International Journal of Environmental Sciences
ISSN: 2229-7359
Vol. 11 No. 17s, 2025
https://theaspd.com/index.php

Factors Affecting The Achievement Of Net Zero Goals: A Case Study Of Manufacturing Companies

Lan Ngoc Thi Uong[1]
[1]Thanh Dong University, Hai Phong City, Vietnam, lanutn@thanhdong.edu.vn, ORCID iD: https://orcid.org/0000-0001-8314-4074

Abstract: *The study focuses on identifying and analyzing factors that affect the ability of manufacturing companies in Hai Phong City to achieve the Net Zero target. The survey of manufacturing companies in Hai Phong City in 2025 reveals seven main factors influencing the accomplishment of this goal, including policies and regulations, investment and finance, technology and innovation, awareness and training, cooperation and networking, economic and social challenges, and management and leadership. The study not only provides an overview of these impact factors but also proposes solutions to enhance businesses' capacity to attain Net Zero goals, contributing to the region's sustainable development. Additionally, the author provides solutions and recommendations to help manufacturing companies more effectively manage waste and emissions, thereby promoting sustainable development and environmental protection.*
Keywords: *Manufacturing companies, Net zero goals, Hai Phong City*

INTRODUCTION

Net Zero is an international goal embraced by many countries and organizations to ensure a sustainable and safe future for the planet. While reaching Net Zero presents challenges, it also creates significant opportunities for the global economy. Its implementation can lead to positive changes across various sectors, including energy, technology, and investment, and promote long-term sustainable development.

Net Zero refers to reaching a balance between the greenhouse gases released into the atmosphere and those removed from it. The goal is to achieve net zero emissions within a specific timeframe, usually by the mid-21st century, to prevent global temperature rises and lessen the harmful effects of climate change (Bolton, 2021). Net Zero plays a vital role in the sustainable growth of businesses by reducing carbon emissions and encouraging long-term environmental responsibility. By committing to Net Zero, manufacturing companies can decrease their ecological footprint, improve resource efficiency, and support efforts to combat climate change (Gulen et al., 2024). This not only helps protect the environment but also enhances a company's reputation, resilience, and competitiveness in a market increasingly focused on sustainability by consumers and investors. Achieving Net Zero can also result in cost savings through energy efficiency and innovations in clean technologies, promoting overall sustainable growth.

The Net Zero goal is more than just an environmental duty; it is also a strategic business tactic. By aiming for Net Zero, companies not only promote sustainable growth but also improve operational efficiency, strengthen brand reputation, and create lasting value for their company and the broader community (Gomes et al., 2024).

LITERATURE REVIEW

2.1. Theoretical framework

The foundational theories used to develop the analytical framework include: Environmental Management Theory, Innovation Theory, Organizational Behavior Theory, Quality Management Theory, and Network Theory. Environmental Management Theory (1970) highlights the importance of environmental management in business activities. It asserts that businesses need to incorporate environmental factors into their strategies and operational processes. The study will examine how legal regulations and environmental policies influence a company's decision to take measures to reduce emissions.

Innovation Theory (1990) states that innovation is a crucial factor for helping businesses grow and compete. Implementing new technology not only enhances performance but also reduces the environmental impact. The study examines how green technology and innovative solutions assist businesses in reaching Net Zero targets.

Organizational Behavior Theory (1980) examines how organizational culture, leadership, and employee perceptions influence business performance. "The study will investigate the level of awareness of the importance of Net Zero among leaders and employees, thereby examining its impact on actions and decisions in the company."

Quality Management Theory (1980) emphasizes the importance of quality management across all business processes, promoting continuous improvement and process optimization. This study will examine a company's ability to manage waste and emissions, and how this impacts its capacity to achieve sustainability goals.

Network Theory (1990) suggests that cooperation among parties in a network can generate added value and synergy. The study will examine how businesses and other stakeholders collaborate by sharing experiences and resources to reach the Net Zero goal.

The above theories offer a solid basis for studying the factors influencing manufacturing companies in Hai Phong City to reach the Net Zero goal. Applying these theories will help better understand the internal and external factors affecting their sustainable transformation, leading to appropriate and effective solutions.

2.2. Overview of research

Aguilera et al. (2021) argue that "As corporations face increasing scrutiny over their environmental impact, scholars are more frequently focusing on the role of corporate governance in promoting sustainability efforts. However, a comprehensive understanding and research agenda are still lacking. Our framework links governance actors to sustainability outcomes, identifies knowledge gaps, and suggests new approaches for future research."

Hakovirta et al. (2023), addressing climate change, now lead the priorities of global corporations, calling for innovation in technology, policy, and finance. This article explores the crucial role start-ups play in driving climate innovation and supporting corporate sustainability initiatives.

Erb et al. (2022) indicate, "A leader is essential for transitioning to a zero-carbon global economy. Companies are under increasing pressure from investors, customers, and employees to set climate targets with actionable plans. Many large firms are now committing to long-term GHG reduction goals, including net-zero by 2050, using strategies like renewable energy adoption and carbon removal investments".

Chan et al. (2024) reveal "The G20 emphasized the urgency of financing the net-zero transition, but investors lack a framework to assess the credibility of corporate transition claims. Negative screening based on GHG emissions remains common. This paper uses economic modeling and interviews to suggest that a firm's transition capacity, urgency, and pathway concavity are key factors in assessing its net-zero potential. It also explores how the TCFD framework can help evaluate corporate transition credibility."

Mazhar et al. (2024) show that "Small and medium-sized enterprises (SMEs) are vital to the UK and EU economies, making up most businesses and employing many people. Despite their positive impact, SMEs contribute 43–53% of greenhouse gas emissions and face challenges in carbon management due to limited support. This research investigates the effect of a university-led program on helping SMEs develop carbon management strategies, revealing that universities play a key role in assisting SMEs with transitioning to net zero through resource monitoring, policy development, and target setting.

Xu and Adams (2024) state, "Amid the climate crisis, countries like the US, UK, and France are working toward net-zero emissions targets, with the UK aiming for 2050. SMEs, responsible for nearly half of the UK's business emissions, are crucial to this effort. However, action among SMEs remains limited. This research examines factors driving pro-NetZero actions among UK SMEs using a mixed-method approach, revealing that owner-managers' attitudes and perceived behavioral control directly influence their intentions, while societal and stakeholder pressures have an indirect effect."

Sharma et al. (2024) explore how different resources, such as tangible assets, human expertise, and intangible assets, affect the development and adoption of net zero practices and influence SMEs' environmental performance. It also examines the moderating role of digitalization in this process. Analyzing data from 291 SMEs with structural equation modeling, the study highlights the importance of managing resources and capabilities, especially intangible assets like organizational culture and learning, for reaching net-zero targets. Additionally, using Industry 4.0 technologies is identified as essential for SMEs progressing toward a sustainable net zero economy.

Based on these theories, the author conducted a survey of manufacturing companies in Hai Phong City and examined factors affecting the achievement of Net Zero targets by manufacturing companies through the following research model.

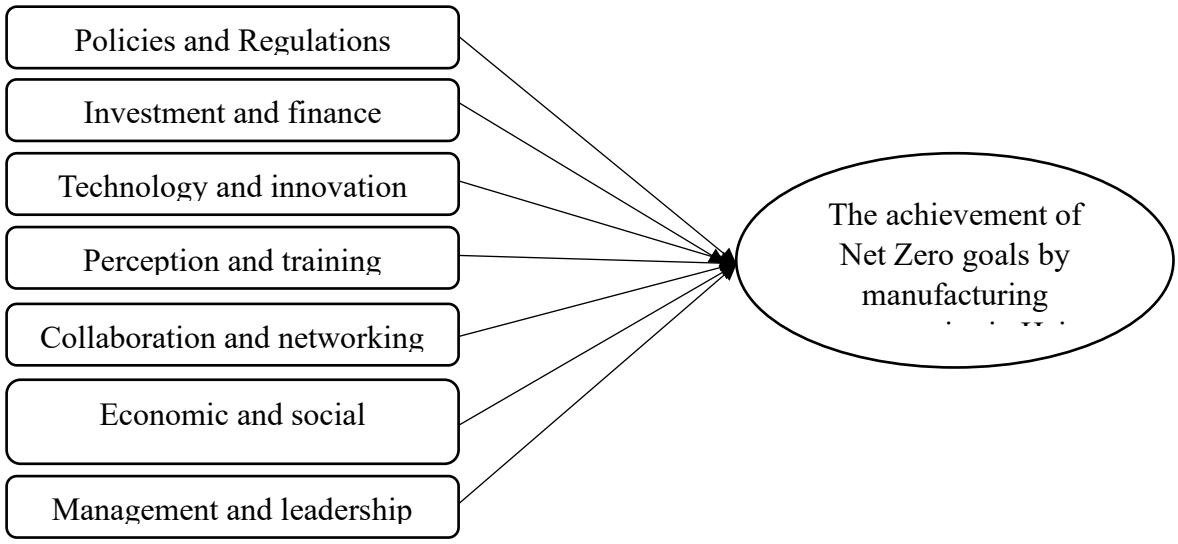

Figure 1: Research model
Source: Compiled by the author

The proposed research hypotheses are as follows:

H1: Policies and regulations have a positive impact on the achievement of Net Zero goals by manufacturing companies in Hai Phong.

H2: Investment and finance have a positive impact on the achievement of Net Zero goals by manufacturing companies in Hai Phong.

H3: Technology and innovation have a positive impact on the achievement of Net Zero goals by manufacturing companies in Hai Phong.

H4: Perception and training have a positive impact on the achievement of Net Zero goals by manufacturing companies in Hai Phong.

H5: Collaboration and networking have a positive impact on the achievement of Net Zero goals by manufacturing companies in Hai Phong.

H6: Economic and social challenges have a positive impact on the achievement of Net Zero goals by manufacturing companies in Hai Phong.

H7: Management and leadership have a positive impact on the achievement of Net Zero goals by manufacturing companies in Hai Phong.

METHODOLOGY

3.1. Measurement scales

The scale of the observed variable, shown in detail in Table 1.

Table 1: Measurement scales

Scales	Sign	Items
Policies and regulations (PR)	PR1	The region provides detailed guidance for enforcing regulations on emission control, waste management, and the expansion of renewable energy.
	PR2	Local agencies implement policies that promote business investments in green technology and lower emissions.
	PR3	Local programs are in place to raise awareness and assist businesses with implementing environmental regulations.
	PR4	Companies understand the legal framework regarding local and national regulations on emissions and environmental protection.
	PR5	The company has set long-term strategies to promote sustainability, with clear goals for reducing emissions and protecting the environment.
	PR6	Local authorities work together to oversee and examine the enforcement of environmental regulations.

Scales	Sign	Items
Investment and finance (IF)	IF1	Companies often struggle to access capital for sustainable projects.
	IF2	The loan process is often long and complicated, making it hard for companies to quickly fund sustainable projects.
	IF3	Companies lack sufficient understanding of financial products and how to secure funding, particularly for environmental projects.
	IF4	Companies might lack sufficient information to evaluate the risks and benefits of investing in sustainable technology, which causes hesitation in borrowing.
Technology and innovation (TI)	TI1	The ability to implement new technologies in energy production and management to lower emissions.
	TI2	Using eco-friendly technologies such as solar, wind, and heat recovery systems decreases emissions during production.
	TI3	Using smart energy management technology helps businesses optimize their energy consumption, which in turn cuts greenhouse gas emissions.
	TI4	Enhance production processes and employ eco-friendly raw materials.
Perception and training (PT)	PT1	Management's view of climate change and the importance of the Net Zero goal critically influence the company's strategy and commitment.
	PT2	Employee understanding of Net Zero goals promotes a sustainable company culture, encouraging participation in environmental efforts.
	PT3	The company regularly conducts employee training on sustainable development and environmental management.
	PT4	Encourage sharing experiences and best practices from other companies that have successfully implemented the Net Zero goal.
Collaboration and networking (CN)	CN1	Cooperation between companies helps to combine resources, knowledge, and experience, creating synergies to address common challenges.
	CN2	Sharing processes and best practices helps businesses improve operations, reduce costs, and boost production efficiency.
	CN3	Partner with NGOs and global networks to gain support and expertise.
Economic and social challenges (ES)	ES1	Competition within the industry can prevent investment in sustainable projects.
	ES2	Companies competing on price incur higher costs due to sustainable technology investments.
	ES3	Eco-friendly projects often take longer to turn a profit, which makes companies hesitant to invest.
Management and leadership (ML)	ML1	Effective waste and emission management helps companies reduce resource waste, boost production efficiency, and lower costs.
	ML2	Companies must follow regulations on emissions and waste management to prevent legal risks and fines.
	ML3	The management's commitment to achieving the Net Zero goal.
The achievement of Net Zero goals by manufacturing	NET1	The company has set specific targets to achieve Net Zero emissions in its manufacturing operations.
	NET2	The company is taking specific actions, such as conserving energy, recycling, and using renewable energy, to achieve Net Zero goals.

Scales	Sign	Items
companies in Hai Phong (NET)	NET3	The management is deeply committed to reaching the company's Net Zero targets.

Source: Compiled by the author

3.2. Data collection and analysis

The author surveyed 500 manufacturing companies in Hai Phong City. After that, 250 questionnaires were obtained to meet the requirements. Then, the author cleaned and analyzed the data using SPSS 26 software. The timeframe is from January 2024 to May 2024.

FINDINGS AND DISCUSSION

4.1. Reliability testing

Table 2 shows that the Cronbach's Alpha coefficients range from 0.748 to 0.862, which are all above 0.7, confirming the reliability of the scales. The Corrected Item - Total Correlation coefficients range from 0.574 to 0.712, indicating a correlation above 0.3 between variables. Therefore, the variables are suitable for exploratory factor analysis (EFA) (Hair et al., 2010).

Table 2: Cronbach's Alpha

Scales	Cronbach's Alpha	Corrected Item – Total Correlation
Policies and regulations	0.764	0.574
Investment and finance	0.839	0.655
Technology and innovation	0.748	0.629
Perception and training	0.862	0.700
Collaboration and networking	0.849	0.712
Economic and social challenges	0.798	0.688
Management and leadership	0.804	0.673
The achievement of Net Zero goals by manufacturing companies in Hai Phong	0.800	0.682

Source: Analysis results from SPSS 26

4.2. Exploratory factor analysis

Table 3 presents a KMO coefficient of 0.813, which exceeds 0.5, indicating that the EFA analysis is appropriate. Bartlett's Test has a significance level of 0.000. In terms of linear correlation, the observed variables from PR1 to ML3 have a high correlation with the independent factors. Based on the matrix analysis results, the observed variables have factor loadings greater than 0.5 and are arranged accordingly, suggesting that the model does not contain any problematic variables (Hair et al., 2010).

Table 3: Rotation matrix of independent factors

Items	Factor						
	1	2	3	4	5	6	7
PR1	0.893						
PR2	0.884						
PR3	0.867						
PR4	0.856						
PR5	0.844						
PR6	0.832						
IF1		0.846					
IF2		0.835					
IF3		0.824					
IF4		0.812					
TI1			0.888				
TI2			0.876				
TI3			0.859				
TI4			0.822				
PT1				0.855			
PT2				0.830			

Items	Factor						
	1	2	3	4	5	6	7
PT3				0.823			
PT4				0.818			
CN1					0.799		
CN2					0.784		
CN3					0.777		
ES1						0.870	
ES2						0.861	
ES3						0.840	
ML1							0.849
ML2							0.833
ML3							0.811

Source: Analysis results from SPSS 26

Table 4 displays a KMO coefficient of 0.810, which is above 0.5, and Bartlett's test has a significance level of 0.000. The factor loadings are all higher than 0.5, indicating good convergence and variable reliability (Hair et al., 2010).

Table 4: Rotation matrix of the dependent factor

Items	Factor
	1
NET1	0.834
NET2	0.817
NET3	0.800

Source: Analysis results from SPSS 26

4.3. Correlation analysis

Table 5 shows that the correlation coefficient between independent and dependent variables ranges from 0.121 to 0.492, indicating a strong relationship. All independent variables have Sig. values > 0.05, supporting the hypothesis. The overall correlation coefficient is 0, indicating no variation in the model. Additionally, the VIF coefficients for independent variables are all < 2, signifying no multicollinearity issues (Table 6) (Hair et al., 2010).

Table 5: Correlation analysis between independent and dependent variables

	Correlation							
	PR	IF	TI	PT	CN	ES	ML	NET
PR	**1.000**	0.453**	0.327*	0.261***	0.372**	0.402**	0.127***	0.465***
IF	0.453**	**1.000**	0.232***	0.156**	0.210***	0.319***	0.222**	0.201***
TI	0.327*	0.232***	**1.000**	0.321***	0.121**	0.200**	0.492***	0.384***
PT	0.261***	0.156**	0.321***	**1.000**	0.231**	0.300***	0.213**	0.322***
CN	0.372**	0.210***	0.121**	0.231**	**1.000**	0.345**	0.400***	0.378***
ES	0.402**	0.319***	0.200**	0.300***	0.345**	**1.000**	0.394**	0.268***
ML	0.127***	0.222**	0.492***	0.213**	0.400***	0.394**	**1.000**	0.303***
NET	0.465***	0.201***	0.384***	0.322***	0.378***	0.268***	0.303***	**1.000**
Notes: *significant at p < 0.05, **significant at p < 0.01, ***significant at p < 0.001								

Source: Analysis results from SPSS 26

4.4. Multiples regression analysis

Table 6 shows that the adjusted R^2 value of 0.754, or 75.4%, indicates the direct influence of factors such as policies and regulations, investment and finance, technology and innovation, awareness and training, cooperation and networking, economic and social challenges, and management and leadership on achieving Net Zero targets by manufacturing companies in Hai Phong City. The F test reveals a very low significance value (Sig. = 0.000), suggesting the research model fits the survey sample well. All independent variables (PR, IF, TI, PT, CN, ES, ML) are statistically significant with Sig. < 0.05. The variance inflation factor (VIF) ranges from 1.253 to 1.743, indicating no multicollinearity issues among the independent variables (Hair et al., 2010).

Table 6: Results of regression analysis

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	Constant	0.253	0.035		2.382	0.002		
	PR	0.313	0.036	0.335	2.043	0.034	0.558	1.253
	IF	0.301	0.040	0.320	2.383	0.001	0.628	1.470
	TI	0.345	0.038	0.367	2.562	0.000	0.579	1.738
	PT	0.298	0.040	0.312	2.093	0.023	0.563	1.743
	CN	0.276	0.039	0.288	2.427	0.003	0.555	1.578
	ES	0.190	0.034	0.202	2.942	0.012	0.569	1.696
	ML	0.186	0.036	0.197	2.894	0.004	0.600	1.600
Adjusted R^2 = 0.754 Durbin-Watson = 1.874 Statistics F(ANOVA) = 91.273 Sig. of ANOVA = 0.000								

Source: Analysis results from SPSS 26

CONCLUSION AND IMPLICATIONS

The inspection results show that the research model is appropriate, identifying seven key factors affecting the achievement of Net Zero goals by manufacturing companies in Hai Phong City: (1) Investment and finance; (2) Policies and regulations; (3) Technology and innovation; (4) Perception and training; (5) Collaboration and networking; (6) Economic and social challenges; and (7) Management and leadership. Based on this, the author recommends the following actions:

First, to reach the Net Zero targets, Hai Phong manufacturing companies must adopt appropriate investment and financial strategies. Support from the government, financial institutions, and the community is vital for overcoming challenges and achieving sustainability goals through these approaches: creating dedicated investment funds for sustainable and green projects; encouraging government support with concessional loans or subsidies for clean technology and renewable energy; promoting public-private partnerships for sustainable initiatives; investing in research and development; developing a sustainable financial network; improving training and awareness; and offering green financial products.

Secondly, to help Hai Phong manufacturing companies achieve Net Zero, effective policies and regulations are essential. Solutions include establishing a clear legal framework, encouraging the participation of manufacturing companies in sustainability programs, providing technical assistance, enforcing environmental reporting rules, offering tax incentives and financial support for clean technology, conducting ecological management and sustainability training, and promoting collaboration among governments, enterprises, NGOs, and communities.

Thirdly, adopting technology and innovation is essential for Hai Phong manufacturing companies to achieve Net Zero. Solutions include investing in renewable energy sources such as solar, wind, and biomass; utilizing energy-efficient equipment; investing in carbon capture and storage technologies; implementing smart technologies, such as IoT, for monitoring energy and emissions; partnering with research and educational institutions to develop new sustainable technologies; and hosting entrepreneurship competitions and innovation events to promote new sustainability ideas.

REFERENCES

1. Aguilera, R. V., Aragón-Correa, J. A., Marano, V., & Tashman, P. A. (2021). The corporate governance of environmental sustainability: A review and proposal for more integrated research. Journal of Management, 47(6), 1468-1497. http://dx.doi.org/10.1177/0149206321991
2. Bolton, P., Reichelstein, S. J., Kacperczyk, M. T., Leuz, C., Ormazabal, G., & Schoenmaker, D. (2021). Mandatory corporate carbon disclosures and the path to net zero. Management and Business Review, 1(3), 21-28. https://journals.sagepub.com/doi/pdf/10.1177/2694105820210103003
3. Chan, K. J. D., Cheung, B., & Shen, L. Y. (2024). An economic foundation for assessing the credibility of corporate net zero transition pathways. Business Strategy and the Environment, 33(8), 8868-8881. https://doi.org/10.1002/bse.3951

4. Erb, T., Perciasepe, B., Radulovic, V., & Niland, M. (2022). Corporate climate commitments: the trend towards net zero. In Handbook of climate change mitigation and adaptation (pp. 2985-3018). Springer.
5. Gomes, A., Gopalan, R., Leary, M. T., & Marcet, F. (2024). Analyst coverage networks and corporate financial policies. Management Science, 70(8), 5016-5039. https://doi.org/10.1287/mnsc.2023.4891
6. Gulen, H., Ion, M., Jens, C. E., & Rossi, S. (2024). Credit cycles, expectations, and corporate investment. The Review of Financial Studies, 37(11), 3335-3385. https://doi.org/10.1093/rfs/hhae047
7. Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). Multivariate Data Analysis (7th Edition). Pearson, New York.
8. Hakovirta, M., Kovanen, K., Martikainen, S., Manninen, J., & Harlin, A. (2023). Corporate net zero strategy-Opportunities in start-up driven climate innovation. Business Strategy and the Environment, 32(6), 3139-3150. https://doi.org/10.1002/bse.3291
9. Mazhar, M. U., Domingues, A. R., Yakar-Pritchard, G., Bull, R., & Ling, K. (2024). Reaching for net zero: The impact of an innovative university-led business support programme on carbon management strategy and practices of small and medium-sized enterprises. Business Strategy and the Environment, 33(7), 6940-6960. https://doi.org/10.1002/bse.3844
10. Sharma, A., Chaudhary, M., Kumar, K., & Daga, S. (2024). Promoting Net-Zero Economy for Sustainable Development: Practice-Based View. In Net Zero Economy, Corporate Social Responsibility and Sustainable Value Creation: Exploring Strategies, Drivers, and Challenges (pp. 101 116). Springer.
11. Xu, Z., & Adams, R. (2024). Navigating the Green Transition: A Mixed-Method Study of Pro-NetZero Actions in UK SMEs. Academy of Management Proceedings, 2024(1), 20699. https://doi.org/10.5465/AMPROC.2024.271bp