

Environmental Sustainability Practices and Financial Performance of Manufacturing MSMEs in Tagum City, the Philippines

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Abstract

This study explores how environmental sustainability practices impact the financial performance of manufacturing MSMEs in Tagum City, grounded in the Resource-Based View (RBV) and Natural Resource-Based View (NRBV) theories. Using a quantitative, non-experimental correlational design, data were gathered from 255 respondents through validated questionnaires. Results show that waste management had the highest level among sustainability practices, while liquidity topped financial performance indicators. Key sustainability areas—water conservation, waste management, and energy efficiency—were found to significantly influence financial outcomes. These findings affirm that strategic environmental practices serve as valuable internal resources, offering a sustainable competitive edge. The study recommends that MSMEs strengthen efforts in these three areas. Additionally, it urges LGUs and the Department of Trade and Industry to implement supportive policies, including tax breaks, grants, and green financing. Doing so will encourage MSMEs to adopt eco-friendly technologies. Aligning sustainability with profitability presents a viable path to long-term business success.

Keywords: Environmental sustainability practices, financial performance, SDG- 8 decent work and economic growth, responsible consumption and production.

Introduction

The manufacturing MSMEs are widely recognised as vital contributors to economic development, as they provide employment opportunities and foster wealth generation within local communities. However, the environmental impact of MSMEs presents significant challenges to sustainability (Andrade, 2025). As global demand for raw materials is projected to double by 2060 due to economic expansion and rising living standards (Organisation for Economic Co-operation and Development, 2018), the resulting increase in resource consumption will lead to higher levels of waste generation, particularly in the manufacturing sector.

Environmental sustainability is defined as the ability of firms to minimise resource consumption, pollution, and waste generation. According to Hami et al. (2015), reducing resource use, including water, energy, non-renewable resources, and hazardous inputs, along with limiting waste production and pollutant emissions, is a key indicator of a firm's environmental performance. Furthermore, the planet's sustainability significantly impacts the global economy, as the increasing pollution of air, soil, and water continues to degrade the ecological system, potentially hindering economic growth (Jayeola, 2018). While industrialisation is critical for economic growth, its environmental consequences cannot be overlooked. Due to deteriorating climatic conditions, MSMEs face growing pressure from governments and society to adopt sustainable practices. Rigorous government regulations and societal expectations compel manufacturers to integrate environmental considerations into their operations (Luthra & Mangla, 2018).

The measurement of company financial performance has been increasingly significant in the financial sector, particularly in recent years (Yalçin & Bayrakdaroglu, 2012). Managers must measure the economic performance of the firms they oversee (Tsolas, 2020). In today's competitive environment, a proper assessment of a company's performance is crucial for its internal management and creditors and investors (Farrokh et al., 2016). Financial performance is analysed by various stakeholders, including corporate owners, managers, investors, competitors, and creditors (Bağcı & Yerdelen Kaygin, 2020). Financial performance is fundamental to overall firm performance and significantly influences business activity management (Phan et al., 2020). Businesses also play a vital role in sustainable development by fostering economic growth and promoting innovation (Alamansour, 2023). However, MSMEs, especially in the manufacturing sector, face several challenges in maintaining profitability and stability. One of the most common financial struggles is high operational costs, which arise from rising expenses in energy consumption, raw materials, labour, and compliance with environmental regulations. Masocha (2018) states that many SMEs experience financial pressure due to inefficient resource use, leading to lower profit margins. Without cost-saving measures, these businesses may struggle to remain competitive.

Environmental sustainability can substantially affect a company's financial outcomes by lowering costs, improving operational efficiency, and boosting its brand image (Skordoulis et al., 2024). It is reported that operational costs, such as energy consumption, water usage, and waste management, can be substantially reduced through sustainable practices, thereby boosting a firm's profitability. For instance, improving resource efficiency typically lowers input costs, decreasing operational expenses (Skordoulis et al., 2024).

Moreover, the significance of this research aligns with the sustainable development goals, particularly SDG 12, which promotes responsible consumption and production, and SDG 8, which focuses on sustainable economic growth and decent work. By adopting sustainable practices in waste management, water conservation, energy efficiency, and eco-friendly packaging, manufacturing MSMEs can enhance their financial performance while contributing to environmental sustainability. This helps reduce environmental impact and strengthens business resilience, enabling MSMEs to contribute to long-term economic sustainability. Furthermore, by integrating eco-friendly practices into their operations, businesses can enhance their market competitiveness, attract environmentally conscious consumers, and align with global sustainability standards, ultimately fostering a greener and more sustainable economy (Heasley et al, 2025; Salite et al, 2024).

Furthermore, this study aims to determine the influence of environmental sustainability practices on the financial performance of manufacturing MSMEs in Tagum City. Firstly, the research investigates the level of environmental sustainability practices, specifically focusing on eco-friendly packaging, energy efficiency, waste management, and water conservation. Secondly, the financial performance of manufacturing MSMEs in terms of profitability, liquidity, and sales volume should be considered. Thirdly, if there is a significant relationship between environmental sustainability practices and the financial performance of manufacturing MSMEs in Tagum City, determine what domain of environmental sustainability practices significantly influence financial performance.

Theoretical Underpinnings

This research is anchored to the resource-based view theory of Jay Barney (1991), which suggests that resources that are unique, valuable and inimitable, such as a cleaner environment, help establish legitimacy, increase competitiveness, and ultimately improve financial performance (Russo & Fouts, 1997, p. 3). This research utilises the Resource-Based View (RBV) as its theoretical foundation to investigate how Manufacturing MSMEs perceive and leverage environmental sustainability as a source of competitive advantage. This theory guides managers and business owners in making informed decisions about resource allocation and strategic investments in environmental sustainability practices initiatives, while explaining the diverse performance levels observed among firms within the industry. The theory identifies the most valuable ecological sustainability practices for a firm's performance, such as innovative green technologies, a strong environmental reputation, and efficient resource management. The Resource-Based View theory also provides a framework for developing and implementing effective sustainability strategies that contribute to ecological and financial performance. Most importantly, it analyses the role of internal resources, including environmental sustainability practices, in driving firm performance and competitive advantage.

This research is also supported by Stuart Hart's Natural Resource-Based View (NRBV) Theory (1995), which builds upon the Resource-Based View (RBV) theory introduced by Barney (1991), emphasising the role of environmental practices in achieving sustainable competitive advantage. This theory proposes that sustainable competitive advantage is achieved when an enterprise's valuable, rare, inimitable, and non-substitutable resources are related to specific strategic capabilities, such as pollution prevention, product stewardship and sustainable development (Hart, 1995).

The theory also emphasises that when integrated with a firm's core strategy, sustainability can lead to enhanced reputation, customer loyalty, and regulatory benefits, driving both financial performance and environmental stewardship. In the context of MSMEs, this theory encourages businesses to view environmental sustainability as a valuable resource that can help the company maintain a competitive edge and achieve long-term success, even as the market evolves.

Methodology

Design and Procedure

In this study, the researchers used a quantitative, non-experimental research design that employed correlational techniques. Non-experimental research does not entail the manipulation of control or variables. Within non-experimental research, researchers observed variables in their natural state without intentional manipulation (Longe 2020). To ensure relevance and suitability of participants, the researchers used purposive sampling, a non-probability sampling method that involves the deliberate selection of individuals based on specific characteristics. In this case, only manufacturing MSMEs that had been operating in Tagum City for at least 10 years were included. This criterion ensured that the data collected reflected established enterprises with sustained operational and financial histories, enhancing the reliability of responses regarding long-term sustainability practices and performance.

Purposive sampling strategies intentionally move away from random sampling methods and are designed to ensure that specific types of cases, relevant to the research objectives, are included in the final sample. The decision to use this strategy was based on the understanding that certain participants, due to their experience and longevity in the industry, are more likely to hold meaningful insights about the issues under study and therefore must be part of the sample (Campbell et. al., 2020). In addition, the researchers adhered to ethical guidelines throughout the data collection process. Participants were informed of the purpose of the study and were required to sign both the informed consent form and the survey questionnaire, ensuring their voluntary participation and understanding of the research procedures.

Statistical tools were essential for determining the impact of different factors that affect the financial performance of the various enterprises. The following statistical methods were utilised to analyse data and interpretations: Firstly, the mean was used to determine the level of environmental sustainability practices and financial performance among manufacturing MSMEs in Tagum City. Second, the standard deviation measures the extent of data variation from the mean. Third, Pearson's correlation was employed to determine a significant correlation between environmental sustainability practices and financial performance among manufacturing MSMEs in Tagum City. Lastly, Multiple regression analysis determines what domain of environmental sustainability practices significantly influence financial performance among manufacturing MSMEs in Tagum City.

Respondents

The sellers, staff members, managers, and business owners of manufacturing MSMEs in Tagum City were the respondents of this study. Such samples were chosen based on their ability to consider all aspects of enterprise operations. The researchers obtained a list of registered manufacturing MSMEs from the Business Permit and

Licensing Office at the New City Hall of Tagum. The initial population consisted of 544 manufacturing MSMEs; however, only businesses that had been operating for at least 10 years were included. A purposive sampling method was employed to select 255 respondents, ensuring all businesses met the 10-year operational requirement. This method allowed for targeted data collection, ensuring the gathered information was directly relevant to the study while minimising the influence of unrelated variables.

To improve the practicality and impact of the research, the researchers utilised purposive sampling to determine the appropriate sample size from the population. Purposive sampling is used when the target sample has specific characteristics, ensuring that only relevant respondents are included. According to Sugiyono (2012), purposive sampling is a technique for selecting samples based on specific considerations. This approach ensures that only manufacturing MSMEs operating for at least 10 years are selected as respondents.

Based on the total number of respondents per industry, the majority of the respondents are from the Bakery/Cakes and Pastries industry (37.65%), followed by the Water Processor/Purifier (23.53%), smaller percentages from other industries, including Furniture (11.76%), Concrete Product Manufacturer (5.88%) and Upholstery (5.88%), Garment Manufacturer (4.71%), Gold/Silver Smith (3.53%), Ice Cream Maker (2.35%), and lastly, Footwear Manufacturer, Lumpia Wrapper Maker, Metal Craft, and Plaque/Trophy Maker (1.18%).

Instruments

The study employed a survey questionnaire for data collection, adopting and modifying established instruments to align with the research objectives. Specifically, the questionnaire on environmental sustainability practices was adapted from the study by Sendawula et al. (2020), which examined the relationship between environmental commitment and environmental sustainability practices among manufacturing micro, small and medium enterprises (MSMEs) in Uganda. Similarly, the questionnaire for assessing financial performance was based on research by Kazimoto (2016) on Working Capital Management and Financial Performance of Selected Companies in Kampala. By utilising these established and validated instruments, the study ensures the reliability and validity of the data collection process. The modifications were carefully undertaken to address the specific context of the research, allowing for the exploration of the impact of environmental sustainability practices on the financial performance of manufacturing MSMEs in Tagum City.

The results were interpreted using the standard mean ranges. In measuring the environmental sustainability practices and financial performance among manufacturing MSMEs in Tagum City, the five-order degree with corresponding numerical range and interpretation is used. Starting from 1.00-1.79 or very low, which means that environmental sustainability practices and financial performance among manufacturing MSMEs in Tagum City are not effective, range 1.80-2.59 or low, which means that environmental sustainability practices and financial performance among manufacturing MSMEs in Tagum City are relatively effective, 2.60-3.39 or moderate, which means that environmental sustainability practices and financial performance among manufacturing MSMEs in Tagum City are reasonably practical, range 3.40-4.19 or high, which means that environmental sustainability practices and financial performance among manufacturing MSMEs in Tagum City is much effective, and range 4.20-5.00 or very high, which means that environmental sustainability practices and

financial performance among manufacturing MSMEs in Tagum City are very much effective.

Results and Discussion

Levels of Environmental Sustainability Practices among Manufacturing MSMEs

Table 1 presents the mean scores for the environmental sustainability practices among manufacturing MSMEs in Tagum City, with an overall mean score of 4.08 with a standard deviation of 0.53 for all indicators, indicating a high level of environmental sustainability practices. This implies that environmental sustainability practices among manufacturing MSMEs in Tagum City signify a high level of influence in terms of *water conservation, eco-friendly packaging, waste management, and energy efficiency*.

The overall score was gathered from the highest to lowest computed mean scores, and waste management achieved the highest mean score of 4.43 with a standard deviation of 0.71, reflecting a very high level of influence. Energy efficiency followed a mean score of 4.39 and a standard deviation of 0.62, indicating a very high level of influence. Water conservation attained a mean score of 4.06 with a standard deviation of 0.60, indicating a high level of influence. Finally, eco-friendly packaging had a mean score of 3.42 with a standard deviation of 0.93, which was described as high.

Table 1.
Levels of Environmental Sustainability Practices among Manufacturing MSMEs in Tagum City, the Philippines

Indicators	Mean	SD	Descriptive Level
Waste Management	4.43	0.71	Very High
Energy Efficiency	4.39	0.62	Very High
Water Conservation	4.06	0.60	High
Eco-friendly Packaging	3.42	0.93	High
Overall	4.08	0.53	High

Waste management has the highest mean among environmental sustainability indicators, 4.43, with a standard deviation of 0.71, as indicated in the table above, showing a very high level of influence on waste management practices for manufacturing MSMEs. This signifies that manufacturing, specifically the Manufacturing MSMEs in Tagum City, gives their employees special training in waste management. Bartolacci et al. (2018) emphasise that effective waste management can improve financial outcomes, suggesting that companies adopting sustainable practices may experience better financial performance. Furthermore, companies with strong waste management practices are seen as more responsible, attracting customers, investors, and employees (Roffe & Gonzales, 2023). These studies underscore the complex interplay between waste management practices and financial performance,

suggesting that while effective waste management can enhance financial outcomes, the relationship is influenced by various factors, including the nature of the waste management strategies and the specific industry context.

Energy Efficiency is the second highest mean score, with a very high level of 4.39, with a standard deviation of 0.62. This indicates that manufacturing MSMEs in Tagum City minimise energy in their business activities. This shows that MSMEs practice energy efficiency to reduce energy consumption and operational costs, directly contributing to enhanced productivity and profitability. Beyond cost savings, the emphasis on energy efficiency may also reflect growing concerns about sustainability and environmental impact as businesses align with regulatory standards and respond to consumer demand for more sustainable practices. Accordingly, Diaz and Alfaro (2021) emphasise that implementing green initiatives, such as energy efficiency measures, decreases total expenses for manufacturing MSMEs. The decrease in expenses led to increased net revenue, which in turn contributed to increased capital. Overall, the findings demonstrate a positive relationship with financial performance. Therefore, companies that optimise their energy usage, as measured by the gross value added from production relative to total energy expenses, will likely see an improvement in their financial performance in the subsequent year (Monteiro, 2022).

Further, *Water Conservation* achieved a high average of 4.06 with a standard deviation of 0.60, implying that manufacturing MSMEs in Tagum City apply effective strategies in improving water conservation and regularly monitor trends in water usage. This finding is supported by the study conducted by Cristofolletti (2017), which emphasises that MSMEs can significantly benefit from water stewardship initiatives. By adopting sustainable water management practices, these enterprises can reduce water usage, mitigate pollution, and engage in water governance, enhancing their environmental sustainability. Ong et al. (2014) also emphasised that water sustainability offers significant cost advantages that directly enhance a firm's financial performance. When companies implement water-saving measures such as recycling, reducing water consumption, and developing water sustainability policies, they will likely achieve improved financial outcomes.

Lastly, *Eco-friendly Packaging* ranked fourth among all environmental sustainability practices indicators at a high level of influence, with an average mean score of 3.42 and a standard deviation of 0.93, implying that manufacturing MSMEs in Tagum City exploit packaging materials that are safe for people's health and that have an economically friendly label. While eco-friendly packaging is still recognised as a valuable component of sustainability, it is considered a lower priority or as immediately effective in improving business performance. This could be due to factors such as the potentially higher costs of sourcing sustainable packaging, limited access of local MSMEs to these materials, the complexity of transitioning from traditional packaging, or a lack of immediate, measurable financial benefits. Many small enterprises operate with constrained budgets and limited supply chain networks, making it difficult for them to source eco-friendly alternatives that are often available only through specialized or larger-scale suppliers. Additionally, the local market may lack sufficient distributors or producers of sustainable packaging, resulting in higher procurement costs and longer lead times. This lack of access not only discourages MSMEs from transitioning to greener practices but also hinders their ability to compete with larger firms that can more easily adopt and benefit from sustainable solutions. This result suggests that while eco-friendly packaging is acknowledged for its positive environmental impact, manufacturing MSMEs may not fully perceive it as a top driver

of business performance improvements. Further, Bricks (2023) affirmed that eco-friendly packaging supports sustainability by lowering the carbon footprint, promoting biodegradability, and enhancing recycling efforts, all of which contribute to a more environmentally responsible and sustainable future. In addition, NEFAB (2016) confirmed that adopting sustainable packaging materials, such as biodegradable, renewable, reusable, compostable, or post-consumer recycled materials, can result in significant environmental benefits.

This research aligns with two key United Nations Sustainable Development Goals (SDGs): SDG 8 – Decent Work and Economic Growth and SDG 12 – Responsible Consumption and Production. SDG 8 promotes inclusive and sustainable economic growth, productive employment, and decent work for all. By enhancing the financial performance of MSMEs through sustainable practices, businesses can create more stable jobs and contribute to local economic resilience. Meanwhile, SDG 12 emphasizes the need to reduce waste, improve resource efficiency, and promote sustainable production practices. By encouraging MSMEs to adopt strategies such as energy efficiency, waste management, eco-friendly packaging, and water conservation, this study supports the broader global agenda of fostering sustainable industry practices while promoting long-term economic growth.

Levels of Financial Performance among Manufacturing MSMEs

Presented in Table 2 are the mean scores for the indicators of Financial Performance of Manufacturing MSMEs in Tagum City, with an overall mean of 3.94 with a standard deviation of 0.57, indicating a high rating given by the participants. This shows that most of the respondents’ evaluations regarding financial performance among manufacturing MSMEs have good performance in *profitability, liquidity, and sales volume*.

The overall score represents the average computed mean scores from highest to lowest. 4.00 over profitability, which had a standard deviation of 0.64 and a high descriptive level; 4.10 over liquidity, which had a standard deviation of 0.68 and a high descriptive level; and 3.72 over sales volume, which had a 0.77 standard deviation and a high descriptive level.

Table 2.
Levels of Financial Performance among Manufacturing MSMEs in Tagum City, the Philippines

Indicators	Mean	SD	Descriptive Level
Liquidity	4.10	0.77	High
Profitability	4.00	0.64	High
Sales Volume	3.72	0.77	High
Overall	3.94	0.57	High

Liquidity is the highest mean among the indicators of financial performance. A mean of 4.10 with a standard deviation of 0.77 implies that manufacturing MSMEs in Tagum City’s financial performance is evident in its ability to pay suppliers on time and ensure it always has enough funds to cover operational costs and purchase necessary equipment for business operations. This also implies that these practices enabled

manufacturing businesses to improve their operational costs – energy consumption, water usage, and waste management, enhance resource efficiency, and promote long-term profitability. This finding is supported by Boakye et al. (2020) observed a significant positive relationship between environmental practices and the financial performance of firms. Further, the results suggest that manufacturing businesses agree that environmental sustainability practices have enabled manufacturing to increase liquidity and improve its ability to manage sales volume and profitability. Moreover, having a high level of liquidity is crucial for a company's financial health and operational efficiency. It is revealed by Nam and Tuyen (2024) that companies with higher liquidity generally have better financial performance and vice versa.

Profitability is the second highest mean. The data above suggests a strong positive relationship between environmental sustainability practices and profitability, with an average mean of 4.00 and a standard deviation of 0.64, which signifies that manufacturing MSMEs in Tagum City has been able to improve its profitability, leading to businesses to pay on time as a result of the availability of profits and fund its business growth from profits. Also, (Alexandru, 2019), reported that financial profitability is an indicator through which capital owners appreciate the efficiency of their investments, i.e. the opportunity to maintain them; in a given competition system, an enterprise must develop, invest, and this investment must be funded. These factors collectively strengthen the financial standing of the MSMEs, demonstrating the significant connection between sustainability initiatives and financial performance.

Lastly, *Sales Volume* in the level of financial performance is also high, with a mean of 3.72 and a standard deviation of 0.77. This implies that the manufacturing MSMEs in Tagum City have achieved their sales objectives, and sales have increased over the last year of operation, strengthening their market position. A high sales volume positively impacts the business's financial performance. According to Basir et al. (2021), the greater the number of sales generated by the company, the greater the possibility of profit that the company will generate.

Moreover, a study by Jum'a et al. (2021) revealed that multiple studies highlight a positive and significant relationship between environmental sustainability and a company's financial performance. Higher financial performance was correlated with environmental performance, particularly in reduced pollution, waste reduction, and lower on-site waste disposal. The study observed that environmental sustainability positively impacts a firm's financial performance. Moreover, the study confirmed a significant relationship between environmental sustainability practices and financial performance.

However, the study by Monteiro (2022) challenges this view, stating that there is no significant relationship between corporate financial performance and incorporating environmentally sustainable practices into business operations. As seen in previous literature, the results were mixed, varying based on how financial performance was conceptualised in each model and the perspective on environmental sustainability. Overall, the study found that implementing environmental practices in daily operations reduces financial performance, regardless of how financial performance is measured.

Relationship between Environmental Sustainability Practices and Financial Performance among Manufacturing MSMEs

This study aims to determine whether there is a significant relationship between environmental sustainability practices and financial performance among manufacturing MSMEs. Table 3 presents the significant correlation between

environmental sustainability practices and financial performance. Regarding environmental sustainability practices, the average score was 4.08, with a standard deviation of 0.53, while financial performance achieved an average score of 3.94, with a standard deviation of 0.57.

Also depicted in Table 3 is the overall computed r-value of 0.493 with a p-value of 0.001. The result implied a moderate positive significant relationship between environmental sustainability practices and financial performance. This also indicates that a correlation exists among the population. The null hypothesis was tested at a 0.05 level of significance, which states that there is no significant relationship between environmental sustainability practices and financial performance and that no domains of environmental sustainability practices significantly influence financial performance. Therefore, evidence suggested the rejection of the null hypothesis of this study.

Table 3
Relationship between Environmental Sustainability Practices and Financial Performance

Variables	Mean	SD	R-Value	P-Value	Decision	Interpretation
Environmental Sustainability Practices	4.08	0.53		0.001	Reject H ₀	Significant
Financial Performance	3.94	0.57	0.493			

**Significant at 0.05 level of significance*

The study's results on environmental sustainability practices and financial performance, as discussed above, also prove the anchored theory of this study. Jay Barney's Resource-Based View (RBV) theory (1991) asserts that firms can achieve a sustained competitive advantage if they possess resources that are valuable, rare, inimitable, and non-substitutable, as these attributes make such resources challenging to replicate while providing long-term value. Consistent with the RBV theory (Barney 1991, cited by Dzomonda 2022), firms with unique resources, such as product and process innovations that competitors cannot easily imitate, are more likely to sustain profitability and long-term success. This study has validated the Resource-Based View by demonstrating that the efficient allocation of financial resources toward proactive environmental practices can positively impact a firm's financial performance. The findings confirm that resources are crucial in developing sustainable environmental management strategies that enhance financial outcomes. This is aligned with the arguments of the Resource-Based View, which suggests that unique, valuable, and inimitable resources such as a cleaner environment can strengthen a firm's legitimacy within society, improve competitiveness through greater consumer patronage, and ultimately contribute to financial success (Russo & Fouts, 1997).

This demonstrated the vital role of environmental sustainability practices in strengthening financial performance. It emphasises that companies with a robust sustainability strategy often face fewer regulatory fines and risks as they comply with

increasingly stringent environmental regulations, thus avoiding potential financial penalties. This boosts productivity and reduces turnover costs, further strengthening the company's financial performance. Dahlmann et al. (2019) emphasise that, over time, corporate efforts to reduce carbon emissions can enhance performance by strengthening relationships with key stakeholders and gaining competitive advantages. Similarly, Li et al. (2017) suggest that the financial benefits of environmental management practices are not immediate; therefore, firms must integrate green initiatives and sustainability policies into their long-term strategies to remain competitive and resilient. This perspective aligns with Hart's (1995) Natural Resource-Based View Theory, which argues that environmental resources can be a source of competitive advantage, particularly when firms implement strategies that address environmental challenges and resource constraints.

Regression Analysis Between Environmental Sustainability Practices and Financial Performance of Manufacturing MSMEs

One of the aims of this study is to determine what domain of environmental sustainability practices significantly influence financial performance among manufacturing MSMEs in Tagum City. In terms of that, the statistical tool employed in this comparison is R Square. The results shown in Table 4 reveal that the influence of environmental sustainability practices on financial performance has an F-value of 31.333 and a P-value of .001. Further, the R-squared of 0.334 indicates that environmental sustainability practices influence 57.8% of the factors that affect financial performance. This also signifies that other variables constitute 42.2% of the financial performance of manufacturing MSMEs.

Specifically, the results indicate that water conservation and energy efficiency have a positive and statistically significant relationship with financial performance. Water conservation has a coefficient of 0.368 and a t-value of 6.144 (p-value = 0.001), while energy efficiency has a coefficient of 0.374 and a t-value of 5.336 (p-value = 0.001). Also, waste management shows a considerable influence on financial performance, with a coefficient of -0.143 and a t-value of -2.304 (p-value = 0.022). This indicates that the three indicators: water conservation, energy efficiency and waste management are the domains of the environmental sustainability practices that significantly influence financial performance.

On the other hand, the result of eco-friendly packaging does not demonstrate a significant influence on financial performance, as indicated by a coefficient of 0.016 and a t-value of 0.429 (p-value = 0.669).

Since the p-value is less than 0.05, the regression analysis indicates that environmental sustainability practices, specifically the domain of water conservation, energy efficiency, and waste management, positively impact financial performance. As a result, the researchers decided to reject the null hypothesis. It is important to remember that additional indications still impact financial performance. The regression analysis result described above is displayed in Table 4.

Table 4

Regression Analysis on the Impact of Environmental Sustainability Practices and Financial Performance of Manufacturing MSMEs in Tagum City, the Philippines

Indicators	Unstandardized Coefficients		Standardized Coefficients	t-value	p-value	Decision
	B	SE	B			
constant	1.380	0.245				
Water Conservation	0.368	0.060	0.390	1.294	0.001	Reject Ho
Eco-friendly Packaging	0.016	0.036	0.025	2.710	0.669	Do not Reject Ho
Waste Management	-0.143	0.062	-0.176	-2.304	0.022	Reject Ho
Water Conservation	0.374	0.070	0.103	5.336	0.001	Reject Ho
Dependent Variable: Financial Performance						
R-value:	0.578	F-value:	31.333			
R Squared:	0.334	P-value:	0.001			

Further, the results above are corroborated by the literature. Regarding waste management, the results of the study of Bogdan et al. (2022) revealed that transparent waste management practices are associated with improved financial performance. The same researchers also stated that firms that engage in waste reduction and recycling can reduce disposal costs and optimise resource usage, directly boosting profitability. This demonstrates that companies that proactively manage and disclose their waste management practices tend to outperform their peers, enjoying tremendous financial success while contributing positively to environmental sustainability. Regarding energy efficiency, Li and Hossain (2021) emphasise that it can be a key driver of financial performance, particularly in industries where energy consumption represents a significant portion of operational costs. Li and Hossain (2021) also concluded that firms that invest in energy-efficient technologies or practices typically experience reduced energy costs, directly leading to better profit margins and higher overall financial performance.

Furthermore, the emphasis on strengthening water conservation among manufacturing MSMEs in Tagum City is especially pertinent given the frequent interruptions in water and electricity supply, not only in Tagum City but also in many areas across the Philippines. These recurring service disruptions create operational vulnerabilities for manufacturing firms that depend on consistent utility access. The study's findings indicate that proactive water-saving practices can reduce reliance on external supply systems and help sustain operations during shortages. This aligns with Dzomoda and Fatoki's (2021) conclusion that adopting proactive water strategies that reduce water consumption mitigates the risk of water shortages and enhances the

overall value of a company, including those in the manufacturing sector. Dzomoda and Fatoki (2021) also state that water conservation and financial performance have a significant positive relationship, suggesting that firms investing in water sustainability initiatives can significantly influence their financial performance.

Moreover, eco-friendly packaging, as Mahmoud et al. (2022) concluded, despite a general awareness of green packaging among consumers, the result of the study found that this awareness did not significantly influence their purchase behaviour, which, in turn, has no significant impact on financial performance. This finding challenges the assumption that eco-friendly packaging automatically leads to increased sales or higher revenue, especially when consumers may not prioritise environmental concerns as much in their buying decisions. This suggests that while eco-friendly packaging was appreciated regarding environmental impact, it did not directly translate into increased sales or revenue.

Limitations and Future Research Directions

While this study provides meaningful insights into the relationship between environmental sustainability practices and financial performance among manufacturing MSMEs in Tagum City, several limitations must be acknowledged. First, the data collected relied on self-reported responses, which may be subject to social desirability bias or inaccuracies in recall, possibly leading to an overstatement of sustainability efforts or financial achievements. Second, the sample was limited to MSMEs that have been operational for at least ten years within Tagum City, which may not fully represent the practices and outcomes of newer or less established enterprises. Third, the study did not account for external factors such as economic conditions, industry-specific challenges, government policies, or the level of technology adoption, all of which may significantly influence financial performance independently of sustainability practices. Future research should consider expanding the geographic scope to include MSMEs from different cities or regions and involve a more diverse range of industries. Further exploration into the influence of specific external variables, such as regulatory changes or shifts in consumer behavior, may also contribute to a more holistic understanding of the dynamics between sustainability and financial performance. These future directions can guide academics, practitioners, and policymakers in developing more robust sustainability strategies that are adaptable across various contexts.

Conclusion

This study confirms that the level of environmental sustainability practices among manufacturing MSMEs in Tagum City is notably high, with waste management and energy efficiency evaluated as very high, and water conservation and eco-friendly packaging rated as high. Financial performance, measured through profitability, liquidity, and sales volume, also reflected high levels. The rejection of the null hypothesis further validates the significant relationship between environmental sustainability practices and financial performance. Moreover, the findings emphasise the strategic role that specific sustainability practices—particularly water conservation, waste management, and energy efficiency—play in enhancing financial outcomes. These practices contribute to reduced operational costs, improved resource utilisation, and increased operational efficiency within MSMEs. The integration of the

Resource-Based View (RBV) and Natural Resource-Based View (NRBV) theories provided a comprehensive framework for understanding the mechanisms through which environmental sustainability contributes to financial success. RBV underscores the importance of leveraging valuable, rare, inimitable, and non-substitutable resources, such as sustainable practices, as a pathway to competitive advantage. Similarly, NRBV affirms that proactive environmental engagement fosters compliance, reduces risk, and enhances market legitimacy, ultimately improving financial outcomes. These findings are further reinforced by existing literature, such as the study by Jum'a et al. (2021), which reported a substantial positive correlation between environmental sustainability practices and financial performance in manufacturing firms. Together, these results suggest that prioritising sustainability is not only environmentally responsible but also financially strategic. As such, it is strongly recommended that manufacturing MSMEs in Tagum City institutionalize sustainability by investing in staff training on efficient waste and energy management, integrating water-saving technologies into operations, and gradually shifting to biodegradable or recyclable packaging materials. Furthermore, MSMEs should establish internal monitoring systems to track sustainability metrics alongside financial performance and seek partnerships with local government units to access sustainability-related incentives, resources, and technical assistance. By doing so, MSMEs can build long-term resilience, enhance competitiveness, and actively contribute to both local economic growth and environmental stewardship.

Recommendations

As manufacturing MSMEs strives for efficient production, sustainable growth, and financial stability, the role of environmental sustainability practices becomes increasingly vital. This study found a significant positive relationship between such practices and financial performance among manufacturing MSMEs in Tagum City. To provide practical value to practitioners, specific recommendations are proposed: prioritize energy-efficient technologies to lower operational costs, adopt waste reduction strategies to improve environmental and financial outcomes, implement monitoring systems for sustainability efforts, engage employees through training, and collaborate with local government or industry networks for support and resources. These actions can help MSMEs strengthen sustainability frameworks, optimize resource use, and enhance stakeholder confidence. However, several limitations must be acknowledged. The study relied on self-reported data, which may be affected by social desirability bias or inaccurate recall, potentially overstating sustainability efforts or financial outcomes. The sample included only MSMEs in Tagum City that have been operational for at least ten years, excluding newer enterprises with potentially innovative approaches. Additionally, external factors such as market competition, government regulation, inflation, and technology adoption were not examined but may influence financial outcomes. Future studies should expand the sample to include various industries and regions, utilize other research methods to gain deeper insights, and explore external influences to gain a more comprehensive understanding of the sustainability–financial performance relationship. Ultimately, the study reinforces that environmental sustainability is a strategic imperative, and when effectively integrated, it can serve as a key driver of long-term business success for MSMEs in Tagum City.

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