of the country's manufacturing industry as a whole. To improve the generalizability of the results, future research could broaden the sample to include additional businesses from various sectors or geographical areas. However, because of particular economic, political, and cultural elements, the study focuses on the Sri Lankan environment, which may be different from other emerging markets. To assess the moderating impacts of conservation innovation in various situations, future studies should investigate urban sustainability and conservation innovation in other developing nations. Finally, future research should examine other factors, including consumer behavior, market dynamics, and regulatory frameworks, that might have an impact on the relationship between urban sustainability, conservation innovation, and company performance. Examining these elements could yield a more thorough comprehension of the dynamics at work and aid in the improvement of tactics for improving business success via sustainability.

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