

Conference Name: BuPol Kuala Lumpur 2024– International Conference on Business, Economics & Policy, 02-03 December

Conference Dates: 02-Dec- 2024 to 03-Dec- 2024

Conference Venue: Hotel Capitol, Bukit Bintang, Kuala Lumpur, Malaysia

Appears in: PEOPLE: International Journal of Social Sciences (ISSN 2454-5899)

Publication year: 2024

Lam & Chuyen, 2024

Volume 2024, pp. 479-489

DOI- <https://doi.org/10.20319/icssh.2024.479489>

This paper can be cited as: Lam, N.T., Chuyen, D. T, (2024) Impacts of Green Training on the Performance of Logistics Companies. BuPol Kuala Lumpur 2024– International Conference on Business, Economics & Policy, 02-03 December. Proceedings of Social Science and Humanities Research Association (SSHRA), 2024, 479-489

IMPACTS OF GREEN TRAINING ON THE PERFORMANCE OF LOGISTICS COMPANIES

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Abstract

This paper explores the effects of green training, green intellectual capital, and green logistics practices on the performance and sustainability of logistics enterprises, focusing on firms in Ho Chi Minh City, Vietnam. A quantitative methodology, including Structural Equation Modeling (SEM), was applied to analyze data from 437 respondents representing logistics firms. The results affirm that green training enhances employees' environmental skills and awareness, leading to improved operational efficiency and reduced ecological impact. Green intellectual capital supports innovation, fostering long-term competitive advantages, while green logistics practices streamline processes, lower costs, and enhance sustainability. These findings contribute to the

broader understanding of sustainable development by emphasizing the strategic importance of green practices in achieving economic and environmental goals within the logistics industry. The study offers actionable insights for policymakers and industry leaders aiming to integrate sustainability into organizational frameworks.

Keywords

Green Training, Green Logistics Practices, Organizational Performance, Corporate Sustainability, Green Intellectual Capital.

1. Introduction

Green logistics practices (GLPs) are increasingly significant for the sustainable development (SD) of businesses (BEs) as they aim to enhance ecological, economic (EC), and social (SC) sustainability by reducing operational costs and saving energy without harming the natural environment (NE) and society (Zhang et al., 2014; Baz & Laguir, 2017; Kumar, 2015; Zowada & Niestroj, 2019). Thus, green logistics is a developmental orientation within the logistics sector to minimize its negative impact on the environment. Developing green logistics requires balancing three objectives: economic, social, and environmental. Furthermore, training plays a crucial role in improving the quality of human resources (HR) in the logistics sector; therefore, it is essential to seriously study the impact of green training (GT) and green intellectual capital (GIC) on the sustainability and performance of enterprises.

According to the Vietnam Logistics Report 2022, 51% of transport enterprises have adopted solutions to enhance freight efficiency sustainably, such as using fewer vehicles, improving fuel efficiency, standardizing truck dimensions, etc. In Vietnam, logistics activities are primarily concentrated in major cities like Hanoi and Ho Chi Minh City (HCMC). Specifically, approximately 28% of logistics enterprises are operating in Hanoi, while nearly 50% are based in HCMC (Ministry of Industry and Trade, 2019).

Therefore, evaluating the impact of GT, GIC, and GLPs on the performance of logistics enterprises is crucial to developing appropriate policies that help improve the operational efficiency of logistics businesses in HCMC in particular and across Vietnam in general in the future.

2. Theoretical Framework and Research Model

Training is considered a preparation process for equipping versatile employees with the necessary knowledge and skills for innovation (Liebowitz, 2010). Paille et al. (2013) pointed out that green training (GT) is associated with environmental management and influences organizational performance (OP). GT helps businesses overcome barriers to implementing sustainable development (SD) practices (Pham et al., 2022) and aims to achieve employee sustainability as well as adopt various SD practices within organizations (Yong et al., 2020). GT has a long-term positive impact on economic, social, and environmental performance (Xie & Zhu, 2020).

Enterprises face fierce competition in the current global market. Consequently, businesses focus on measuring the environmental, social, and economic impacts of their actions and emphasize the link between OP and SD (Subramanian & Gunasekaran, 2015). Sustainable efforts in enterprises are characterized by renewable energy, innovations in energy efficiency, green practices, and effective resource utilization (Lubin & Esty, 2010).

In recent decades, scientists, politicians, and society have increasingly emphasized integrating social, economic, and environmental goals for SD. Bajdor et al. (2021) argue that the concept of SD has shifted the perspective and strategy of modern businesses from achieving economic and financial profits to addressing social and ecological priorities. Green logistics is viewed as particularly significant in addressing environmental, economic, and social issues (Centobelli et al., 2020).

Other scholars have highlighted the positive impact of sustainability on OP by enhancing the value and image of enterprises, thereby improving long-term financial performance (Zahid et al., 2019). Furthermore, sustainability enhances brand image and reputation, increases sales, fosters employee dedication and loyalty, boosts productivity, improves quality, and provides additional benefits (Bansal & Song, 2017).

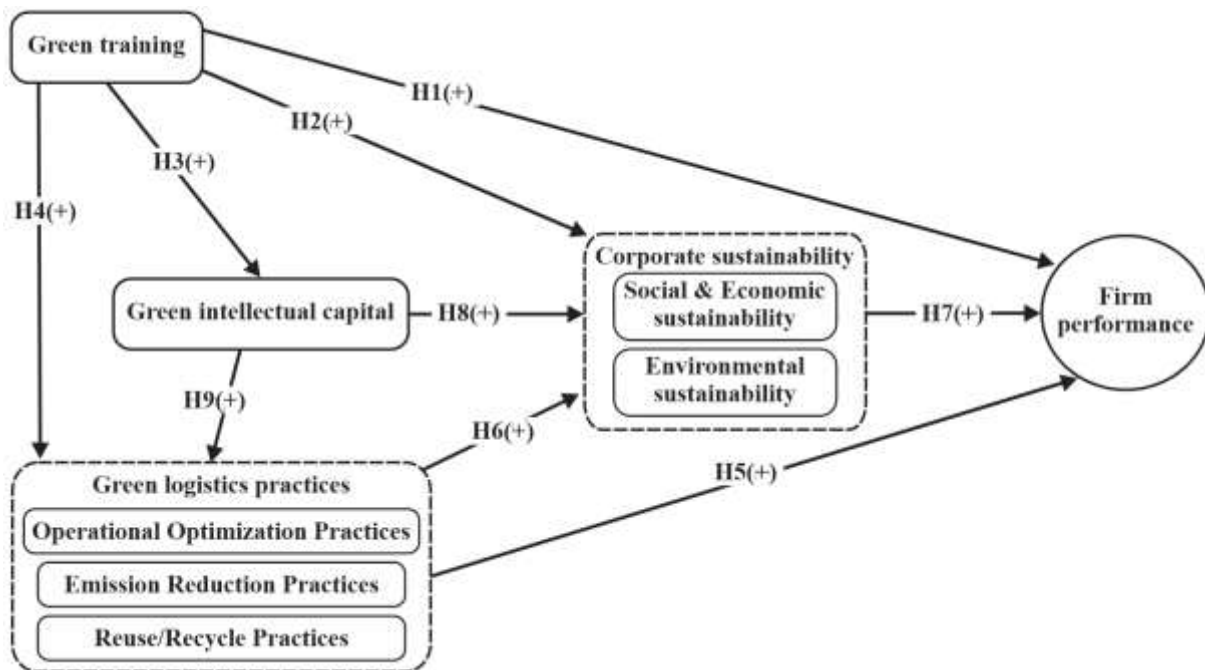
Researchers define intellectual capital as the accumulated stock and flow of valuable skills and knowledge within an organization (Wang et al., 2019). Green intellectual capital (GIC) is a multidimensional concept that has been evaluated and studied under several theories. From a human resource perspective, green human capital (GHC) and green structural capital (GSC) are among the most crucial sustainability factors for enterprises. GHC plays a vital role in organizations and supports the development of new information in the economy (Wang & Juo,

2021). GIC is key to implementing internal and external environmental management activities within organizations.

Based on the literature review, this study proposes to test the following hypotheses:

- H1: Green training has a positive impact on organizational performance.
- H2: Green training has a positive impact on organizational sustainability.
- H3: Green training has a positive impact on green intellectual capital.
- H4: Green training has a positive impact on green logistics practices.
- H5: Green logistics practices have a positive impact on organizational performance.
- H6: Green logistics practices have a positive impact on organizational sustainability.
- H7: Organizational sustainability has a positive impact on organizational performance.
- H8: Green intellectual capital has a positive impact on organizational sustainability.
- H9: Green intellectual capital has a positive impact on green logistics practices.

Figure 1: *Proposed Research Model*



3. Research methods

To achieve this objective, the author employs a quantitative method based on market data collection. Accordingly, to fulfill the research objectives, a mixed-method approach is adopted, integrating both qualitative and quantitative research methods. The measurement scales used in this study are adapted from original scales developed in foreign markets and refined based on the results of the qualitative research phase.

The formal quantitative research phase is conducted using convenience sampling with a non-probability approach. Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM) are utilized to test the research hypotheses. Data processing is performed using SPSS/AMOS version 20.0 software.

4. Research Results

Data collection for the formal research phase was conducted from February 2023 to July 2023. The author surveyed 600 individuals from the management teams of 200 logistics enterprises in Ho Chi Minh City. A total of 496 responses were collected, achieving a response rate of 82.67%. Among these, 57 responses were deemed invalid due to significant omissions. Consequently, the dataset used in this study comprises 437 valid observations.

4.1 Descriptive Statistics of Survey Respondents

The descriptive statistics of the 437 respondents are summarized in Table 1.

Table 1. *Descriptive Statistics of Survey Respondents*

Enterprise Characteristics		Quantity	Ratio (%)
Size	<=10 employees	51	11.7
	11-50 employees	79	18.1
	51-100 employees	178	40.7
	>=101 employees	129	29.5
Type	1-member limited company	188	43.0
	Other limited company	244	55.8
	Joint stock company	5	1.1
	<5 years	65	14.9

Enterprise Characteristics		Quantity	Ratio (%)
Years in Operation	5-10 years	231	52.9
	>=10 years	141	32.3
Total		437	100.0

4.2 Statistical Analysis

The results of the Exploratory Factor Analysis (EFA) for the independent and dependent factors indicate that the KMO coefficients are 0.741 and 0.831, respectively. Additionally, the significance levels of Bartlett's Test for both analyses are less than 0.001. The total variance explained by the seven extracted independent factors exceeds 72% (>50%), while the total variance explained by the single dependent factor exceeds 64% (>50%). Therefore, the use of EFA in this analysis is appropriate.

Moreover, the reliability assessment results using Confirmatory Factor Analysis (CFA), as shown in Table 2, indicate that all factors have Cronbach's Alpha coefficients and Composite Reliability (CR) values greater than 0.6, with Average Variance Extracted (AVE) values exceeding 0.5. These results demonstrate that the measurement scales exhibit high reliability.

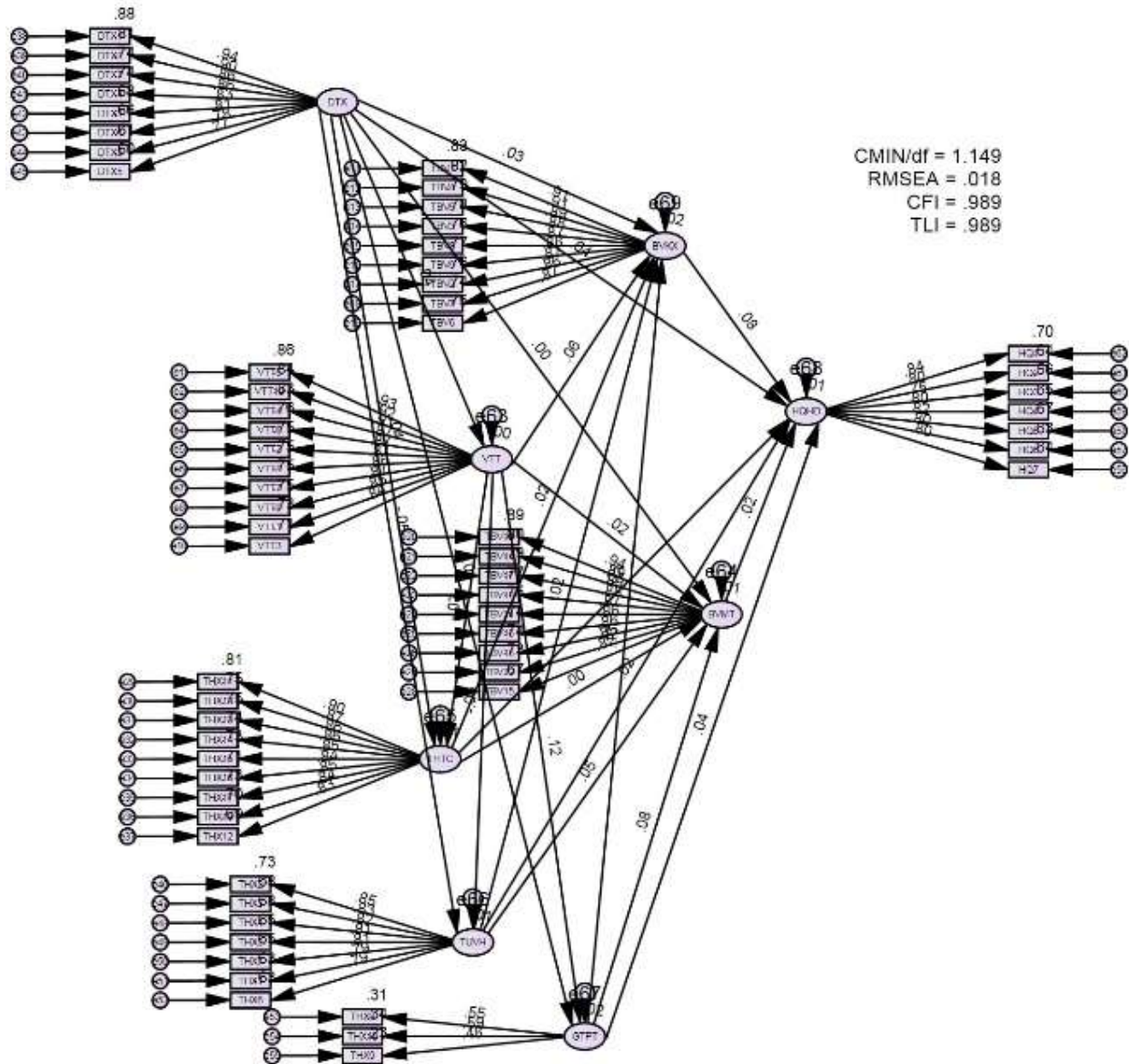
Table 2: Reliability Assessment using CFA

Scale	Cronbach's Alpha	Composite Reliability	Corrected Item-Total Correlation
VTT- Green intellectual capital	0.871	0.896	0.846
BVKX- Social & Economic sustainability	0.869	0.901	0.802
BVMT- Environmental sustainability	0.871	0.878	0.752
THTC- Reuse/ Recycle practices	0.859	0.889	0.817
DTX- Green training	0.852	0.860	0.670
TUVH- Operational optimization practices	0.833	0.868	0.822
GTPT- Emission reduction practices	0.792	0.809	0.781
HQHD- Firm performance	0.826	0.844	0.751

The results of the Structural Equation Modeling (SEM) analysis, as shown in Figure 2, indicate that the model demonstrates good fit with the data. The relative Chi-square (CMIN/df) is 1.149,

and other fit indices such as TLI = 0.989, CFI = 0.989, and RMSEA = 0.018 meet the criteria for model evaluation. Therefore, it can be concluded that the model is appropriate and aligns well with the market dataset.

Figure 2: Standardized SEM Testing Results



4.3 Hypothesis Testing Results

The model testing results in Table 3 indicate that all hypotheses are supported at a significance level of 0.05.

Table 3: Results of Hypothesis Testing

	Relationship	Standardized Coefficient	p value	Conclusion
H1	HQHD ← DTX	0.037	0.016	Supported
H2a	BVKX ← DTX	0.031	0.011	Supported
H2b	BVMT ← DTX	0.001	**	Supported
H3	VTT ← DTX	0.044	0.014	Supported
H4a	TUVH ← DTX	0.052	0.024	Supported
H4b	GTPT ← DTX	0.042	0.018	Supported
H4c	THTC ← DTX	0.036	***	Supported
H5a	HQHD ← TUVH	0.022	0.010	Supported
H5b	HQHD ← GTPT	0.044	0.013	Supported
H5c	HQHD ← THTC	0.018	0.016	Supported
H6a	BVKX ← TUVH	0.016	0.015	Supported
H6b	BVKX ← GTPT	0.131	0.012	Supported
H6c	BVKX ← THTC	0.023	0.018	Supported
H6d	BVMT ← TUVH	0.048	0.021	Supported
H6e	BVMT ← GTPT	0.080	**	Supported
H6f	BVMT ← THTC	0.001	0.024	Supported
H7a	HQHD ← BVKX	0.075	0.024	Supported
H7b	HQHD ← BVMT	0.024	0.023	Supported
H8a	BVKX ← VTT	0.063	0.025	Supported
H8b	BVMT ← VTT	0.016	***	Supported
H9a	TUVH ← VTT	0.063	**	Supported
H9b	GTPT ← VTT	0.118	0.017	Supported
H9c	THTC ← VTT	0.072	**	Supported

4.4 Discussion of Research Findings

The findings reveal that green training (DTX) has a positive impact on organizational performance (HQHD), consistent with the research of Teixeira et al. (2016). Specifically, DTX enhances employees' awareness and skills regarding environmental issues, thereby improving work efficiency and minimizing negative environmental impacts. Additionally, DTX strengthens employees' commitment and improves their behavior towards the organization's sustainability goals. Employees who receive DTX are more likely to actively engage in environmental protection activities, which ultimately improves overall organizational performance. Therefore, businesses, particularly logistics enterprises, should invest in DTX to achieve environmental and economic objectives and foster sustainable development.

Similarly, green intellectual capital (VTTX) plays a crucial role in improving HQHD, aligning with the study by Weng & Chen (2015). Investment in VTTX brings significant economic and social benefits to organizations. Notably, VTTX enhances employees' capacity and commitment to implementing green initiatives while providing a foundation of processes and standards to support sustainable activities.

Moreover, the study confirms that green logistics practices (THLX) reduce operational costs, enhance economic efficiency, and minimize negative environmental impacts. Thus, adopting THLX is a key strategy for achieving sustainable development. These results are consistent with findings by Kassinis & Soteriou (2003). Furthermore, THLX not only reduce costs but also provide significant economic and social benefits, enhancing the overall HQHD of organizations. This observation aligns with the research of Huang & Yang (2014) and Sari & Yanginlar (2015). These findings underscore the importance of investing in THLX implementation to help businesses, especially logistics enterprises, achieve sustainable development.

However, the study highlights notable differences in research contexts and approaches. These differences may stem from advancements in THLX and the growing awareness among businesses about their importance in modern contexts. Modern enterprises may have learned how to optimize THLX to maximize their benefits.

Particularly, this study emphasizes the critical role of VTTX in fostering innovation within logistics enterprises, helping them maintain a competitive edge and swiftly adapt to changing market demands and environmental regulations. Green human capital is identified as a key factor in driving creativity and implementing innovative green logistics solutions. THLX

adoption not only mitigates environmental harm but also delivers clear economic benefits, such as reducing operational costs through energy efficiency, logistics process optimization, and enhanced customer relationships fostered by an environmentally friendly corporate image. These findings are especially significant in the current economic context, as businesses face pressures to cut costs and enhance HQHD.

5. Conclusion

This study has explored the impact of green training, green intellectual capital, and green logistics practices on the firm performance of the logistics enterprises in Ho Chi Minh City. Based on data analysis and findings, the research clarifies that these green factors play essential roles in improving organizational performance. The results not only reinforce existing sustainable development theories but also contribute new empirical evidence from the Vietnamese context.

Specifically, the findings indicate that green training has a significant positive impact on firm performance. Green training enhances employees' awareness and skills regarding environmental issues, improving work efficiency and reducing environmental harm. This aligns with previous research and reaffirms that investing in green training is a critical strategy for achieving economic and environmental goals.

The study also establishes that green intellectual capital has a strong influence on firm performance. Businesses need to invest in green intellectual capital to foster sustainable development. Additionally, green logistics practices positively affect the firm performance of logistics enterprises. Adopting green transportation and warehousing solutions, eco-friendly packaging, and reverse logistics has reduced environmental harm while improving economic efficiency. This highlights that green logistics practices are a vital strategy for achieving sustainable development in the logistics sector.

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