

THE IMPACT OF DIGITAL TRANSFORMATION AND ESG ON THE BUSINESS PERFORMANCE OF SMALL AND MEDIUM-SIZED LOGISTICS ENTERPRISES

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ABSTRACT

This study uses a mixed methodology to assess the impact of digital transformation and ESG on the business performance of small and medium-sized logistics enterprises. The research model was constructed and validated using a linear structural equation model. Data was collected from 268 small and medium-sized logistics enterprises in Ho Chi Minh City, Vietnam. The findings of the research indicate that the phenomena of digital transformation and ESG criteria are emerging as pervasive global trends, significantly influencing logistics enterprises, while simultaneously posing challenges associated with financial resources, technological advancements, and the operationalization of environmental policies. Empirical analysis indicates that the two digital transformation factors of technological innovation and the trend of innovation, and the three ESG factors of environmental commitment, social responsibility, and governance capacity, all five factors have a significant impact on the business performance of small and medium-sized logistics enterprises. Based on these findings, the study proposes managerial implications and practical solutions to improve business performance for small and medium-sized logistics enterprises (SMEs). The research provides valuable results for SMEs and managers in developing strategies and policies to promote digital transformation and ESG towards sustainable business.

Keywords: ESG standards, logistics enterprises, sustainable development, sustainable environmental economy.

1. INTRODUCTION

According to the Global Reporting Initiative (2022), "The concept of ESG is a set of specific quality standards used in the development of strategic reports by businesses" [1]. Bowen (1953), said that "The ESG standard is a set of criteria for evaluating the level of impact related to sustainable development and the impact of companies on the community and society, aiming towards the Net Zero green transformation goals. A higher ESG score indicates better ESG performance, and vice versa. Initially, the theory of ESG was reported in the form of CSR, originating from a work" [2]. Since then, the term ESG officially appeared in 2004 in a landmark report of the United Nations Global Compact [3]. The PwC (2022), "Vietnam ESG Index Report states that In Vietnam, ESG standards are not just a new term but are gradually

becoming a vital factor for companies participating in the international economy. The ESG Readiness Survey, a public survey conducted from May to August 2022 among the business community in Vietnam, involved 234 participating businesses asked about their commitments, plans, capabilities, and activities related to ESG. It found that 44% had established and committed to implementing ESG initiatives; 36% are currently in the preparation phase for the next 2-4 years" [4].

Many logistics enterprises need to outline a clear strategy for long-term ESG implementation with the goal of sustainable development and minimizing their emission footprint, particularly among logistics enterprises in Ho Chi Minh City. This is a necessary step in the context of the logistics industry needing to save costs, improve operational efficiency, and meet customer expectations. It provides a foundation for identifying the challenges faced by small and medium-sized logistics enterprises and necessitates policy recommendations and solutions to build a framework for information exchange to effectively access and respond to the trends of the Fourth Industrial Revolution. This study analyzes the impact of digital transformation and ESG on the business performance of logistics enterprises in Ho Chi Minh City, Vietnam. The research proposes specific solutions for building a policy framework, technical framework, and roadmap for developing modern infrastructure to flexibly apply ESG standards, contributing to improved business efficiency. Simultaneously, it helps businesses find ways to adapt and keep up with green logistics trends in the Industry 4.0 era, aiming for sustainable business practices for logistics enterprises.

2. THEORETICAL BACKGROUND & RESEARCH MODEL

2.1. Theoretical background

The theory of ESG was initially put forward by Anderson and Erika (2023) in his book "Social Responsibility of the Businessman, referring to the social responsibility of businesses in their production and business activities (CSR - Corporate Social Responsibility)" [5]. From there, Swiss Federal Department of Foreign Affairs and United Nations (2004), proposed "The term ESG officially appeared in 2004 in a landmark report of the United Nations Global Compact titled 'Who Cares Wins'. The ESG standard, an acronym for E – Environment; S – Social and G – Governance, is a set of standards to assess the extent to which factors related to sustainable development and the impact of companies on the community and society are affected, aiming towards the Net Zero green transformation goals. A higher ESG score indicates better ESG practices, and vice versa" [3].

Agency theory by Jensen and Meckling (1976), suggests that "Participation in environmental, social, and governance initiatives constitutes an agency dilemma between management agents and shareholders. In line with this theoretical framework, spending on ESG initiatives is considered inconsistent with the optimal interests of shareholders, as such expenditures represent a direct capital outflow that negatively impacts returns" [6]. This is firstly when managers use company resources for personal gain Brown et al. (2006) [7]. From this perspective, participation in ESG activities is seen as a misallocation of the company's net resources, thus undermining operational efficiency. Furthermore, ESG commitments can cause companies to abandon projects that could yield superior returns (Schuler and Cording, 2006) [8]. According to Allouche and Laroche (2005), "The social achievements a company makes incur financial costs attributable to capital, thus putting the company at a relative competitive disadvantage compared to its rivals due to its less social activity" [9]. Therefore, Environmental, Social and Governance (ESG) initiatives are implemented with the goal of enhancing the organization's reputation and attracting public interest as a strategy to mitigate suboptimal performance outcomes.

2.2. Literature review and research hypothesis

Increasingly, small and medium-sized logistics enterprises are becoming interested in sustainability issues and are seeking to make ESG investment decisions based on reliable data analysis to meet the growing demands of the market. According to the author's research, logistics enterprises and stakeholders anticipate a high level of transparency regarding ESG information to facilitate the evaluation and comparative analysis of performance indicators. Based on theoretical foundations and a literature review conducted by the authors, this research hypothesis is proposed:

Hypothesis H1: Environmental commitment from businesses has a strong impact on reducing emissions. "Environmental concern is understood as the level of awareness, willingness to act, and commitment to support the resolution of environmental issues" (Hu et al., 2024) [10]. "Businesses with a high level of environmental concern tend to have a positive attitude towards green supply chains and demonstrate responsibility in the production process" (Sultana et al., 2022) [11]. Furthermore, "Environmental concern is a crucial component of environmentally friendly construction, strongly influences the green value chain" (Ogiemwonyi and Eneizan, 2025) [12], and significantly impacts subjective attitudes and norms (Justin et al., 2016) [13]. The study by Ogiemwonyi and Eneizan (2025), showed that "Corporate environmental commitment has a strong impact on reducing emissions through the adoption of sustainable production and operational solutions. Investing in clean technology, optimizing logistics processes, and using energy efficiently helps businesses significantly reduce greenhouse gas emissions. Simultaneously, environmental commitment encourages businesses to comply with ESG standards and enhance their responsibility for sustainable development" [12].

Hypothesis H2: Social responsibility influences the adoption of ESG standards. A study by P. Justin et al. (2016) demonstrated that organizations with accurate understanding of ESG issues are more likely to engage in practical behaviors in their operations, thus facilitating the achievement of sustainable development goals consistent with ESG standards [13]. Seon-Ok and Jung (2025) highlighted "The increasing recognition of sustainability and corporate responsibility in business practices"[14]. Seon-Ok and Jung (2025), showed that "Ethical responsibility is a key factor driving businesses to adopt ESG standards as part of their commitment to sustainable development. Awareness of obligations to the environment, employees, and communities leads businesses to proactively comply with social norms and transparent governance"[14]. Therefore, ethical responsibility contributes to the formation of intentions and behaviors to adopt ESG voluntarily and sustainably.

Hypothesis H3: Public governance influences the intention to adopt ESG standards and digital transformation. According to Carroll's (1991). "pyramid" model, economic responsibility is considered the foundation upon which other aspects of corporate responsibility are built. ESG investment forms a model that integrates Environmental, Social, and Governance factors into risk assessment and asset allocation strategies, thereby enhancing sustainable and long-term financial returns"[15]. Carroll's (2016) research shows that "Government support plays a crucial role in promoting the intention of businesses to adopt ESG standards. Incentive policies, a clear legal framework, and financial support programs help reduce cost and risk barriers to ESG implementation"[15]. Simultaneously, training, guidance, and communication from government agencies contribute to raising awareness and capacity for ESG implementation among businesses, especially small and medium-sized enterprises.

Hypothesis H4: Technological innovation significantly impacts business performance in implementing ESG standards. An international survey conducted by Carter and Rogers (2008) further corroborated that "Technological innovation in the supply chain constitutes a

fundamental factor enabling businesses to achieve long-term sustainable growth"[16]. Businesses demonstrating higher compliance with legal responsibilities tend to perform better in implementing ESG standards (Hummel and Schlick, 2016). Hummel and Schlick's (2016) research showed that "Business expectations significantly influence the intention to adopt ESG standards when businesses perceive technological innovation as providing long-term benefits in operational efficiency and sustainable growth. Expectations of enhanced brand image, market expansion, and attracting investors motivate businesses to integrate ESG into their business strategy"[17]. Therefore, ESG is seen as a tool to support the creation of value and competitive advantage in the future.

Hypothesis H5: The dynamics of digital transformation influence the adoption of ESG standards. According to Porter's (2008), "Theory of industry competition, the intensity of competition among companies not only catalyzes innovation but also forces organizations to continuously improve their practices to maintain competitiveness"[18]. In the Vietnamese context, leading businesses implementing ESG principles not only inspire but also set standards for logistics enterprises in the logistics and supply chain management sector to follow, thereby ensuring their competitiveness while meeting the escalating demands from the market and stakeholders. Porter's 1980 research showed that market dynamics significantly influence the adoption of ESG standards by businesses through competitive pressure and demands from customers and supply chain partners. As the market increasingly prioritizes sustainable products and services, businesses are forced to implement ESG to maintain a competitive advantage and market access. Furthermore, the trend towards responsible investing also encourages businesses to proactively integrate ESG into their development strategies.

2.3. Research model

From the research results of the theoretical basis and expert interviews, the author proposes a research model of the impact of digital transformation and ESG on the business performance of small and medium-sized logistics enterprises in Ho Chi Minh city, Vietnam, including: 1) Commitment to the environment (MT); 2) Social responsibility (XH); 3) Management competence (QT); 4) Technological innovation (DM); 5) Trends in innovation (XT) (Figure 1).

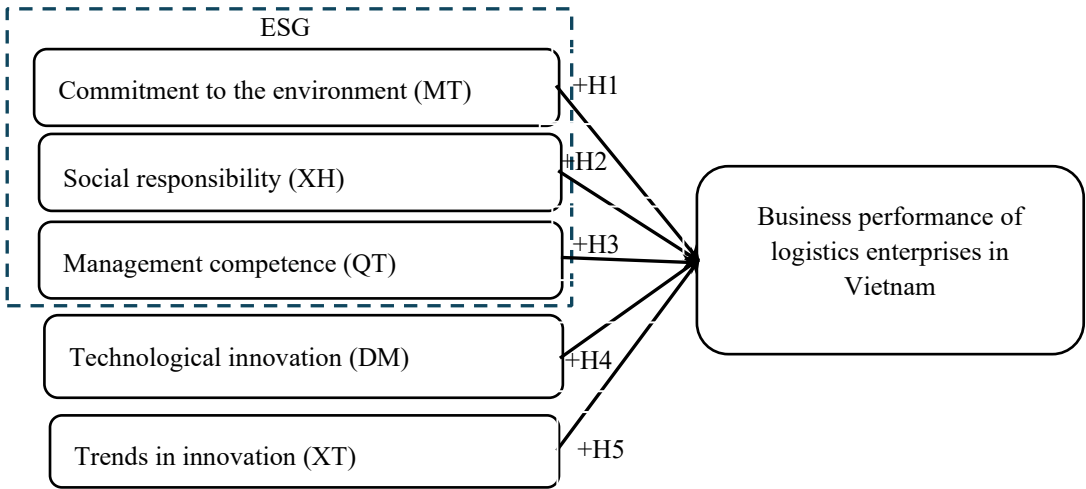


Figure 1. Research model of factors affecting the application of ESG standards to small and medium-sized logistics enterprises in Ho Chi Minh City, Vietnam

Source: Study Authors, 2026

In particular, the hypothesis of the scale variable is as follows:

- Management competence on ESG standards (QT), including 04 scales: QT1 - Laws regarding the application of ESG standards; QT2 - Policy applying ESG standards; QT3 - Deployment strategy implementing ESG of enterprises; QT4 - Applying ESG standards in the supply chain of small and medium-sized Logistics enterprises.

- Commitment to the environment (MT), including 05 scales: MT1 – Commitment to green and sustainable consumption; MT2 – Commitment to minimizing risks in business; MT3 – Commitment to actively accepting ESG; MT4 – Commitment to reducing emissions in production; MT5 – Commitment to green transformation in the supply chain.

- Trends in innovation (XT), including 05 scales: XT1 – Trend of using standards ESG in trade; XT2 – Deployment trend implementing ESG in production as well as XT3 – Standard consumption trend from major markets; XT4 – Trend of applying pressure on investment costs. XT5 – Market trend regarding the level of ESG application in the future because it is in the digital age with the superior ability to verify goods and secure customer information.

- Social responsibility of businesses (XH), including 05 scales: XH1 – Responsibility environment safe working environment for employees; XH2 – Responsibility for service quality for customers; XH3 – Responsibility for legal compliance, community charity work. These factors will affect the decision of businesses in applying ESG standards in the logistics sector, as well as increase the prospects of businesses to transform faster in the logistics industry. XH4 – Responsibility and protection of rights for employees and customers; XH5 – Experience protecting customer data privacy and rights.

- Technological innovation for ESG standards (DM), including 05 scales: DM1 – Improve corporate image and brand; DM2 – Increase access to investment capital; DM3 – Expand markets and improve competitiveness; DM4 – Reduce waste and long-term operating costs; DM5 – Minimize risks from boycotts or negative reactions from the community.

3. METHODOLOGY

Using a market system, policy, organizational and institutional research approach for the study, the authors used a mixed research method. The qualitative method is used to study the current situation and collect secondary information and data including relevant domestic and foreign studies, published reports, interviews with 10 experts who are managers and related researchers, using questionnaires to identify and standardize scales and screening questions, build official surveys for research, with objectivity and reliability.

The quantitative research method used to synthesize and analyze primary data is compiled from the survey results with a conveniently distributed sample from enterprises with food retail supply chains in Ho Chi Minh City, ensuring the sample size according to Hair et al (2019), "The sample size for discovery factor analysis (EFA) and linear structure model analysis is at least 50 observations, with an acceptable rate of 05 observations/01 variable. The formula for calculating the sample size is: $N = 5x$ (N is the number of observations/survey sheets, x is the number of measurement variables/questions), the critical sample size requirement must be 100 respondents"[19]. The authors developed a set of 24 questions, with a ratio of 5:1, the appropriate sample size for EFA analysis was $24 \times 5 = 120$. The authors collected 268 valid questionnaires (out of 280 samples emitted) to carry out the evaluation, 12 invalid samples due to insufficient authenticity of the evaluation data should be discarded, ensuring the reliability of the research analysis steps.

In addition to assessing the conditions for applying ESG standards at logistics enterprises in Ho Chi Minh city, Vietnam from the literature review method, the article conducts a survey using a Google Form questionnaire. After collecting 280 responses, the author compiled 268

valid responses from logistics enterprises and 12 invalid responses (Of the 268 valid responses, 126 were from Ho Chi Minh City, 80 from Hanoi, 45 from Quang Ninh and Hai Phong, 35 from Dong Nai Province, 30 from Can Tho City, 22 from Da Nang City, and 20 from other provinces and cities).

Official research of the topics quantitative method to collect survey information, analyze survey data and test the model. Data collected from 268 survey samples during the interview from the workers will be coded and cleaned. Then proceed to data analysis including: Sample descriptive statistics, scale testing using Cronbach's Alpha reliability coefficient, EFA exploratory factor analysis and Annova test, all research results performed by SPSS 26.0 software.

Research tools, survey questionnaires, data synthesis, and analysis are EXCEL, SPSS 26.0 software.

4. RESULTS & DISCUSSION

4.1. Trends driving and current status of ESG application in Vietnamese small and medium-sized logistics enterprises

According to Cheng et al. (2024), "The logistics industry, essential to global supply chain operations, has a significant impact on the environment, contributing approximately 25% of global emissions. It is a major source of pollution and resource consumption, mainly due to transportation's reliance on fossil fuels (16.2% of global greenhouse gas emissions), warehousing, and in some cases, inefficient operations." Furthermore, the 2016 Greenhouse Gas Inventory Report of the Ministry of Natural Resources and Environment also shows that the largest emitting sectors are industrial energy, construction energy, and transportation energy. CO₂ emissions from the transportation sector alone account for 17.6%, ranking second. More and more businesses are actively participating in initiatives to reduce carbon emissions and waste, and use resources responsibly, in order to meet ESG criteria that are becoming paramount in the minds of both investors and consumers"[20]. This trend has prompted logistics enterprises to adjust their strategies. According to Ho (2024), "J&T Express, for example, is very active in using environmentally friendly materials in its logistics operations. The company put into use 42,192 recyclable bags at its transit centers nationwide. The company also implemented a series of community projects through the "Building the Future" program – J&T Express's joint project 'Planting 1 Billion Trees', or previously the 'Collecting Recyclable Waste into Gifts for Schools' program, aiming to encourage recycling and raise community awareness about environmental protection" [21]. These initiatives not only meet consumer needs but also help businesses build a positive image in a competitive market. A study by Amuda et al. (2025), "Conducted a panel regression analysis over ten years (2012–2022) using data from 49 countries. A study was conducted involving 34,953 observed businesses to investigate the relationship between ESG adoption and business sustainability." [22]. The results showed that implementing ESG criteria in risk management strategies is crucial as it strengthens both long-term sustainability and financial stability.

Businesses that understand the role of ESG in risk management and achieve financial stability will have better financial results, supporting global sustainable development goals. According to the Ministry of Industry and Trade (2025), "Vietnam currently has 34,476 logistics enterprises, with a total of 563,354 employees. The Vietnamese logistics service industry has made significant progress, growing at an average rate of 14-16% per year, more than double the world average. The size of the Vietnamese logistics service market is estimated at approximately US\$45-50 billion, equivalent to 10% of GDP and 5% of import and export turnover." In particular, by 2025, Vietnam is expected to be ranked by international organizations in the Top 10 emerging logistics markets, Top 4 in the region for the Logistics

Opportunity Index, Top 5 in ASEAN and Top 40 in the world for the Logistics Efficiency Index"[23]. However, according to the Ministry of Industry and Trade (2025), “logistics enterprises are facing very clear opportunities and challenges when applying ESG standards” [23]. According to the Vietnamese Ministry of Industry and Trade (2024), “ESG integration is not only an inevitable trend but also a foundation for logistics enterprises to enhance their competitiveness, achieve sustainable development, and participate more deeply in the global supply chain. Recent surveys show that approximately 28.8% of logistics enterprises are in the ESG planning stage, while about 31.2% have established and partially implemented ESG commitments, but no businesses have reported having fully implemented ESG. Human resources are a major obstacle: more than 60% of businesses report a lack of internal ESG experts or professionals to measure and report indicators such as emissions, supply chain management, and occupational safety. The cost of hiring ESG consultants or specialized personnel, including data processing and building management systems, is also a barrier for small and medium-sized logistics enterprises”[24]. Therefore, it can be seen that Vietnamese logistics enterprises have the opportunity for breakthrough development, while also facing pressure to change their brand development strategies by adopting and implementing ESG standards, which still present many limitations and challenges.

4.2. Results of the analysis of factors influencing the adoption of ESG standards in small and medium-sized enterprises in the logistics sector in Vietnam.

4.2.1. Cronbach's Alpha Test Results

According to Hoang and Chu (2008), "Observed variables within the same factor seeking reliability must exhibit a correlation coefficient of 0.3 or higher with the total variable. If this coefficient is less than 0.3, it will reduce the reliability of the entire group" [25]. All variables have a total variable correlation coefficient greater than 0.3, and most are above 0.5; all observed variables are accepted and will be used in the subsequent factor analysis. The standard for a scale to be considered acceptable is Cronbach's Alpha > 0.6. With 268 official samples, with 5 criteria and 24 scales of the survey questionnaire, the variables met the reliability requirements, with the overall scale Cronbach's Alpha coefficient all > 0.6, which is within the good measurement range (Table 1).

Table 1. Results of Cronbach's Alpha reliability test of factors affecting the application of ESG standards in small and medium-sized logistics enterprises in Vietnam

Observed Variable	Total Inter-item Correlation Coefficient	Cronbach's Alpha if Variable Excluded	Cronbach's Alpha for Entire Scale
Management competence (QT)	0.820	0.796	0.845
Technological innovation (DM)	0.832	0.739	
Trends in innovation (XT)	0.837	0.832	
Commitment to the environment (MT)	0.839	0.824	
Social responsibility (XH)	0.817	0.635	

Source: Study Authors, 2026

This result shows the relevance and reliability of observed variables in assessing factors affecting the application of ESG standards at small and medium-sized logistics enterprises in Ho Chi Minh City.

4.2.2. Results of EFA Exploratory Factor Analysis

+ Evaluate the scale through EFA exploratory factor analysis: KMO coefficient = 0.886 ($0.5 < \text{KMO} < 1$). The Chi-Square statistic of Bartlett's test has a value of 6513.835 with a significance level of $\text{Sig.} = 0.000$, showing that the observed variables are correlated with each other. "The results of EFA analysis show that the total variance extracted reaches 82.716% ($> 50\%$), showing that these 4 extracted factors explain 82.716% of the variation in the data, this is an acceptable result and proves the grouping elements together is appropriate. The stopping point when extracting factors is at the 5th factor with Eigenvalues of $1.636 > 1$, indicating that the factor analysis results are appropriate. The observed variables have satisfactory factor loading coefficients > 0.5 "[25]. There are no observed variables that have loading factors simultaneously on both factors, so the scales have convergent validity (Table 2).

Table 2. KMO and Bartlett's Test

Kaiser-Meyer-Olkin test for sample adequacy		0.886
Bartlett's test of sample configuration	Equivalent to Chi-Square	6513.835
	Df	268
	Sig.	0.000

Source: Study Authors, 2026

The Kaiser-Meyer-Olkin test indicates a good level of sampling adequacy ($\text{KMO} = 0.886$). Bartlett's test of sphericity is statistically significant ($\text{Chi-Square} = 497.203$, $df = 268$, $\text{Sig.} = 0.000$), suggesting that the observed variables are correlated with each other.

4.2.3. Check for method changes and miscompatibility

Observed variables are extracted into 24 factors at Eigenvalues = 1.108 (>1). The factor analysis results are reasonable, the total variance extracted reaches 77.271% ($>50\%$) of the variation of the data. Acceptable variables were extracted into factors at the same time (Table 3).

Table 3. Variance explained by influencing factors

Factor	Variance Extraction			Total variance extracted			The total cumulative variance was extracted		
	Total	Variance Percent	Cumulative Percent	Total	Variance Percent	Cumulative Percent	Total	Variance Percent	Cumulative Percent
1	10.420	37.215	37.215	10.420	37.215	37.215	4.793	17.119	17.119
2	4.037	14.419	51.634	4.037	14.419	51.634	4.452	15.900	33.019
3	2.804	10.015	61.649	2.804	10.015	61.649	4.249	15.176	48.194
4	2.122	7.577	69.226	2.122	7.577	69.226	4.207	15.026	63.220
5	1.705	6.089	75.315	1.705	6.089	75.315	3.328	11.884	75.105
6	1.108	3.956	77.271	1.108	3.956	77.271	1.167	4.166	77.271
7	0.873	3.118	82.389						
8	0.713	2.547	84.936						
9	0.533	1.902	86.839						
10	0.435	1.854	87.392						
11	0.420	1.809	88.072						
12	0.369	1.417	89.710						
13	0.356	1.318	90.690						

Factor	Variance Extraction			Total variance extracted			The total cumulative variance was extracted		
	Total	Variance Percent	Cumulative Percent	Total	Variance Percent	Cumulative Percent	Total	Variance Percent	Cumulative Percent
14	0.341	1.220	90.929						
15	0.313	1.118	92.048						
16	0.261	0.932	92.980						
17	0.246	0.880	93.860						
18	0.223	0.795	94.655						
19	0.195	0.695	95.349						
20	0.182	0.650	96.000						
21	0.121	0.549	98.611						
22	0.115	0.522	99.133						
23	0.040	0.144	99.925						
24	0.021	0.075	100.000						
Extraction method: Principal component analysis.									

Source: Study Authors, 2026

4.2.4. Linear regression feature analysis

According to Hair et al (2019), “Linear regression analysis shows that there is no multicollinearity phenomenon. Collinearity Statistics with the VIF (Variance Inflation Factor) of the independent variables in the model are all less than 2, proving that there is no multicollinearity phenomenon (Table 4). As a result, all variables have statistically significant Sig values. = 0.000 (< 0.05)”[19]. Thus, there are 05 factors affecting business performance in Ho Chi Minh City according to the standardized regression coefficient (Beta).

Table 4. Linear regression test

Model		Coefficients are not standardized		Standard coefficient	Coefficient (t)	Sig	Multicollinearity statistics	
		Coefficient (B)	Standard deviation	Beta coefficient			Tolerance	Variance magnification factor
1	Constant	-1.194	0.196		6.107	0.000		
	MT	0.235	0.035	0.238	6.781	0.000	0.840	1.191
	XH	0.515	0.047	0.437	11.044	0.000	0.662	1.510
	QT	0.212	0.046	0.155	3.939	0.020	0.714	1.400
	XT	0.229	0.045	0.214	5.116	0.000	0.595	1.680
	DM	0.392	0.035	0.376	11.075	0.030	0.899	1.112

Source: Study Authors, 2026

From the above results, we have a linear equation expressing the influencing factors (MT, XH, QT, DM, XT) to Y - affecting the business performance of sustainable development in Vietnam, as follows:

$$Y = 0.437 *XH + 0.376*DM +0.238*MT + 0.214*XT + 0.155*QT$$

Thus, the linear regression model built according to equation Y does not violate the necessary assumptions in linear regression. Therefore, the hypotheses are accepted with a statistical significance level of 5% and the relationship between each factor and "The impact of ESG application on business performance and sustainable development to logistics enterprises in Ho Chi Minh city, Vietnam" is a directly proportional relationship.

4.2.5. Correlation analysis

The variance inflation factor $VIF < 2$, shows that multicollinearity does not occur and there is no strong correlation between independent variables (Hoang and Chu, 2008) [25].

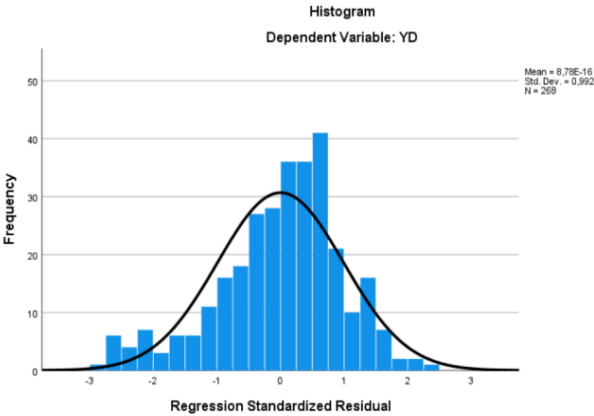


Figure 2. Testing assumptions about the distribution of residuals and autocorrelated residuals

**Source: Compiled by the authors from research results, 2026*

We see that the graph of the residuals (Figure 2) has a balanced bell shape, the average value of the residual = $8,78 \times 10^{-16}$ is very small and close to 0, and the deviation value is close to 1, so we conclude assume that the standardized residual has a normal distribution.

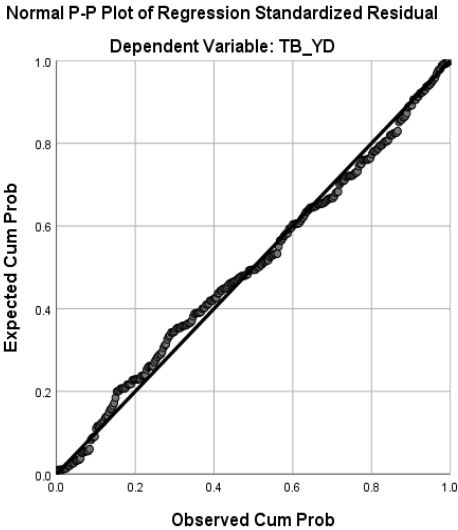


Figure 3. Residual correlation analysis graph

**Source: Compiled by the authors from research results, 2026*

The graph of standardized residual values randomly converges along the value line = 0, so we conclude that there is no autocorrelation between residuals (Figure 3). The results of the EFA exploratory factor analysis ensure reliability.

5. IMPLICATIONS AND APPLICATIONS

Based on the research findings and discussion of the impact analysis of ESG standards adoption and digital transformation in small and medium-sized enterprises (SMEs) in Ho Chi Minh City, Vietnam, the following policy implications are proposed:

5.1. Enhancing social responsibility and fostering technological innovation in applying ESG standards to small and medium-sized logistics enterprises in Ho Chi Minh City

Research results show that "About 28.8% of logistics enterprises are in the ESG planning stage, while about 31.2% have established and partially implemented ESG commitments, but no businesses have reported having fully implemented ESG. This shows that businesses lack transparency in ESG reporting to fulfill social responsibility and implement technological innovation"[24]. According to the research results (Table 4), the factor XH - Social responsibility of the business towards society, with $\beta'1 = 0.437$ and DM - Technological innovation regarding ESG standards in the future with $\beta'2 = 0.376$, *has the highest impact business performance to apply ESG standards to small and medium-sized logistics enterprises in Vietnam*, and is also the most important factor. This is explained by the fact that a safe working environment for employees is now considered the most important factor that employees and businesses care about when choosing to apply standards to the logistics supply chain in Vietnam. Enhancing social responsibility and fostering technological innovation in the implementation of ESG in small and medium-sized logistics enterprises is not just about complying with environmental or labor laws, but also about embracing technological innovation in the digital transformation process. It's also a way for businesses to demonstrate their concern for society, the community, and future generations. However, many small businesses view ESG as a mandatory expense rather than an opportunity for long-term growth. This shows that many still don't fully understand the ethical value of sustainable development, as well as the role of ESG in long-term business governance. In Ho Chi Minh City, the gap in management and financial capacity between large corporations and small businesses further highlights the need to improve business ethics. To achieve this, appropriate educational programs, technical support, and incentive policies are necessary. Suitable for Prime Minister of Vietnam (2025). Decision No. 2229/QĐ-TTg, "Approving the Strategy for the Development of Vietnam's Logistics Services for the period 2025-2035, with a vision to 2050" [26] and Prime Minister of Vietnam (2022). Decision No. 888/QĐ-TTg, "Approving the scheme on tasks and solutions to develop the outcomes of the 26th National Assembly (COP26) of the parties to the framework convention on climate change of the country" [27].

5.2. Commitment to making positive environmental impacts to reduce emissions and trends in innovation in applying ESG standards to logistics company in Ho Chi Minh City

The findings of the study by Cheng et al. (2024) show that "The logistics industry, essential to global supply chain operations, has a significant impact on the environment, contributing approximately 25% of global emissions with increasingly complex global innovation trends" [20]. According to the synthesis of research results (Table 4), the factor MT - The company's commitment to the environment achieved with $\beta'3 = 0.238$ and the factor XT - Trends in innovation, with $\beta'4 = 0.214$ *has the third and fourth impact on the level of assessment of the application of ESG standards to enterprises small and medium-sized enterprises in the logistics industry* for employees and businesses is also an important factor. In the context of worsening climate change, logistics enterprises in Ho Chi Minh City are under mounting pressure to commit to positive environmental impacts and emission reduction, driven by both international supply chain demands and Vietnam's green growth policy. While many firms have begun adopting green technologies such as electric trucks and route optimization software, the level of commitment varies significantly, with small and medium-

sized enterprises facing barriers including high investment costs, lack of technical expertise, and policy gaps like the absence of clear emission assessment systems. The adoption of ESG standards has shifted from an optional strategy to a vital requirement, offering competitive advantages such as access to higher-value supply chains, investment attraction, and enhanced brand reputation. However, major challenges remain: the environmental (E) factor requires costly fleet transitions and waste management; the social (S) factor demands labor protection and worker safety; and the governance (G) factor suffers from weak transparency and unreliable reporting mechanisms. To effectively participate in this trend, logistics enterprises in Ho Chi Minh City should adopt a pragmatic approach, starting with small improvements in internal governance, then gradually increasing investment in environmental and social initiatives, while proactively communicating their ESG commitments to build trust with partners and clients. Suitable for Prime Minister of Vietnam (2022). Decision No. 687/QD-TTg, "Approving the Circular Economy Development Scheme in Vietnam." [28] and Prime Minister of Vietnam (2022). Decision No. 1658/QD-TTg, "Approving the National Strategy on Green Growth for the period 2021-2030, with a vision to 2050" [29].

5.3. Enhancing strategic management practices regarding ESG standards in logistics enterprises in Ho Chi Minh City

According to the research results of the Ministry of Industry and Trade (2025), "Logistics enterprises are facing very clear challenges when building management work such as policy institutions that make it difficult for businesses to access or lack of human resources with expertise in the field of ESG" [23]. Also from the research results (Table 4), the factor QT - Management competence towards ESG standards, with $\beta^*5 = 0.155$, is the factor with the lowest impact on the application of ESG standards to small and medium-sized enterprises in the logistics industry in Vietnam. First, the author argues that the government needs more policies to support the development of logistics services in Ho Chi Minh City to align with the socio-economic characteristics and key national economic sectors to access domestic and foreign capital, develop markets, receive training, and access information quickly. Furthermore, appropriate policies and budget allocation are needed to apply modern technology, improve infrastructure, and plan warehouses to facilitate sustainable development of logistics and supply chain management in Vietnam, aligning with the government's NetZero goals. The government needs policies such as green credit packages with preferential interest rates to make it easier for businesses to access and implement ESG practices, reduce import taxes on green products such as electric trucks and energy-efficient logistics equipment, and reduce corporate income tax for businesses that achieve green logistics certification. This contributes to minimizing environmental impacts, reducing emissions from manufacturing plants, and mitigating the severe effects of climate change. Suitable for Prime Minister of Vietnam (2022). Decision No. 450/QD-TTg, "Approving the national environmental protection strategy until 2030." [30] and Prime Minister of Vietnam (2025). Decision No. 2229/QD-TTg, "Approving the Strategy for the Development of Vietnam's Logistics Services for the period 2025-2035, with a vision to 2050" [26].

6. CONCLUSION

The final result after regressing the model, the researcher identified five determinants that influence the degree of evaluation regarding the implementation of Environmental, Social, and Governance (ESG) criteria within small and medium-sized logistics enterprises, consistent with initial anticipations. This study provides a comprehensive overview of ESG adoption, enhancing business performance, and promoting sustainable development for small and medium-sized logistics enterprises in Ho Chi Minh City, Vietnam. Specifically, the study developed and validated a system of scales comprising three components representing ESG,

market impacts affecting business performance, and sustainable development of logistics enterprises – ensuring consistency in both theory and practice. Based on the core structural model and the validated scale system, a new evaluation framework is proposed with the participation of logistics enterprises in the study area, along with key stakeholders, primarily managers and experts in ESG and logistics. This approach is considered appropriate for providing information for policy decision-making for logistics managers and national policymakers, while contributing to the development of a new theory on assessing the impact of ESG and market effects on business performance and sustainable development of logistics enterprises in particular.

The research results propose scientifically-based solutions to promote the increasing adoption of ESG to improve business performance and promote sustainable development for logistics enterprises. Simultaneously, the study provides scientific experiments on applying ESG to enhance business performance and promote sustainable development for logistics enterprises and national policymakers. Furthermore, the new findings on the impact of ESG and market effects on business performance and sustainable development open up new research directions from the perspective of scientific research, national policy planning, and business managers. Therefore, this study has provided valuable insights for future research.

REFERENCES

- [1] Global Reporting Initiative (GRI), “GRI Annual Sustainability Report 2022: Towards a Global Comprehensive Reporting System,” Global Reporting Initiative, 2023. Available: <https://www.globalreporting.org/media/3yflhrjrk/gri-sustainabilityreport2022-final.pdf>
- [2] H. R. Bowen, *Social Responsibilities of the Businessman*. New York: Harper & Row, 1953. [Online]. Available: https://books.google.com.co/books?id=ALIPAwAAQBAJ&printsec=frontcover&hl=es&source=gbv_atb#v=onepage&q&f=false
- [3] Swiss Federal Department of Foreign Affairs and United Nations, “The Global Compact: Who Cares Wins—Connecting Financial Markets to a Changing World,” *United Nations Department of Public Information*, 2004, pp. 1–41. Available: https://www.unglobalcompact.org/docs/issues_doc/Financial_markets/who_cares_who_wins.pdf
- [4] PwC, “Vietnam ESG Readiness Report 2022,” *Price Waterhouse Coopers*, 2022. Available: <https://www.pwc.com/vn/vn/publications/2022/pwc-vietnam-esg-readiness-2022-vn.pdf>
- [5] E. Anderson, “Corporate Social Responsibility: The Institutionalization of ESG,” *University of Glasgow*, 2023. Available: <https://theses.gla.ac.uk/id/eprint/83538>
- [6] M. C. Jensen and W. H. Meckling, “Theory of the firm: Managerial behavior, agency costs and ownership structure,” *Journal of Financial Economics*, vol. 3, no. 4, pp. 305–360, 1976, doi: [https://doi.org/10.1016/0304-405X\(76\)90026-X](https://doi.org/10.1016/0304-405X(76)90026-X)
- [7] T. J. Brown, P. A. Dacin, M. G. Pratt, and D. A. Whetten, “Identity, intended image, construed image, and reputation: An interdisciplinary framework and suggested terminology,” *Journal of the Academy of Marketing Science*, vol. 34, no. 2, pp. 99–106, 2006, doi: <https://doi.org/10.1177/0092070305284969>
- [8] D. A. Schuler and M. Cording, “A corporate social performance–corporate financial performance behavioral model for consumers,” *Academy of Management Review*, vol. 31, no. 3, pp. 540–558, 2006, doi: <https://doi.org/10.5465/AMR.2006.21318916>

- [9] J. Allouche and P. Laroche, "A meta-analytical investigation of the relationship between corporate social and financial performance," *Revue de Gestion des Ressources Humaines*, vol. 57, pp. 18–41, 2005. Available: <https://hal.science/hal-00830582v1>
- [10] P. Hu, X. Li, N. Li, Y. Wang, and D. D. Wang, "Peeking into corporate greenwashing through the readability of ESG disclosures," *Sustainability*, vol. 16, no. 6, p. 2571, 2024, doi: <https://doi.org/10.3390/su16062571>
- [11] S. Nafia, A. Sanjida, and I. Azharul, "Influence of perceived environmental knowledge and environmental concern on customers' green hotel visit intention: Mediating role of green trust," *Asia-Pacific Journal of Business Administration*, vol. 14, no. 2, pp. 223–243, 2022.
- [12] O. Ogiemwonyi and B. Eneizan, "Environmental ethics and green practices in the manufacturing sector: The role of green innovation and environmental policy," *Natural Resources Forum*, pp. 1257–1283, 2025, doi: <https://doi.org/10.1111/1477-8947.12444>
- [13] P. Justin, M. Ashwin, and P. Jayesh, "Predicting green product consumption using theory of planned behavior and reasoned action," *Journal of Retailing and Consumer Services*, vol. 29, pp. 123–134, 2016, doi: <https://doi.org/10.1016/j.jretconser.2015.11.006>
- [14] S.-O. Park and M. K. Jung, "The influence of green SCM on SCM utilization in the shipbuilding and shipping industries: The mediating role of ESG management awareness," *Journal of International Logistics and Trade*, pp. 1–16, 2025, doi: <https://doi.org/10.1108/JILT-03-2025-0019>
- [15] A. B. Carroll, "Carroll's pyramid of CSR: Taking another look," *International Journal of Corporate Social Responsibility*, vol. 1, no. 3, pp. 1–8, 2016, doi: <https://doi.org/10.1186/s40991-016-0004-6>
- [16] C. R. Carter and D. S. Rogers, "A framework of sustainable supply chain management: Moving toward new theory," *International Journal of Physical Distribution & Logistics Management*, vol. 38, pp. 360–387, 2008, doi: <https://doi.org/10.1108/09600030810882816>
- [17] K. Hummel and C. Schlick, "The relationship between sustainability performance and sustainability disclosure—Reconciling voluntary disclosure theory and legitimacy theory," *Journal of Accounting and Public Policy*, vol. 35, pp. 455–476, 2016, doi: <https://doi.org/10.1016/j.jaccpubpol.2016.06.001>
- [18] M. E. Porter, "On Competition," Harvard Business School Publishing, 2008.
- [19] J. F. Hair, J. J. Risher, M. Sarstedt, and C. M. Ringle, "When to use and how to report the results of PLS-SEM," *European Business Review*, vol. 31, no. 1, pp. 2–24, 2019, doi: <https://doi.org/10.1108/EBR-11-2018-0203>
- [20] H. Cheng, H. R. Chaudhry, I. Kazi, and M. Umar, "Unlocking greener supply chains: A global innovative perspective on the role of logistics performance in reducing ecological footprints," *Journal of Innovation & Knowledge*, vol. 9, no. 4, p. 100612, 2024, doi: <https://doi.org/10.1016/j.jik.2024.100612>
- [21] L. N. Ho, "Improving the quality of human resources in the logistics industry of Vietnam," *International Journal of All Research Writings*, vol. 5, no. 10, pp. 50–53, 2024. Available: <https://ijarw.com/PublishedPaper/IJARW1723.pdf>
- [22] O. A. Amuda, A. Saka, I. O. Bamiyase, O. O. Arulogun, and G. Omoregbee, "Evaluating the impact of corporate governance on bank risk and financial stability in Sub-Saharan Africa: A CAMELS-based empirical analysis," *Indonesian Journal of*

- Sustainability Policy and Technology*, vol. 3, no. 2, pp. 62–73, 2025, doi: <https://doi.org/10.61656/ijospat.v3i2.350>
- [23] Ministry of Industry and Trade of Vietnam, “Report on Policy Regulations in the Logistics Sector of Vietnam and the World, Q3/2025,” *Center for Industry and Trade Information*, 2025, pp. 1–33.
- [24] Ministry of Industry and Trade of Vietnam, “Vietnam Logistics Report 2024: Automated Trade Zone,” *Industry and Trade Publishing House*, 2024, ISBN: 978-604-481-770-5.
- [25] T. Hoang and N. M. N. Chu, “Analyzing Research Data with SPSS,” *Hong Duc Publishing House*, 2008. Available: <https://drive.google.com/file/d/1L-RSveXF1FTjfYHCqptel7RObysZLv0h>
- [26] Prime Minister of Vietnam, "Decision No. 2229/QD-TTg, Approving the Strategy for the Development of Vietnam's Logistics Services for the period 2025-2035, with a vision to 2050." Dated September 10, 2025.
- [27] Prime Minister of Vietnam, "Decision No. 888/QD-TTg, Approving the scheme on tasks and solutions to develop the outcomes of the 26th National Assembly (COP26) of the parties to the framework convention on climate change of the country." Dated July 25, 2022.
- [28] Prime Minister of Vietnam, "Decision No. 687/QD-TTg, Approving the Circular Economy Development Scheme in Vietnam." Dated June 7, 2022.
- [29] Prime Minister of Vietnam, "Decision No. 1658/QD-TTg, Approving the National Strategy on Green Growth for the period 2021-2030, with a vision to 2050." Dated October 1, 2022.
- [30] Prime Minister of Vietnam, "Decision No. 450/QD-TTg, Approving the national environmental protection strategy until 2030." Dated April 13, 2022.