

IT Adoption and Wireless Network Use for Logistics and Customer Service Performance in the Management of Freight Transport Enterprises

Marta Kadlubek

*Czestochowa University of Technology
Czestochowa, Poland*

martakadlubek@wp.pl

Dimitrios Chatzoudes

*Democritus University of Thrace
Xanthi, Greece*

dchatzou@pme.duth.gr

Dimitrios Maditinos

*International Hellenic University
Kavala, Greece*

dmadi@mst.ihu.gr

Abstract

The paper presents the results of research on the determination of the significance of Information Technology adoption and wireless network use in freight transport enterprises for their logistics and customer service performance. The moderating role of organizational commitment, as well as organizational flexible and control orientation, was included in the research on the impact of IT endorsement and wireless networks application on freight transport enterprises' achievements. The research procedure was conducted in 2022 in 278 freight transport enterprises. A quantitative survey in the questionnaire form was established and collected data analysis was completed using descriptive statistics methods and Structural Equations Modeling (SEM). The unveiled findings of the investigation indicate that IT adoption and wireless network technology maintenance, in their integration, facilitates the enterprises to obtain both their customer service goals and operational logistics performance. Moreover the implementation of IT can support the adoption of different organizational orientations' approaches.

Keywords: Information Technology adoption, wireless network, logistics performance, customer service performance, management.

1. Introduction

Information Technology (IT) adoption and its diverse solutions have become a crucial strategic tool for freight transport companies seeking to expand their operational competencies, recognize new market conveniences, or raise their customers' loyalty. While IT adoption offers benefits in managing information effectively, wireless network solutions enhance the value of the overall logistics processes. This convergence of IT adoption and wireless network use may results in improved operational and customer service performance. Accordingly, numerous business entities have adopted IT to support their day-to-day operations, as present the findings of research by [2]. IT solutions are exploited across all levels of an organization, including strategic, tactical, and operational levels' applications [4]. Moreover, in the framework of adopting novel and distinct IT solutions, an organization's commitment and orientation reinforces substantially to the advancement in culture's evolvement and attaining the intended status of performance [3].

With the above-signalised concerns in consideration, a framework of their conjoined analysis is proposed, as not determined earlier in similar integrative regard in the literature studies. The aim of the paper is a determination of the significance of Information Technology adoption and wireless network use in freight transport enterprises for their logistics and customer service performance. The moderating role of organizational

commitment, as well as organizational flexible and control orientation was included in the research on the impact of IT endorsement and wireless network application on freight transport enterprises' achievements. Simultaneously the study investigates if the relevance of Information Technology adoption and wireless networks use is influenced by the size of the enterprise and the area of the enterprise's activity in the view of organizational information processing theory.

2. Hypotheses Development

Based on a comprehensive review of existing literature, not detailed in this paper but only signaled earlier, there is significant evidence indicating that the adoption of IT including wireless networks use in the context of management of freight transport enterprises and their logistics and customer service performance is limited and selectively introduced.

Accordingly, the above-mentioned arguments identified in the literature allow to formulate the following hypotheses:

H1. Information Technology Adoption (ITA) has a positive influence on Customer Service Performance (CSP)

H2. Information Technology Adoption (ITA) has a positive influence on Logistics Performance (LP)

H3. Wireless Networks for Freight Transport (WN) have a positive influence on Customer Service Performance (CSP)

H4. Wireless Networks for Freight Transport (WN) have a positive influence on Logistics Performance (LP)

H5a. Organizational Commitment (OC) positively moderates the association between Information Technology Adoption (ITA) and Customer Service Performance (CSP)

H5b. Organizational Commitment (OC) positively moderates the association between Information Technology Adoption (ITA) and Logistics Performance (LP)

H5c. Organizational Commitment (OC) positively moderates the association between Wireless Networks for Freight Transport (WN) and Customer Service Performance (CSP)

H5d. Organizational Commitment (OC) positively moderates the association between Wireless Networks for Freight Transport (WN) and Logistics Performance (LP)

H6a. Organizational Flexible Orientation (OFO) positively moderates the association between Information Technology Adoption (ITA) and Customer Service Performance (CSP)

H6b. Organizational Flexible Orientation (OFO) positively moderates the association between Information Technology Adoption (ITA) and Logistics Performance (LP)

H6c. Organizational Flexible Orientation (OFO) positively moderates the association between Wireless Networks for Freight Transport (WN) and Customer Service Performance (CSP)

H6d. Organizational Flexible Orientation (OFO) positively moderates the association between Wireless Networks for Freight Transport (WN) and Logistics Performance (LP)

H7a. Organizational Control Orientation (OCO) positively moderates the association between Information Technology Adoption (ITA) and Customer Service Performance (CSP)

H7b. Organizational Control Orientation (OCO) positively moderates the association between Information Technology Adoption (ITA) and Logistics Performance (LP)

H7c. Organizational Control Orientation (OCO) positively moderates the association between Wireless Networks for Freight Transport (WN) and Customer Service Performance (CSP)

H7d. Organizational Control Orientation (OCO) positively moderates the association between Wireless Networks for Freight Transport (WN) and Logistics Performance (LP)

3. Materials and Methods

Between October and December 2022, a Computer Assisted Telephone Interviewing (CATI) survey was conducted with 390 respondents from freight transport enterprises located in Poland. Ultimately, 278 interviews with representatives from the target freight transport sector provided fundamental research information.

The items' measurements were based on a five-point Likert scale, where 1 means "I

strongly disagree” and 5 means “I strongly agree”. Initially the pretesting of the questionnaire form was realized to provide its validity and reliability. Collected data were standardized with regard to the missing rank and variance concern. Certain threats to construct validity were evaluated, including insufficient clarification of constructs, confounding of constructs operations, and mono-method bias. Subsequently, the test for non-response bias was completed with the results suggesting no impediments to further survey data analysis. The essential data investigation was performed using Structural Equations Modeling (SEM) with a partial least square (PLS-SEM)-based technique [1].

4. Results of Research

The principal part of the survey questionnaire form included the list of 37 measurement items divided into 7 critical areas of the study: ITA with 9 items, WN with 7 items, OC with 5 items, and OFO, OCO, CSP, LP with 4 items.

The discriminant validity was applied to investigate the relationship between the latent variables and the square root of the average variance extracted, as indicated in Table 1. In the diagonal the square roots of the AVEs are presented.

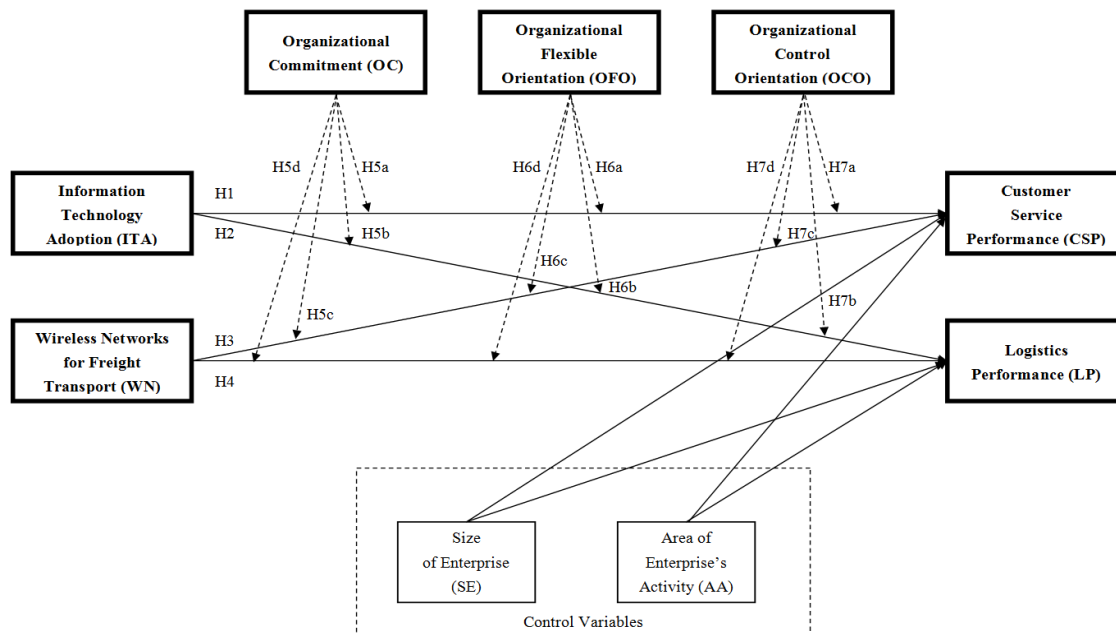
Table 1. The relationship between latent variables and the square root of average variance extracted.

	WN	ITA	CSP	LP	OFO	OCO	OC
WN	0.613						
ITA	0.570	0.600					
CSP	0.526	0.543	0.675				
LP	0.261	0.360	0.416	0.645			
OFO	0.420	0.440	0.431	0.200	0.580		
OCO	0.611	0.567	0.617	0.300	0.482	0.600	
OC	0.424	0.566	0.540	0.275	0.501	0.475	0.611

Note: The constructs demonstrating discriminant validity are indicated by higher values in bold. The diagonal displays the square roots of the AVEs.

The ultimate results of the research model comprise both supported and rejected hypotheses. The crucial detailed effects are reported in Figure 1 and its attached table, which validates the primary objective of the research model.

Figure 1. Results of the model.



Hypothesis	β	p-value	Effect	Hypothesis	β	p-value	Effect
H1.	0.31	<0.01	Supported	H6a.	0.03	0.30	Rejected
H2.	0.30	<0.01	Supported	H6b.	0.08	0.10	Rejected
H3.	0.21	<0.01	Supported	H6c.	0.10	0.04	Supported
H4.	0.03	0.30	Rejected	H6d.	0.01	0.30	Rejected

H5a.	0.18	<0.01	Supported	H7a.	0.22	<0.01	Supported
H5b.	0.011	0.41	Rejected	H7b.	0.15	<0.01	Supported
H5c.	0.18	<0.01	Supported	H7c.	0.10	0.05	Supported
H5d.	0.04	0.20	Rejected	H7d.	0.05	0.20	Rejected

The revealed results of research suggest that IT adoption can assist organizations in coordinating resources, planning their endeavours, and utilizing market information to gain a competitive advantage. With IT adoption assistance, enterprises can develop feasible customer service strategies. To enhance the achievements of these strategies, companies may arrange IT adoption next to wireless network technology maintenance, and their integration also facilitates the firms to obtain their customer service goals. Nevertheless, due to the demand of information system integration, inaugural investment, and the availability of skilled personnel to manage such technology, it has limited benefits in reference to the operational logistics performance. Enhancing an organization's information processing capabilities can boost both its customer service and operational logistics performance. However, the fusion of wireless network with other technologies still requires the focus and effort of researchers and practitioners to acquire remarkable accomplishments.

5. Conclusion

Predominant findings of the research subsidize the determination of the conditions for the management of the enterprise's organizational orientation in a strategic perspective in reference to technology involvement. Organizational achievements require consideration thorough both attitudes of external customer service performance, and internal logistics performance. The effectiveness of these factors may be influenced by a control variable, such as a company's investment in technological solutions adapted to the size and area of activity of the organization, which can respond as a strategic tool for the enterprise's management. A robust indication has been expanded and revealed the accomplishment of IT adoption in enhancing comprehensive customer service performance. While wireless network use can contribute to customer service performance in certain practices, achieving optimal logistics performance necessitates the implementation of technically proficient integration and the use of evidence at scale by freight transport enterprises.

The implementation of technology in an organization can facilitate the adoption of different organizational orientations' approaches. The study also emphasizes that organizational control orientation is particularly sufficient for an initial business endeavour, whereas flexible orientation can be considered when technology has been effectively integrated across all operational areas.

As the results revealed that the majority of enterprises were engaged in transportation-related activities (over 70% of all the companies joined in the study), but also in shipping (more than 20%) and third-party logistics (nearly 8.6%), the findings of the research may be of interest for all these sectors of activity in Poland and other UE developing countries.

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