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GREEN INNOVATIVENESS AND PERFORMANCE OF SMALL AND MEDIUM ENTERPRISES IN THE PUBLIC TRANSPORT SECTOR IN NAIROBI METROPOLIS, KENYA

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Abstract

Investors in the public transport sector in Nairobi incur high maintenance costs due to the petroleum products used by their vehicles and this has had a negative effect on the financial performance of the SMEs. This research was done to establish the influence of environmentally mindful innovation on the performance of public transportation SMEs in Nairobi Metropolis, Kenya. The authors applied a descriptive survey research design and were able to get 334 people in the Nairobi Metropolis area; being investors, route managers with the Super Metro and Metro Trans Sacco's. Three variants were used in the sampling that include stratified sampling technique, simple random, and purposive sampling technique. Validity and reliability of the primary data were confirmed through the application of a questionnaire that had a structure. Secondary data in the form of financial annual reports of the years 2019 to 2024 was also gathered using a data collecting form. The performance indicators had been provided in these reports like total assets, return on equity and return on assets. The findings showed that green innovativeness had a positive correlation with performance of SMEs in the public transport sector in Nairobi Metropolis (0.685**). The regression results indicated that green innovativeness showed a strong positive and significant relationship with the performance ($\beta = 0.806$, $t=6.974$, $p = 0.000$). The study recommends that the management should provide trainings for its managers to enhance their managerial innovation.

Key words: Green Entrepreneurial Orientations, Green Innovativeness, Organizational Performance



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Introduction

Small and medium enterprises (SMEs) are undeniably the backbone of a country's economy, contributing significantly to economic prosperity and social well-being (Gherghina et al., 2020). These enterprises play a crucial role in fostering innovation and introducing new ideas into the market, thereby enhancing economic diversity and productivity (Endris & Kassegn, 2022). Despite the transport sector in Kenya being among the biggest contributors to the economy, the high operational costs affect the performance of the SMEs operating in the sector. This has resulted to inadequate and lack of proper maintenance of the vehicles and motorcycles used in the road transport sector. The transport sector is the largest consumer of petroleum products in Nairobi metropolis and hence a major contributor to greenhouse gases (GHG) emissions. In 2015, the sector accounted for about 67% of Kenya's energy-related CO₂ emissions and 11.3% of Kenya's total GHG emissions for fuel consumption in civil aviation, road transport and rail (GIZ, 2021). Nairobi metropolis has the highest number of vehicles operating in the public transport. The draft National e-Mobility Policy by the Ministry of Roads and Transport identifies high capital costs for setting up charging infrastructure in Nairobi as challenges slowing down the adoption of green entrepreneurship in the transport sector (Mineikis, 2024). In addition, investors in the public transport sector in Nairobi incur high maintenance costs due to the petroleum products used by their vehicles. This has had

a negative effect on their financial performance of the SMEs (Kangogo et al., 2024). The financial performance of Matatu Sacco's in Nairobi metropolis is highly variable, with some struggling with capital adequacy, loan defaults, and liquidity issues (Mutua, 2024). In addition, the financial standing of some Matatu Sacco's has been due to not fully being compliant with regulations (Mbithi & Kariuki, 2024). As per the Sacco supervision annual report 2024, the public transport sector contributed 3.6% to Kenya's gross domestic profit which is a decrease from 4.6% in 2023. Empirical studies highlighted a scarcity of researches in the public transport sector, which this study sought to fill.

Literature Review

Green Innovativeness and Organizational Performance

In a recent 2023 study, Ahmed et al. examined the Pakistani textile industry in an attempt to establish the impact of green innovativeness on organizational performance. The major focus of investigation were green goods and processes. Structural equation modeling was applied in this research. Green innovation methods had been shown to enhance organization performance. This research and the one that asserts structural equation modelling differed in the way they were directed methodologically with the latter employing the regression method. In addition, a contextual gap was demonstrated because the current research has been conducted in the transport sector whereas textile business featured the model of the



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research conducted in the past. In this study, there was a geographical disparity because it was conducted in Kenya and the former in Pakistan.

Ahmed Akhter (2024) explored the relationship between environmental consciousness innovation and business success in pharmaceutical industry in Pakistan. The main areas of inquiry were environmental friendly advertising and new administrative practices. The study adopted a cross-sectional research design. Green innovativeness skills were demonstrated to be closely connected to organizational performance. The report states that by acquiring such skills, a company stands in a better position, reduces the costs and meets the issue of the environment, which enable the enterprise to take the opportunity of growing. There was a gap in the context of the study as the current study was conducted within the transportation industry, and the earlier study was conducted within a pharmaceutical industry. The conceptual divide also existed as the current study involved the focusing on the product and process innovation and the last study involved the green marketing and administrative advancement.

Baeshen et al. (2021) have examined the relationship between the environmentally conscious innovation and the business performance of small and medium-sized enterprises (SMEs) in Saudi Arabia. The main focuses of the research were on environmental absorption ability, long-term human capital and organizational support. Structural equation modeling was used in this inquiry. Green innovativeness had a positive

correlation with organizational success, as the findings stated. The poll reveals that more and sustainable production methods are being adopted and implemented by companies to come up with environment friendly products and services. The research location of Healthcare and RSAF indicates a geographical difference between the current study location in Kenya and where the one is located in Saudi Arabia. This research based on green absorptive ability, sustainable human capital, and organizational support, unlike the current research that would focus on product, managerial, and process innovation.

German et al. (2023) explored how Hispanic scholars address innovation based on the environmental concern in the Philippines automotive sector and its impacts on business performance. Specifically, the study examined how the market demand, competition, government regulation, the actions of the employees and CSR drive green innovation. The study relied on structural equation modelling to examine the information. These findings have established that the influence of green creative activities on the competitiveness and the success of a firm is significantly large. This is because this research was conducted in the Philippines and the present in Kenya, thus demonstrating a geographical difference. The gap in methodology was also indicated by the fact that this research used structural equation modeling, compared to the fact that the present research used regression analysis. Jayaraman et al. (2023) examined the connection between the aspect of green innovativeness and organizational



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achievement in the Malaysian manufacturing industry. The suppliers, employees, government requirement, and consumer needs were highlighted as the most significant drivers of green innovation in a company. Structural equation modeling was applied in the analysis of data in the research. The results indicated positive association between the concept of green innovativeness and corporate profitability. A conceptual gap in this research was that the major aspects, which determine green innovativeness, were focused upon the product, managerial, and process innovation. The study also indicated a gap in context since the study was conducted in the transportation sector unlike the prior one where the industry was industrial. The methodological difference that existed between this study and the one that assumed structural equation modeling was attributed to the fact that the latter employed regression analysis.

In their investigation, Liu et al. reviewed China-based A-Share listed companies to determine the effect of green innovativeness on organizational performance. The search was conducted through the published articles that were published not earlier than 2010 and not later than 2021. The findings revealed that the performance of organizations is highly promoted when creative to the environment. Another outcome, concerning green technology breakthroughs, is likely to improve quality of products and flexibility and lower operating costs, which led to improved performance. The difference of geographical issue was highlighted by the formulation of this research being conducted in Kenya and not in China. The other

weakness in this research methodology was that even though it conducted a literature analysis, the research collected primary data. Opazo-Basaex et al. (2024) examined the case of medium-sized manufacturing firms in Spain on the impact of green innovativeness on organizational performance. The study discovered that the implementation of green technology enhanced the performance of an organization as organizations saved on the amount of resource wastage, manufacturing costs, and time. This has led to increased productivity and preservation of resources better. The study established a positive relationship between the success of an organization and green innovativeness. The dissimilarity in geographies is evident since this study was conducted in Spain and the present one in Kenya. Also, the contextual difference was brought by the fact that this study was within industrial sector and the current one in the transport sector.

Qiang and Yang (2023) conducted a thorough literature review in China in an effort to identify the impact of green innovativeness on the performance of organizations. The focus of the research was played on green product, green process and green management innovation. The study determined that green innovation has been a valuable element of business strategies and played a significant role in the performance. Green innovation can help to alter business operations and enable the companies to respect the new conditions in the environment and enhance their performance. Two consequences of process innovation were improved efficiency in production and use of resources whereas taking into



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consideration green management innovation ensured that businesses were able to meet the national standards in environmental production. As per the research, green product innovation either minimized the adverse effect on environment characteristic of a product through improved design or provided new products which had a less macro environmental impact. This study had a methodological gap in the sense that its data collection raised through original data contrasted with the analysis of the existing literature. The other difference is that the previous study was conducted in Kenya whereas the one carried was conducted in China. This produces a geographical difference.

Wang et al. (2021) investigated green innovativeness and its influence on organizational performance within the Pakistani manufacturing and service organizations. The main topics of research were both green product and green process. The researchers relied on a convenient random sampling technique in the selection of the research participants. Green innovativeness and organization success are positively and significantly related as depicted by the findings. This study has a contextual disparity with the current study as the former used manufacturing and services firms and the later used public land transport SMEs. This also demonstrated a methodological gap because the study employed in this paper used unchallenged sampling, whereas the current study employed stratified sampling.

Marfo et al. (2024) examined the objective of environmental conscious innovation on hotel

companies bottom lines in Ghana. Structural equation modeling was used in data analysis of the research. The results suggest that there is a positive and significant impact of green innovation on performance. The findings have also proven the role of green leadership in enhancing sustainability and business outcomes. This did not provide the context because this research study was grounded in the hotel business whereas this one was grounded in the transportation sector. This research and the one that utilized structural equation modeling to analyze data differed in its approach methodologically; the latter applied regression. Omonijo and Zhang (2024) have researched green innovation approaches and their health effects on the performance of African nations. This study undertook the survey of previous research. According to the data, green innovativeness had a strong influence on organizational performance. Green innovation according to the research is the process of improving the properties or processes with an aim of minimizing pollution. This type of innovation is on the developments and designs of materials products, and the extent to which it impacts organization performance. Current study has sampled Kenya only, which represents a geographical distance to the rest of the studies which covered several African countries. The other methodological shortcoming was that although this study conducted a literature review, it also collected primary information. Oluwajimade and Olanrewaju (2023) compared how green innovation tools reflect the performance of selected pharmaceuticals in Nigeria. The main areas of the research



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exactly were product and process sustainability. In particular, the research project involved descriptive survey as its research methodology. Based on the findings, green innovation tools had a great influence on the business. It was concluded that the pharmaceutical companies must also invest in R&D to develop new technology and products that are eco-friendly so that they can continue to compete in the market and assist in popularizing sustainable practices. A contextual gap was identified in this research because the study had been conducted in the transportation field whereas in the earlier one it had been in the pharmaceutical business.

Tugli (2023) in a research on small and medium-sized enterprises (SMEs) in Ghana examined the relationship between green innovativeness and the organizational success. Structural equation modeling was incorporated in the research to analyze the data in a manner that discussed environmentally friendly practices. The results of the study indicated the non-significant relationship between performance and green process innovation. It differed in terms of methodology between this study and the one that used the structural equation modeling to release information; the latter came up with a regression analysis evaluation.

Environmentally conscious innovation is an area that was examined by Muketha et al. (2024), who reported on its impact on the efficiency of floricultural companies in Kenya. The major areas of enquiry were products, processes, and services. Academicians performed a test of the theory by the help of structural equation modelling

which was a census-derived technique. The study revealed that product as well as process and service innovation, played an important role in performance. The research states that companies can enhance performance by applying green innovation wherein they adopt procedures and inputs that are environmental friendly. This study has a contextual dissimilarity with this investigation because the first study was based on the findings of floricultural organizations whilst the second one dealt with SMEs in the transportation sector.

Nzomo et al. (2023) compared green innovativeness and organizational performance in the industrial sector. Methods applied by the research on relating to the study were descriptive and explanatory. The results show that green innovativeness and success of the organization are inseparable. The report recommends that most of the processes be automated by the management and trainees give workers the opportunity to use tacit level of knowledge as a means of effective performance. This study found that there was inadequate setting because it was conducted in the transportation sector whereas the latter used industrial sector. The other methodological shortcoming was that this study employed descriptive research design as opposed to explanatory or mixed methods research design.

In the case under discussion, Obiso et al. (2023) focused on the connection between environmentally friendly innovations and business success by conducting a research carried out in the oil and gas industry. This study narrowed its attention on the dimensions of distribution of green in



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specific. The results of the study strongly indicated that green distribution impacts on the performance of companies positively. The study supports the idea that by transitioning to green distribution, the performance of the sector private oil and gas marketing companies could be better regarding their social, environmental, and financial results. This study indicated lack of conceptual fit because it focused on the dimension of green distribution whereas this research focused on a product, managerial, and process innovation.

Otundo (2019) examined the impact of green technology on the efficiency and effectiveness of the manufacturing companies in the Mombasa County. The field of green production factor was the central focus of the study. The type of research that was used in this study was descriptive. Firms that have initiated green manufacturing operations registered better organizational performance indicators. Green manufacturing approaches in the form of using recyclable materials were the most favored ones, the survey found. In fact, this study revolved around environmentally friendly production so a conceptual gap arose when the current research that involved innovation in products and management processes and processes was compared to the above.

Research Methodology

The approach employed in the research involved a descriptive survey, and involved 334 residents of the Metropolis of Nairobi;

Table 1: Influence of Green Innovativeness on Performance of SMES in the Public Transport Sector

these comprised of 334 Super Metro and Metro Trans Sacco investors and the finance managers and route managers engaged with monitor agencies. Those sampling methods that were used in this research were stratified, simple random and purposive. The reliability and validity of the primary data were proven through the application of a designed questionnaire. A data collecting form was also used to cull secondary data in the form of financial annual reports in the period of 2019-2024 years. In these reports, the performance metrics were total assets, the ratio of the return on equity, as well as the ratio of the return on assets. The findings of the descriptive and inferential data analysis presented in tables, figures and pie charts respectively encompassed measurements such standard deviations and means and statistical techniques, such as the regression and correlation analysis.

Results and discussion of findings

Descriptive Statistics for Green Innovativeness

We have been keen to examine how green innovativeness is associated with the success of small settings of small medium-sized enterprises (SMEs) in the public transportation industry within the Nairobi Metropolitan Region, Kenya. A five-point Likert scale based on 1 to very low extent, 2 to low extent, 3 to moderate extent, 4 to great extent and 5 to very high degree was utilized. Table 1 presents results of the statistical analysis of the obtained data.



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Items	Mean	S.D
The management ensures that new bus designs incorporated into the product are environment friendly	4.30	0.911
The new bus changes are tailored to focus on customer experience	4.11	1.032
The managers have an innovative mindset when formulating business strategy	3.99	1.147
Managers have created a work environment that encourages employee creativity	2.47	1.589
Unnecessary costs within the production process have been identified and eliminated	3.39	1.544
Work processes have been automated to enhance efficiency	4.01	1.187
Composite Mean	3.71	

Source: Research data, 2025

Table 1 shows that the respondents indicated that the management ensures that new bus designs incorporated into the product are environmental friendly to a high extent as shown by a means score=4.30 (standard deviation=0.911). The respondents also showed that the new bus changes were tailored to focus on customer experience to a high extent with a mean score of 4.11 (standard deviation=1.032). On the other hand, the respondents indicated that there was moderation in the managers having an innovative mindset when formulating business strategy with a mean score of 3.99 (standard deviation=1.147). However, the creation of a work environment that encourages employee creativity by the managers to done to a low extent with a mean score of 2.47 (standard deviation=1.589). The respondents further indicated that unnecessary costs within the production process had been identified to a moderate extent with a mean score of 3.39 (standard deviation=1.544). Finally, the respondents indicated that work processes had been

automated to enhance efficiency to a high extent with a mean score of 4.01 (standard deviation=1.187).A composite mean of 3.71 was an indication that green innovativeness had been adopted in moderation by the SMES in the public transport sector in Nairobi Metropolis. However, aspects of new bus designs incorporated being environment friendly, tailor making the new buses to focus on customer experience and the automation of work process seemed to be highly adopted. There greatest concern was on the creation of a work environment to boost employee creativity which was poorly adopted by the managers. The aspects of having an innovative mindset by the managers, and identification of unnecessary costs was moderately adopted and if effectively handled could boost the performance of SMEs in the public transport sector in Nairobi metropolis.

The results are in tandem with those of Liu et al. (2024) who established that green technology innovations can improve product quality and adaptability, and reduce



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operating costs which tends to improve the performance. They are also supported by those of Opazo-Basaex et al. (2024) who found that adopting green innovations enabled firms to reduce the overuse of resources, production costs and time, which in turn increased productivity and resource conservation. Qiang and Yang (2023) further noted that green innovation could aid businesses to adjust environmental changes and enhance performance. It also improved the quality and design of existing products or introduced new products to minimize the product’s adverse effect on the environment. The findings are also corroborated by those of Akhter (2024) which noted that acquiring

such competencies enhances the positioning of a business, decreases costs and helps in dealing with challenges in the environment making it possible for firms to capitalize growth prospects. Baeshen et al. (2021) also noted that businesses were adopting and incorporating more sustainable manufacturing methods to produce environmental products and services.

Correlation Analysis

The coefficient correlation matrix for the green innovativeness and performance of SMEs in the public transport sector in Nairobi metropolis variables is shown in Table 2.

Table 2: Pearson Correlation Coefficients

		Organizational Performance
Green innovativeness	Pearson correlation	0.685**
	Sig. (2-tailed)	0.000
	N	140

** . Correlation is significant at the 0.01 level (2-tailed).

Source: Survey Data (2025)

The results in Table 2 showed that there was a positive correlation between green innovativeness and performance of SMEs in the public transport sector in Nairobi metropolis (0.685**).

Regression Analysis

The researcher used multiple regression analysis to establish the influence of green entrepreneurial orientations and performance of SMEs in the public transport sector.

Table 3: Model Summary between Green Entrepreneurial Orientations and Performance of SMEs in the Public Transport Sector

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.776a	0.602	0.590	0.52537

a. Predictors: (Constant), green innovativeness

Table 3 reveals high degree of green innovativeness in judging the success of

SMEs in the public transport industry (R=0.776) expresses that there is a significant



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association. Green innovativeness has a very high R2 of 0.602, and this implies that it must explain the 60.2 percent of performance variation. Thus, it would be assumed that the intensity of green innovativeness influences the probability of SMEs functioning within the segment of Nairobi Metropolis, offering transport services. The remaining 39.8

percent of the variance in performance is due to other types of green innovation that were not considered in this study. Since it is true that the model is determining different values of the independent variable, the adjusted R Square of 0.590 provided a more objective consideration of the variance of the model.

Table 4: ANOVA Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	56.338	4	14.085	51.028	.000 ^b
	Residual	37.262	135	0.276		
	Total	93.600	139			

a. Dependent Variable: Performance of SMEs in public transport sector

b. Predictors: (Constant), green innovativeness

The analysis of variance (ANOVA) results of the analysis of the public transport industry in Nairobi Metropolis indicate that green innovativeness significantly predicted the performance of the SMES (See Table 4). Green innovativeness is one of the largest predictions of the success of SME in the Nairobi metropolis public transportation sector with an F-statistic value at 51.028

exceeds the critical value by far. The p-value is below the expected value of 0.05 significantly (0.000). This justifies the notion that green innovativeness used by small and medium-sized enterprises (SMEs) in Nairobi Metropolis in the context of the public transportation industry is considerably influential in the sector.

Table 5: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	T	
1	(Constant)	0.164	0.270		0.608	0.544
	Green innovativeness	0.774	0.111	0.806	6.974	0.000

a. Dependent Variable: Performance of SMEs in the public transport sector



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This is non-significant in nature as noted in Table 5 by the constant value of 0.164 and p-value of 0.544. The results of Figiel and Badar, who discovered no significant correlation between GEO and performance, and the impact may be negligible, correspond to our findings (Figiel and Badar 2025).

Hypotheses Testing

The results revealed that green innovativeness showed the greatest and most significant relationship with performance when compared to all the other variables that may be employed as predictors (0.806, $t=6.974$, $p=0.000$). This implies that as the degree of green innovativeness shifts by a single unit, the output of SMEs in the public transport sector of Nairobi Metropolis increases by 0.806 units. Due to this, we may affirm that the level of green innovation does not have a negative impact on SMEs operating in the transport sector in Nairobi Metropolis, Kenya. Green innovativeness capacities bore a strong relationship with organizational success, which Akhter (2024) also reports and our results align with this observation. The findings are also in line with those of Baeshen et al. (2021) which highlighted that there was a positive relationship between green innovativeness and organizational performance. According to a different study by German et al. (2023), implementing new green initiatives has a favorable impact on corporate performance. Furthermore, the research conducted by Jayaraman et al. (2023) shown a positive correlation between organizational success and green innovativeness. The results are further corroborated by Wang et al. (2021), who found a strong and positive correlation between organizational success and green innovativeness.

Discussion

The green innovativeness showed a positive relationship with the success of SMEs in Nairobi Metropolis in the transport sector (0.685 judgmental) of the public. The outcome of the regression test also indicated that there was a very strong and positive relationship between performance and the green

innovativeness ($=0.806$, $t=6.974$, $p = 0.000$). The management makes sure that the product has modern bus designs, which are highly ecological friendly as revealed by the mean score of 4.30 by the respondents. The participants also demonstrated that the new bus upgrades have been customer centric by giving the customer an average score of 4.11. The responses revealed that the innovative attitudes of the managers when formulating business strategies were humble with a mean of 3.99. However, the attempts of the managers to create the environment within which the employees should be more creative succeeded partially, as demonstrated by an average score of 2.47. Moreover, the respondents reported that they have encountered other cases of over expenditure during the manufacturing processes (mean score: 3.39). Finally, as stated by the respondents, work routines are highly automated in order to improve efficiency (mean score: 4.01).

Conclusion

This study concludes that green innovativeness had a positive and significant effect on performance of SMES in the public transport sector in Nairobi metropolis, thus the null hypothesis is rejected. Based on the conclusions, this study recommends that under green innovativeness, the management should provide trainings for its managers to enhance their managerial innovation. This could enable them to be more creative when coming up with corporate strategies on green technology. It is also recommended that to reduce excessive expenses in the production process, the management of the SMEs in the public transport sector should fully embrace process innovation. Another recommendation is that the management should create a conducive work environment for employees as this could promote their creativity for enhanced performance.

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