PERFORMANCE EVALUATION CRITERIA OF LOGISTICS SERVICE PROVIDERS WITHIN SUSTAINABILITY PERSPECTIVE

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ETHICAL DECLARATION

I hereby declare that I am the sole author of this thesis and that I have conducted my work in accordance with academic rules and ethical behaviour at every stage from the planning of the thesis to its defence. I confirm that I have cited all ideas, information and findings that are not specific to my study, as required by the code of ethical behaviour, and that all statements not cited are my own.

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ABSTRACT

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Master's Program in Logistics Management

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In this study, we observe the performance evaluation criteria of logistics service providers from the manufacturer's perspective. The research focuses on examining the role of environmental sustainability in logistics service providers (LSPs) selection and identifying actions that can enhance its importance. Furthermore, it seeks to identify the challenges faced by manufacturers in evaluating LSPs in environmental sustainability and green logistics. By examining this aspect, the aim of this study is to contribute to the existing knowledge about LSP selection and sustainability concerns in the logistics industry. This study employs a grounded theory to evaluate LSPs from the perspective of manufacturers and understand their criteria for selection. Using a combination of semi-structured interviews and the Open-Axial-Selective coding technique, this research collects text data from interviews conducted with companies in Turkey. By employing this grounded theory approach, the study seeks to analyze the evaluation criteria used by manufacturers when selecting LSPs. It also aims to

understand how environmental sustainability factors into their decision-making process and propose strategies that can enhance its significance in LSP selection. Our research findings suggest that traditional factors such as cost, reliability, and service quality continue to play an important role in LSP selection. However, an emerging trend is an increasing recognition of the importance of environmental sustainability as a decision-making factor. There has been a remarkable increase in public awareness of the environmental impacts of logistics. This shift reflects a broader commitment to sustainable practices and an understanding that environmental responsibility is central to modern logistics operations.

Keywords: Logistics Service Provider, Evaluation and Selection Criteria, Green Logistics, Sustainability

ÖZET

LOJİSTİK HİZMET SAĞLAYICILARIN SÜRDÜRÜLEBİLİRLİK PERSPEKTİFİ İLE PERFORMANS DEĞERLENDİRME KRİTERLERİ

Sertel, Bülent Cem

Lojistik Yönetimi Yüksek Lisans Programı

Tez Danışmanı: Dr. Öğr. Üyesi Sinem Tokçaer

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Bu çalışmada, lojistik hizmet sağlayıcılarının performans değerlendirme kriterlerini üreticinin bakış açısından gözlemliyoruz. Araştırma, lojistik hizmet sağlayıcılarının (LHS'lar) seçiminde çevresel sürdürülebilirliğin rolünü incelemeye ve önemini artırabilecek eylemleri belirlemeye odaklanmaktadır. Ayrıca, üreticilerin çevresel sürdürülebilirlik ve yeşil lojistik konularında LHS'ları değerlendirirken karşılaştıkları zorlukları tespit etmeyi amaçlamaktadır. Bu yönü inceleyerek, bu çalışmanın amacı lojistik sektöründe LHS seçimi ve sürdürülebilirlik kaygıları hakkındaki mevcut bilgilere katkıda bulunmaktır. Bu çalışma, LHS'ları üreticilerin bakış açısından değerlendirmek ve seçim kriterlerini anlamak için gömülü teori kullanmaktadır. Yarı yapılandırılmış görüşmeler ve Açık-Eksenel-Seçici kodlama tekniğinin bir kombinasyonunu kullanan bu araştırma, Türkiye'deki şirketlerle yapılan görüşmelerden metin verileri toplamaktadır. Bu gömülü teori yaklaşımını kullanarak çalışma, üreticilerin LHS'ları seçerken kullandıkları değerlendirme kriterlerini analiz etmeyi amaçlamaktadır. Ayrıca, çevresel sürdürülebilirliğin karar alma süreçlerine

nasıl etki ettiğini anlamayı ve LHS seçimindeki önemini artırabilecek stratejiler önermeyi amaçlamaktadır. Araştırma bulgularımız maliyet, güvenilirlik ve hizmet kalitesi gibi geleneksel faktörlerin LHS seçiminde önemli bir rol oynamaya devam ettiğini göstermektedir. Bununla birlikte, ortaya çıkan bir eğilim, çevresel sürdürülebilirliğin bir karar verme faktörü olarak öneminin giderek daha fazla kabul görmesidir. Lojistiğin çevresel etkileri konusunda kamu bilincinde kayda değer bir artış olmuştur. Bu değişim, sürdürülebilir uygulamalara yönelik daha geniş bir bağlılığı ve çevresel sorumluluğun modern lojistik operasyonlarının merkezinde yer aldığına dair bir anlayışı yansıtmaktadır.

Anahtar Kelimeler: Lojistik Hizmet Sağlayıcı, Değerlendirme ve Seçim Kriterleri, Yeşil Lojistik, Sürdürülebilirlik

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CHAPTER 1: INTRODUCTION

Supply chain management plays a pivotal role in ensuring the efficient and effective flow of goods and services within businesses. As companies expand globally, they face increasing pressure from competitive markets and rising operating costs, necessitating strategic supply chain management. Logistics Service Providers (LSPs), key players in supply chain operations, offer services that contribute to the success of businesses. For supply chain operations to remain high quality and economical, LSP evaluation is crucial.

Supply chain management has become more educated on sustainability and green initiatives in recent years. For instance, the European Union's Green Lead Action Plan aims to achieve carbon neutrality by 2050, emphasizing sustainability in logistics. The significance of businesses adopting sustainable practices is emphasized by international initiatives like the Sustainable Development Goals of the United Nations. In the context of the supply chain, sustainability is critical to the evaluation and selection of logistics service providers. Consequently, businesses seek LSPs that align with their sustainability goals and exhibit a commitment to reducing environmental impact. Evaluating LSPs from a sustainability perspective is significant for several reasons. Increasing environmental consciousness among consumers and stakeholders prompts businesses to prioritize sustainable practices in logistics. Regulatory frameworks and incentives encourage organizations to adopt environmentally responsible practices and reduce their carbon footprint.

However, selecting LSPs poses challenges and conflicts due to financial and other concerns. Decision-makers must balance environmental and social sustainability with factors like cost, reliability, and service quality. Striking this balance is essential for sustainable and responsible logistics operations while meeting financial and operational objectives.

This master's thesis explores the importance of sustainability and green initiatives as evaluation criteria for Logistics Service Providers. It focuses on understanding manufacturers' perspectives, key stakeholders in LSP selection and evaluation. The research investigates manufacturers' criteria for assessing LSPs and their perspectives on sustainability and green initiatives. By uncovering challenges, conflicts, and

decision-making processes associated with carrier selection, this study aims to provide insights into evaluating LSPs from a sustainability perspective.

Through semi-structured interviews and qualitative data analysis with manufacturers in Turkey, this study offers valuable insights into evaluating LSPs from a sustainability perspective. This research adds to the existing understanding of Logistics Management and highlights the importance of considering sustainability and green initiatives when assessing the performance of logistics service providers. Furthermore, the study provides practical implications and recommendations for effectively balancing sustainability concerns with financial and operational considerations during LSP selection.

The thesis is organized as follows: Section 2 presents a review of research, theories, and literature on LSP evaluation and sustainability in logistics. Semi-structured interviews and qualitative data analysis are both included in the methods described in Section 3. Section 4 presents the research's analysis and findings. Section 5 concludes by summarizing the results and offering suggestions for future research as well as practical applications.

CHAPTER 2: LITERATURE REVIEW

Logistics service provider (LSP) selection and evaluation are essential for effective supply chain management, using various criteria like cost, quality, reliability, responsiveness, and innovation (Ivanov and Dolgui, 2011; Yang et al., 2010). Numerous approaches are used to provide efficient and effective evaluation for an LSP. Yang, Marlow, and Lu (2010) evaluate LSP quality using the Analytic Hierarchy Process and fuzzy linguistic representation.

Another approach to LSP selection is a collaborative platform that enables shippers to evaluate 3PLs based on criteria such as cost, capacity, and service quality (Stefansson, G., 2006). Another approach is a fuzzy multicriteria decision-making method considering the e-commerce environment (Ban and Ban, 2012) while Boran et al., (2009) suggest a fuzzy group decision-making method based on TOPSIS for LSP selection.

In the evolving world of e-commerce, evaluating the logistical performance of couriers has become more significant. Perboli, G. and Rosano, M. (2018) developed a decision support system for the evaluation of logistics performance in a courier company. The study aimed to provide a comprehensive framework for assessing the performance of courier services. The researchers created a decision-support system that considered a number of variables, such as operational efficiency, reliability, and delivery time.

In general, these studies highlight the methodology used to analyze LSPs as well as their selection and evaluation criteria. The criteria for LSP selection may vary based on industry and environment, and various decision-making approaches can be used based on those criteria.

2.1. Selection Criteria of Logistics Service Providers (LSPs)

To gain a competitive edge and improve supply chain performance, organizations must carefully choose their logistics service provider (LSP). Depending on the organization's needs and the requirements of the industry, different criteria may be used to evaluate and choose an LSP. Relationship orientation and organizational learning are important factors influencing the effectiveness and performance of logistics services, according to Panayides (2007). There is an extensive literature on

supplier selection criteria focusing on different aspects of focal companies and handling different layers in a supply chain. Table 1 summarizes LSP selection criteria and recent research on the related criteria. The selection criteria for LSPs can vary based on industry, company size, and stakeholder expectations. Responsiveness, reliability, service quality, logistics resources, supply chain relationships, cost, delivery time, and environmental performance are important factors to consider when selecting an LSP. Additionally, logistics outsourcing decisions, customer satisfaction, and the measurement of reverse logistics performance are essential areas of study in LSP selection and evaluation.

Table 1. LSP Selection Criteria in Selected Studies

LSP Selection Criteria	Related Research Articles
On Time Delivery	On-time service delivery, (Panayides, 2007); Greater percentage of on-time and accurate delivery, (Karia and Wong, 2013); On time delivery performance, (Tanyaş and Serdar, 2003); On-time delivery, (Aharonovitz et al., 2018); On-time delivery, (Rahman and Jim Wu, 2011); Delivery performance, (Jharkharia and Shankar, 2007); Delivery performance, (Liuand Lyons, 2011); Delivery performance, (Jayaram and Tan, 2010); Delivery performance, (Qureshi and Kumar, 2008); Delivery performance, (Rajesh et al., 2011); Delivery performance, (Hwang et al., 2016); Delivery performance, (Efendigil et al., 2008); Timeliness, (Ali et al., 2021); Scheduled delivery fulfillment, (Aharonovitz et al. ,2018); Accuracy in order picking and shipping, (Rahmanand Jim Wu ,2011)
Timely Response	Timely response to clients' requests,(Panayides ,2007); Responding to customer requests in a flexible manner, (Lai, 2004); Quicker responses to customers, (Karia and Wong, 2013); Responsiveness, (Rahmanand Jim Wu, 2011); Reciprocity /Communication, (Jharkharia and Shankar, 2007); Reciprocity /Communication, (Knemeyer and Murphy, 2005); Reciprocity /Communication, (Qureshi and Kumar, 2008); Reciprocity /Communication, (Rajesh et al., 2011)
Solving Problems	Solve clients' problems, (Panayides, 2007); Helping customers to solve problems, Handling customer complaints, (Lai, 2004); Customer relationship management and problem solving., (Tanyaş and Serdar, 2003); Personnel contact quality, (Ali et al., 2021)

Table 1 (Continued). LSP Selection Criteria in Selected Studies

Lead Time	Lead time from order to delivery and consistency of lead time, (Tanyaş and Serdar, 2003); Lead-time, (Aharonovitz et al., 2018); In-transit, loading and unloading time, (Rahmanand Jim Wu, 2011); Timeliness, (Ali et al., 2021)
Information Delivery	Accurate information delivery to clients, (Panayides, 2007); Accuracy and tracing of information/ Use of information technologies in services, (Tanyaş and Serdar, 2003); Information availability and stability and Real-time information, (Rahmanand Jim Wu, 2011); Information technology /Systems, (Göl and Çatay, 2007); Information technology /Systems, (Jharkharia and Shankar, 2007); Information technology /Systems, (Liuand Lyons, 2011); Information technology /Systems, (Qureshi and Kumar, 2008); Information technology /Systems, (Hwang et al., 2016); Information technology /Systems, (Bottaniand Rizzi, 2006); Information technology /Systems, (Chan et al., 2006); Information quality, (Ali et al., 2021)
Additional Service	More additional service, (Karia and Wong, 2013); Capability of fulfilling additional logistics activities, (Tanyaş and Serdar, 2003)
Error-free Delivery	Delivery without defect, damage and loss, (Tanyaş and Serdar, 2003); Error-free delivery, (Aharonovitz et al., 2018); Product damage rateand In-transit damage, (Rahmanand Jim Wu, 2011); Order accuracy, Order condition and Order quality, (Ali et al., 2021)
Flexibility	Adjusting operations in a flexible manner to meet, (Lai, 2004); Flexibility, (Tanyaş and Serdar, 2003); Flexibility, (Rahmanand Jim Wu, 2011); Flexibility billing /payment, (Jharkharia and Shankar, 2007); Flexibility operation /delivery (Jharkharia and Shankar, 2007); Flexibility operation /delivery, (Qureshi and Kumar, 2008); Flexibility, (Rajesh et al., 2011); Flexibility, (Hwang et al., 2016); Flexibility, (Bottaniand Rizzi, 2006); Order release quantities, (Ali et al., 2021)
Help Client in Emergencies	Willingness to help clients, (Panayides, 2007); Making efforts to help in emergencies and Providing emergency services, (Lai, 2004)

Table 1 (Continued). LSP Selection Criteria in Selected Studies

Lower Cost	Helping customers in value analysis, cost reductions, problem solving, etc., (Lai, 2004); Lower distribution cost, (Karia and Wong, 2013); Total logistics costs, (Tanyaş and Serdar, 2003); Shipping costs, (Rahmanand Jim Wu, 2011); Cost /Price, (Göl and Çatay, 2007); Cost /Price, (Jharkharia and Shankar, 2007); Cost /Price, (Liuand Lyons, 2011); Cost /Price, (Jayaram and Tan, 2010); Cost /Price, (Knemeyer and Murphy, 2005); Cost /Price, (Qureshi and Kumar, 2008); Cost /Price, (Rajesh et al., 2011); Cost /Price, (Hwang et al., 2016); Cost /Price, (Efendigil et al., 2008); Cost /Price, (Bottaniand Rizzi, 2006); Cost /Price, (Chan et al., 2006)
Unique Solution	Recommending alternative actions when unforeseen, (Lai, 2004); More unique solution, (Karia and Wong, 2013); Innovation and creativity for new product, method and service solutions, (Tanyaş and Serdar, 2003)
Better Services	Better services/ More satisfied with the service level, (Karia and Wong, 2013); Efficient and effective work and Expertise, knowledge and experience in sector and product, (Tanyaş and Serdar, 2003); Service quality, (Göl and Çatay, 2007); Service quality, (Jharkharia and Shankar, 2007); Service quality, (Liuand Lyons, 2011); Service quality, (Jayaram and Tan, 2010); Service quality, (Qureshi and Kumar, 2008); Service quality, (Rajesh et al., 2011); Service quality, (Hwang et al., 2016); Service quality, (Efendigil et al., 2008); Service quality, (Bottaniand Rizzi, 2006)
Documentation	Accurate client record keeping, (Panayides, 2007); Efficient documentation systems, (Tanyaş and Serdar, 2003); Ordering procedures, (Ali et al., 2021)
Financial Capability	Clearness in cost and pricing policy, (Tanyaş and Serdar, 2003); Financial performance, (Göl and Çatay, 2007); Financial performance, (Jharkharia and Shankar, 2007); Financial performance, (Liuand Lyons, 2011); Financial performance, (Jayaram and Tan, 2010); Financial performance, (Qureshi and Kumar, 2008); Financial performance, (Hwang et al., 2016); Financial performance, (Bottaniand Rizzi, 2006)
Reputation of the Company	Reputation of the company, (Göl and Çatay, 2007); Reputation of the company, (Jharkharia and Shankar, 2007); Reputation of the company, (Liuand Lyons, 2011); Reputation of the company, (Knemeyer and Murphy, 2005); Reputation of the company, (Qureshi and Kumar, 2008); Reputation of the company, (Rajesh et al., 2011); Reputation of the company, (Hwang et al., 2016)

Table 1 (Continued). LSP Selection Criteria in Selected Studies

Experience in the same industrial	Experience in the same industrial, (Göl and Çatay, 2007); Experience in the same industrial, (Jharkharia and Shankar, 2007); Experience in the same industrial, (Liuand Lyons, 2011); Experience in the same industrial, (Hwang et al., 2016)

The literature on selection criteria highlights the significance of common performance objectives, such as cost, delivery (Alkhatib et al., 2015). However, not only these criteria meet the expectations of a well performing and effective supply chain. According to Lai (2004)'s research, it is crucial to consider responsiveness, dependability, and service quality when choosing an LSP. These elements influence the LSP's overall service capability and performance. Moreover, Karia and Wong (2013) investigated how logistics resources affected LSP performance. They found that logistics resources, including people, technology, and equipment, have a big impact on how well LSPs perform.

Another element of LSP selection that has been studied in the literature is logistics outsourcing. Rahman and Wu (2011) specifically focused on China when studying logistics outsourcing from the manufacturer-supplier perspective. Their research determined that decisions about outsourcing logistics are influenced by elements like price, service quality, and strategic considerations. Their study provided insightful data on the strategic ramifications and decision-making processes involved, shedding light on the benefits and drawbacks of logistics outsourcing for Chinese manufacturers.

The impact of LSPs' quality performance criteria on customer satisfaction has also been widely studied. Tanyaş and Serdar (2003) compared the factors that LSPs and their clients thought were crucial. They discovered that effective communication, on-time delivery, and problem-solving skills are crucial components of customer satisfaction. Aharonovitz et al. (2018) highlighted the significance of supply chain relationships in logistics performance. Collaboration, trust, and communication were identified as essential factors in the selection of LSPs.

In the context of small and medium-sized enterprises (SMEs), Suriyajaroen and Sopadang (2018) investigated the criteria influencing the selection of LSPs for retail

SMEs in Thailand. Their study revealed that cost, delivery time, and service quality were the most critical criteria considered by SMEs.

Furthermore, the measurement of reverse logistics performance has gained attention in the literature. Fernandes et al. (2017) conducted a systematic literature review specifically focusing on the measurement of reverse logistics performance. Their study identified various dimensions, including cost efficiency, environmental impact, customer satisfaction, and process effectiveness, used to assess the performance of reverse logistics processes. The research emphasized the importance of considering these metrics to achieve sustainability goals and optimize reverse logistics operations.

With the effect of recent global climate change concerns, there is a growing recognition of the importance of environmental sustainability in the evaluation process. Organizations are increasingly considering the environmental impact of their supply chain operations and seeking LSPs that align with their sustainability goals. Environmental sustainability criteria have gained significance due to increasing environmental consciousness among consumers, stakeholder expectations, and regulatory frameworks promoting sustainable practices.

Centobelli, Cerchione, and Esposito (2017) conducted a systematic literature review focusing on environmental sustainability in the service industry of transportation and logistics service providers. Their work sheds important light on the state of the field's knowledge today and suggests future research directions. It emphasizes how important it is for LSPs to adopt eco-friendly practices, lessen their carbon footprint, and support broader environmental preservation initiatives.

By incorporating environmental sustainability criteria into the selection process, organizations can ensure that LSPs demonstrate a commitment to reducing their environmental impact. These criteria may include factors such as carbon emissions reduction strategies, adopting renewable energy sources, waste management practices, using eco-friendly packaging materials, and adherence to environmental regulations. The integration of environmental sustainability criteria alongside traditional selection criteria can help organizations make more informed decisions that align with their sustainability goals.

In the subsequent subsection, we will explore the specific selection criteria that manufacturers consider when evaluating LSPs from an environmental sustainability perspective. This will provide insights into the challenges, conflicts, and decision-making processes associated with the selection of LSPs with a focus on environmental sustainability.

2.2. Selection Criteria of LSP with Environmental Sustainability Focus

Despite the extensive literature on LSP performance evaluation criteria, there is still a significant gap in our understanding of the specific environmental sustainability and green logistics criteria that manufacturers employ when evaluating LSPs. The growing importance of environmental sustainability in supply chain management has been acknowledged in previous studies (Qureshi and Kumar, 2008); Sarkis, 2012). However, there is limited research on how manufacturers incorporate these criteria into their carrier selection process. Furthermore, the way manufacturers balance environmental sustainability and green logistics criteria with other essential evaluation factors, such as cost and reliability, remains insufficiently explored.

Bask et al. (2018) conducted a study that contributes to addressing this gap by examining environmental sustainability in shipper-LSP relationships. The research explored the criteria used by shippers to evaluate LSPs from an environmental perspective. The authors emphasized the need for shippers to consider the environmental performance of LSPs when selecting their partners. The study highlighted the importance of factors such as carbon emissions reduction strategies, energy efficiency, waste management, and the use of sustainable transportation options in the evaluation process.

Moreover, Bask et al. (2018) emphasized the significance of developing strong relationships between shippers and LSPs to foster environmental sustainability. The study suggested that collaboration, information sharing, and joint efforts to improve environmental performance can lead to better sustainability outcomes. The findings emphasized the importance of aligning the sustainability goals of shippers and LSPs and working together to achieve environmental objectives.

An additional research question of importance is the identification of barriers that hinder manufacturers from prioritizing environmental sustainability and green

logistics criteria during the carrier selection process. Pietro De Giovanni and Vincenzo Esposito Vinzi (2012) contend that implementing sustainable practices necessitates overcoming various institutional, organizational, and cultural obstacles. These barriers may differ across industries and regions, emphasizing the need for further investigation. Sustainability can also be considered as an external pressure to tackle environmental concerns while selecting LSPs. Pålsson and Kovács (2014) examined the reduction of transportation emissions and identified stakeholder pressure and competitive advantage as significant factors in the selection of environmentally friendly LSPs.

Furthermore, it is crucial to examine how different industries and regions vary in their utilization of environmental sustainability and green logistics as evaluation criteria when selecting LSPs. Schilling and Seuring (2023) argue that environmental sustainability is an important consideration in logistics operations, emphasizing the need for companies to select Logistics Service Providers (LSPs) with a focus on environmental sustainability. They identified several selection criteria that companies can use when choosing an LSP with an environmental sustainability focus. These criteria consider various aspects of the LSP's environmental performance and commitment to sustainability throughout its operations. Specifically, the authors highlighted the importance of evaluating the LSP's environmental history, its capacity to offer sustainable transportation options, and its dedication to sustainable practices (Schilling and Seuring, 2023)

In line with this perspective, Karsak and Dursun, (2015) proposed a methodology for evaluating LSPs that incorporates both qualitative and quantitative criteria. They emphasized the significance of considering environmental criteria when selecting an LSP. For instance, they suggested that companies assess the LSP's carbon footprint and its utilization of eco-friendly transport modes. By incorporating these environmental criteria into the evaluation process, companies can ensure that they align with their sustainability objectives and reduce their environmental impact (Karsak and Dursun, 2015).

Furthermore, Göçmen and Erol (2018) provided a comprehensive review of the issue of sustainable intermodal transportation and identified operational problems and potential solutions. In the context of selecting an LSP, they stressed the importance of

environmental criteria such as the LSP's use of environmentally friendly packaging materials. Incorporating these criteria into the evaluation process can contribute to sustainable supply chain practices and reduce carbon emissions (Göçmen and Erol, 2018).

In summary, the literature suggests that when selecting an LSP with an environmental sustainability focus, companies should consider various criteria. The LSP's environmental track record, its ability to offer sustainable transportation options, and its use of environmentally friendly packaging materials are among these criteria. Companies can lessen their environmental impact and reach their sustainability goals by including these criteria in the evaluation process. Companies can choose LSPs that are more closely aligned with their sustainability goals by filling the knowledge gap and embracing environmental sustainability factors.

It is critical to place the selection standards for LSPs with an environmental sustainability focus within the larger framework of Green Supply Chain Management (GSCM) Theory in addition to comprehending the standards themselves. GSCM emphasizes the integration of environmental considerations throughout the entire supply chain, including the selection of LSPs. The literature reviewed so far highlights the growing importance of environmental sustainability in supply chain management and the need for companies to select LSPs that align with their sustainability goals.

The upcoming subsection on Green Supply Chain Management Theory will provide a theoretical framework that further supports the importance of incorporating environmental sustainability into the selection of LSPs. It will explore how GSCM principles can guide companies in their decision-making process, considering not only the selection criteria but also the broader implications for sustainable supply chain management. This theoretical perspective will help contextualize the practical insights gained from the literature review and provide a comprehensive understanding of the role of LSP selection in promoting environmental sustainability within the supply chain.

2.3. Green Supply Chain Management Theory

Due to rising environmental concerns and laws, green supply chain management (GSCM) has received a lot of attention lately. The importance of logistics service providers (LSPs) in attaining these objectives rises as businesses explore ways to lessen their carbon impact and promote sustainability. Evaluating LSP performance from the manufacturer's perspective involves assessing criteria that are relevant to the company's operations and goals, including environmental sustainability and green logistics initiatives.

Sarkis (2012) defines GSCM as an extension of traditional supply chain management that focuses on minimizing environmental impacts and promoting sustainability. GSCM involves incorporating sustainable practices into every aspect of supply chain management, including carrier selection. The selection of carriers can be a complex and challenging task for manufacturers due to financial and other concerns. However, as Chin et al., (2015) note, sustainable carrier selection can lead to long-term profitability and competitiveness. This is because green carriers can help reduce environmental impact, lower costs, and improve reputation, which are all important factors for manufacturers.

Qureshi and Kumar (2008) found that businesses are increasingly adopting sustainable practices in their carrier selection in their study of the green supply chain management practices in the automotive industry. The process of choosing a sustainable carrier entail assessing potential carriers according to their environmental performance, including their emissions, fuel usage, and use of low-emission vehicles. Selecting suppliers who support the company's commitment to sustainability and collaborating with them to enhance their environmental performance can also be considered when choosing a sustainable carrier.

To sum up, green supply chain management theory is relevant to the evaluation of LSP performance from the manufacturer's perspective. The selection of carriers plays an important role in achieving sustainability goals and can have long-term impacts on the profitability and competitiveness of manufacturers. As such, it is important to consider environmental sustainability and green logistics initiatives when evaluating LSP performance and selecting carriers.

2.3.1. Internal and External Practices

Green supply chain management (GSCM) involves incorporating sustainable practices into every aspect of supply chain management, including carrier selection. *Internal* GSCM practices can be classified as a firm's green policy, green marketing, green transport and the actions during the phase of carrier or transportation selection.

The selection of carriers can be a complex and challenging task for manufacturers due to financial and other concerns. However, as Chin et al., (2015) note, sustainable carrier selection can lead to long-term profitability and competitiveness. This is because green carriers can help reduce environmental impact, lower costs, and improve reputation, which are all important factors for manufacturers.

GSCM involves not only internal practices within the organization but also external practices, such as communication with suppliers and customers (Yang et al., 2013). According to Pietro De Giovanni et al. (2012), examples of external practices include working with suppliers to enhance their environmental performance and collaborating with clients to provide environmentally friendly goods and services. The adoption of sustainable practices throughout the supply chain can be promoted with the support of effective external stakeholder collaboration and communication.

2.3.2. Interaction with Other Stakeholders

Interaction with other stakeholders is critical in GSCM since it involves collaborating with multiple stakeholders for enhanced sustainability. According to Zhu and Lai (2010), collaboration with other stakeholders can aid in identifying potential environmental effects of the supply chain and developing mitigation strategies. Pålsson and Kovács (2014) further emphasize the importance of stakeholder engagement, noting that it can lead to improved environmental performance, stakeholder satisfaction, and organizational reputation.

2.3.3. Shipper Commitment

Shipper commitment is an important aspect of GSCM, as it involves a willingness to adopt sustainable practices and actively promote sustainability throughout the supply chain. Oberhofer and Dieplinger (2014) notes that shipper commitment is a key factor in the adoption of sustainable carrier selection practices. Shippers who are committed

to sustainability are more likely to prioritise environmental performance when selecting carriers and to work with carriers to improve their environmental performance.

2.3.4. External Pressures

The adoption of sustainable practices in the supply chain is significantly influenced by external factors including legal obligations, consumer demands, and stakeholder expectations. According to Testa and Iraldo (2010), adoption of GSCM has been significantly influenced by regulatory requirements, particularly in Europe. Customers are increasingly looking for environmentally friendly goods and services, according to Eng-Larsson and Kohn (2012), who emphasize the significance of customer demands in promoting sustainable practices. Organizations are motivated to adopt sustainable practices throughout their supply chains and to improve the sustainability of their supply chains by these external pressures. Collaboration, information sharing, and joint efforts between manufacturers and LSPs can contribute to achieving environmental objectives and promoting sustainability.

2.3.5. Performance Evaluation and Continuous Improvement

Performance evaluation is a crucial component of GSCM. Manufacturers need to assess the environmental performance of LSPs to ensure they meet sustainability goals. Schilling and Seuring (2023) suggests evaluating an LSP's environmental history, sustainable transportation options, and commitment to sustainable practices. By monitoring and measuring the environmental performance of LSPs, manufacturers can identify areas for improvement and encourage continuous sustainability enhancements throughout the supply chain.

2.3.6. Integration of Environmental Sustainability in Decision Making

Incorporating environmental sustainability into the decision-making process is a fundamental principle of GSCM. Companies need to consider the environmental impact and sustainability practices of LSPs when selecting their partners. Karsak and Dursun (2015) propose evaluating an LSP's carbon footprint, use of eco-friendly transport modes, and other environmental criteria. By integrating these sustainability considerations into the evaluation and decision-making process, companies can align

their supply chain operations with their sustainability objectives and reduce their overall environmental impact.

2.3.7. Overcoming Barriers and Challenges

Implementing sustainable practices and embracing GSCM principles can face various barriers and challenges which can be grouped as institutional barriers, organizational barriers, cultural barriers, regional disparities, stakeholder pressures, financial considerations and limited availability of green solutions. Pietro De Giovanni et al. (2012) mention institutional, organizational, and cultural obstacles that need to be overcome to successfully adopt sustainable practices. It is essential to identify and address these barriers, which may vary across industries and regions, to ensure the effective integration of environmental sustainability in the selection of LSPs. Factors such as infrastructure availability, access to green logistics solutions, and local environmental regulations can impact the extent to which companies prioritize environmental sustainability in LSP selection.

2.3.8. Industry and Regional Variations

The adoption of environmental sustainability and green logistics criteria in LSP selection may vary across industries and regions. Zhu and Lai (2010) found regional disparities in the adoption of sustainable practices within logistics in different regions of China. Considering these industry and regional variations is important to tailor the selection criteria and strategies for LSPs with an environmental sustainability focus.

In conclusion, green supply chain management theory provides a framework for incorporating environmental sustainability into LSP evaluation and selection. It emphasizes the importance of sustainable practices, stakeholder collaboration, performance evaluation, continuous improvement, and decision-making integration. Overcoming barriers, considering industry and regional variations, and promoting sustainability throughout the supply chain are key aspects of implementing GSCM principles. Manufacturers can leverage these principles to select LSPs with a focus on environmental sustainability and contribute to overall supply chain sustainability goals.

2.4. Literature Gap

Although the literature on LSP performance evaluation criteria is vast, there is a gap in our understanding of the specific environmental sustainability and green logistics criteria that manufacturers use when evaluating LSPs. Previous studies have noted that environmental sustainability is becoming an increasingly important factor in supply chain management (Singh et al., 2019; Sarkis, 2012), but there is limited research on how manufacturers integrate such criteria into their carrier selection process.

Furthermore, there is a lack of knowledge on how manufacturers balance environmental sustainability and green logistics criteria with other evaluation criteria such as cost and reliability. Abbasi and Nilsson (2016) suggest that the trade-offs between environmental and economic performance are not well understood in the context of supply chain management, and this gap may hinder the adoption of sustainable practices in carrier selection.

Additionally, the barriers that prevent manufacturers from prioritizing environmental sustainability and green logistics criteria in their carrier selection process requires further investigation. Pietro De Giovanni and Vincenzo Esposito Vinzi (2012) argue that the implementation of sustainable practices requires overcoming various institutional, organizational, and cultural barriers, which may differ across industries and regions.

Finally, there is a need to investigate how different industries and regions differ in their use of environmental sustainability and green logistics as evaluation criteria for LSP selection. Zhu and Lai (2010) finds that the adoption of sustainable practices in logistics varies across different regions in China. To address these gaps, this study aims to explore the perspective of manufacturers on LSP performance evaluation criteria, with a particular focus on the role of environmental sustainability and green logistics initiatives in carrier selection. Therefore, this research addresses the following questions:

1. What are the criteria for selecting LSPs?
2. What is the role of environmental sustainability in LSP selection?
3. What actions enhance the importance of sustainability in LSP selection?

4. What are the key challenges and barriers manufacturers face when evaluating LSPs in terms of environmental sustainability and green logistics?
5. What specific environmental sustainability and green logistics criteria do manufacturers use when evaluating LSPs?

CHAPTER 3: METHODOLOGY

This study employs a qualitative research approach, specifically grounded theory, to investigate the dynamics of shipper-LSP relationships and their importance on environmental sustainability. We deployed a qualitative approach as it allows for an in-depth exploration of the complex interactions and dynamics within these relationships, providing rich insights and understanding of the research phenomena.

Grounded theory is a well-established research methodology that focuses on theory development and testing based on existing concepts and frameworks. By using grounded theory in a deductive manner, we aim to explore and understand the complex interactions and dynamics within shipper-LSP relationships, seeking to support and refine current theoretical frameworks. The research methodology draws on a comprehensive coding technique that includes Open, Axial, and Selective coding to analyze the interview data. This iterative coding process facilitates the development of a theoretical framework that illuminates the interplay between shipper-LSP relationships and environmental sustainability.

By grounding the analysis in the data and deductively researching theories, this study contributes to the advancement of knowledge in this field. Furthermore, the application of this coding technique aims to support and refine the current theoretical framework by identifying gaps in existing knowledge and contributing to the enhancement of theories related to shipper-LSP relationships and environmental sustainability.

By employing a qualitative research approach, specifically grounded theory in a deductive manner, this study seeks to provide a deeper understanding of the complexities involved in shipper-LSP relationships and their implications for environmental sustainability.

3.1. Research Design

The research design involves conducting semi-structured interviews with shippers from various industries in Turkey. By selecting shippers from different industries, the study aims to capture diverse perspectives and obtain a comprehensive understanding of shipper-LSP relationships in the context of environmental sustainability. A

qualitative approach is employed to delve deeply into the subject matter and explore the complexities and nuances of these relationships.

3.2. Data Collection

a. Sample: A total of 11 semi-structured interviews were conducted with shippers operating in various industries in Turkey, following a purposive sampling strategy. The selection of participants was based on their relevance to the research objective, aiming for a diverse representation of shippers in terms of company size, industry, and logistics operations (see Table 2[1] for information about interviewees and firms).

Table 2. Information about interviewees and firms

Interview Number	Size of the company	Industry	Position of the interviewee(s)
1	Small	Household Cleaning Products	Managing Director
2	Medium	Construction Machinery	Logistics Specialist
3	Large	Food and Beverage	Sales Operations Specialist
4	Large	Consumer electronics and white goods	Supply Chain Specialist
5	Large	Automotive Wheel	Logistics Executive
6	Large	Automotive Wheel	Logistics Specialist
7	Large	Heating	Logistics Specialist

[1] According to the European Commission, small companies have between 10 and 50 employees, medium-sized companies between 50 and 250 employees, and large companies more than 250 employees.

Table 2 (Continued). Information about interviewees and firms

8	Medium	Packaging	Logistics Purchasing Executive
9	Medium	Textile	Export Executive
10	Medium	Large Engine Components	Logistics Purchasing Specialist
11	Small	Machinery Manufacturing	General Manager

The interviews aimed to gather comprehensive insights into shipper-LSP relationships and their implications for environmental sustainability. Prior to the interviews, participants provided their consent for participation, ensuring their voluntary involvement in the study.

To capture accurate and detailed data, the interviews were audio-recorded, allowing for later transcription and analysis. The interview questions, provided in Appendix A, were carefully designed based on an interview protocol consisting of 15 questions. The protocol covered a range of topics, including the evaluation criteria of logistics service providers (LSPs), the firm's perspective on environmental sustainability, problems encountered during logistics operations, and follow-up questions to delve deeper into specific areas of interest.

The semi-structured nature of the interviews provided flexibility while ensuring that key research areas were addressed. This approach allowed for in-depth exploration of participants' perspectives, experiences, and practices related to shipper-LSP relationships and environmental sustainability.

By conducting interviews with shippers across different industries, this study sought to capture diverse viewpoints and experiences, contributing to a comprehensive understanding of the dynamics within shipper-LSP relationships and their potential impact on environmental sustainability.

3.3. Ethical Considerations

Ensuring that participants' rights and privacy were upheld throughout the research process required careful ethical consideration. Providing informed consent, all participants were briefed on the objectives, outcomes, and procedures of the study. Their voluntary participation was emphasized, with a guarantee that they could withdraw whenever they wished. To preserve the subjects' identity, confidentiality and anonymity were upheld throughout the research. During interviews and the data collection process, sensitive and private information was handled with utmost confidentiality. Any identifying information was either left out or substituted with pseudonyms, and each participant was given their own unique identification number.

The security and integrity of the data were prioritized. On password-protected devices, all information, including audio recordings and interview transcripts, was safely stored. The research team had exclusive access to the data, which ensured its confidentiality and prevented unauthorized access. This research study adhered to the ethical guidelines and principles established by Izmir University of Economics Ethics Committee. The study protocol and informed consent procedures were reviewed and approved by the ethics committee, affirming compliance with ethical standards.

3.4. Data Analysis

The data analysis process involved the application of an iterative coding technique, including Open, Axial, and Selective coding, to derive meaningful insights from the interview data (Corbin and Strauss, 1990).

a. Open Coding: In the initial stage of analysis, the interview transcripts were subjected to open coding. This involved systematically reviewing the data line-by-line, identifying significant concepts, ideas, and themes, and assigning descriptive codes to capture the essence of the information.

b. Axial Coding: The next step involved axial coding, where the initially identified codes were organized into broader categories based on their relationships and connections. This stage aimed to establish linkages between categories and subcategories to develop a comprehensive understanding of the research phenomena.

c. Selective Coding: The final stage of coding, known as selective coding, focused on identifying core categories that emerged as central themes in the data. These core

categories were further refined and analyzed to develop a theoretical framework that illuminates the interplay between shipper-LSP relationships and environmental sustainability.

3.5. Reliability and Triangulation

To ensure the reliability of the study and address potential biases in the data analysis, a triangulation approach was implemented. To affirm and validate the results, triangulation uses a variety of techniques or data sources (Cohen, Manion, and Morrison, 2018). This tends to increase the credibility of the research findings.

One of the potential concerns in qualitative research, such as grounded theory, is the subjectivity involved in the coding and interpretation of data. To mitigate this concern, a double-checking process was employed as a form of triangulation. This approach involved two independent coders who individually reviewed and coded a subset of the interview transcripts.

The coders engaged in a rigorous comparison and discussion of their coding results, addressing any discrepancies or disagreements. Consensus was reached on the coding choices through this process of double-checking, which raised the accuracy of the analysis. The use of multiple coders contributes to establishing the consistency and dependability of the coding process, which is in line with the grounded theory concept of "reliability through replication" (Cohen, Manion, and Morrison, 2018).

By implementing the triangulation of coding through the double-checking procedure, the study aimed to strengthen the trustworthiness and credibility of the analysis. The robustness of the identified concepts, themes, and categories derived from the interview data is ensured using this method, which adds to the overall validity of the findings.

Additionally, thorough documentation of the coding choices, interpretations, and justifications was kept throughout the data analysis process. This documentation served as an audit trail, allowing for transparency and accountability in the analysis, as recommended in grounded theory methodology (Cohen, Manion, and Morrison, 2018).

In summary, the use of triangulation through the double-checking of coding by two independent coders, combined with thorough documentation, helped to enhance the

reliability and rigor of the data analysis in this study, aligning with the principles of grounded theory methodology and ensuring the credibility of the research findings.

CHAPTER 4: FINDINGS

The following section presents the findings of an analysis of information gathered from semi-structured interviews with shippers working in various Turkish industries. The goal of these interviews was to learn more about the dynamics of shipper-LSP relationships and how they affect environmental sustainability. By examining the perspectives and experiences of the interviewees, this study provides insights on the complexities and difficulties faced by shippers in their pursuit of sustainable logistics practices.

Several topics, including the assessment of logistics service providers, perspectives on environmental sustainability, decision-making procedures, logistical challenges, and barriers to the adoption of sustainable logistics, were covered in the interviews using a set of questions (see Appendix A).

Through these interviews, the participants provided insights into their business and company background, shipment volumes, expectations from logistics service providers, and the various factors influencing their decisions in the realm of shipper-LSP relationships.

The findings will be presented under three main subheadings. These subheadings were chosen for the findings section with the intention of logically grouping and presenting the research findings. Each subheading focuses on a particular topic of interest and emphasizes key elements related to the decision-making process shippers use to choose logistics service providers, operational challenges shippers face, and the significance of environmental sustainability. Furthermore, findings are organized as Selective-Axial coding tables after indicating open coding for each valuable comment of the participants in conducted semi-structured interviews. (See Table 3 for LSP Selection Criteria and Table 4 for Environmental Sustainability and Green Logistics Criteria)

Table 3. LSP Selection Criteria

Vehicle and Equipment	Condition of Vehicles
Information and Communication	Information Delivery
	Lack of Communication
	Tracking System

Table 3 (Continued). LSP Selection Criteria

Evaluation and Documentation	Evaluation System
	Documentation
External Factors	Extraordinary Global Events
	Disruptions in import-export balance
	Container Crisis
	Fluctuation in Freight
Cost and Pricing	Price
	Cost
	Financial Capability
Reliability and Quality	Reliability
	Service Quality
	Flexibility Operation/Delivery
	Problem Solving
	Defect/Damage Rate
	Timely Response
	On Time Delivery
Experience and Certification	Certification
	Experience in the same industrial field
Company Factors and External Links	Reference
	Company Scale
	Customer Portfolio
	Agency Network

Table 4. Environmental Sustainability and Green Logistics Criteria

Perception and Awareness	Perceived Significance of Environmental Sustainability Consciousness
Infrastructure and Technology	Lack of Infrastructure/Technology
Vehicle Condition and Optimization	Condition of Vehicles Equipment/Route Optimisation
Budget and Resource Allocation	Budget/Resource
Criteria and Decision Making	Selection Criteria Trade-off
Marketing and Competitive Advantage	Marketing Competitive Advantage
Social Responsibility	Social Responsibility
Company Scale and Delivery Performance	Company Scale On Time Delivery
Environmental Logistics Practices	Reducing Usage of Plastics/Nylon Route Optimization Alternative Transportation Options
Governmental Influence and Pressure	Governmental Regulations Governmental Incentives
Customer Pressure	Pressure from Supply Chain Partners

LSP Selection Criteria: This section explores the criteria and factors considered by shippers when selecting logistics service providers and examines the significance of a number of factors in the decision-making process, including cost-effectiveness, service quality, dependability, flexibility, and technological capabilities.

Operational Problems: In this section, we examine the operational difficulties and difficulties that shippers encounter in their logistics operations. The results highlight

typical issues that are encountered and how these issues might be related to LSPs' selection criteria.

The role of environmental sustainability: Integrating sustainable practices into logistics service providers is essential for environmental sustainability. We will explore the benefits of this approach, some of its challenges and opportunities for green supply chain management. Respondents discussed their views on these issues.

By analyzing the interview data within these thematic areas, patterns, themes, and key findings emerged, contributing to a deeper understanding of the intricate interactions between shippers and logistics service providers. These findings provide valuable insights for practitioners, policymakers, and researchers seeking to enhance the sustainability of supply chain operations and strengthen shipper-LSP relationships.

4.1. LSP Selection Criteria

The selection criteria and elements that shippers consider when choosing logistics service providers are examined in this section. It investigates the significance of several decision-making factors, including cost effectiveness, service quality, reliability, flexibility, and technological capabilities.

When shippers begin the process of selecting a logistics service provider, they face a challenge in locating a partner who can meet their specific needs and assist their supply chain operations in succeeding. Shippers carefully assess a number of factors to ensure that the provider they choose fits their requirements and objectives to make wise decisions.

We will explore the various selection factors that shippers prioritize in this section. These criteria act as guidelines for evaluating and comparing different logistics service providers. We can learn more about the preferences and expectations of shippers when it comes to working with a logistics service provider by understanding the factors that affect their decisions.

4.1.1. Cost-effectiveness

In selecting logistics service providers, cost-effectiveness is crucial. The desire to minimize their transportation costs and overall supply chain costs is a common motivator for shippers. The study by Gupta et al. (2021) emphasizes the importance of

cost when evaluating potential LSPs. Those who responded to our surveys and spoke with us stressed the importance of cost-effectiveness in their decision-making.

During the interviews, shippers expressed their considerations regarding cost when selecting logistics service providers. For example, one respondent from Firm G stated, "Our expectations from the logistics service provider are affordable costs." Another respondent from Firm E mentioned, "At the end of the day, our choice of supplier is based solely on price for suppliers that we are convinced meet certain criteria."

These responses align with the findings from the study, indicating that shippers prioritize cost-effectiveness when evaluating potential LSPs. The insights provided by our interviewees shed light on their considerations and expectations related to cost, emphasizing the need for competitive rates and transparent fee structures without compromising service quality.

By considering cost-effectiveness as a key criterion, shippers aim to optimize their transportation expenses and overall supply chain costs. The findings from both the study and our interviews highlight the practical importance of cost in the decision-making process when selecting logistics service providers.

4.1.2. Service Quality

Service quality is another crucial criterion in the selection of logistics service providers. Shippers prioritize providers who can consistently deliver high-quality services and meet their expectations.

According to the research conducted by Panayides and So (2005), shippers emphasized the significance of service quality when choosing LSPs. This finding is consistent with the insights we gathered from our own interviews with shippers operating in various industries.

During our interviews, shippers highlighted the importance of service quality in their selection process. They expressed a preference for LSPs that have a strong reputation for delivering superior service levels, efficient communication, and prompt issue resolution. For example, one respondent from Firm C stated, " On-time delivery is very important to us. We prefer to partner with LSPs that can consistently meet our service expectations and promises.

These findings from our interviews support Panayides and So (2005)'s findings and emphasize the practical significance of service quality in shippers' decision-making when choosing logistics service providers. Shippers prioritize high-quality service delivery as it directly impacts their supply chain efficiency and customer satisfaction. By considering service quality as a critical criterion, shippers can ensure that their chosen LSPs align with their expectations and contribute to the overall success of their supply chain operations.

4.1.3. Reliability

Reliability is closely linked to service quality and is a key consideration for shippers. Shippers require LSPs that can be relied upon to fulfill their transportation and logistics needs consistently. In our interviews, a shipper from Firm G emphasized the significance of reliability in their decision-making process. They highlighted the importance of selecting logistics service providers who have a proven track record of handling unexpected disruptions effectively and minimizing delays. Timely pickups, deliveries, and adherence to schedules were identified as crucial factors for their operations. These insights from Firm G provide valuable firsthand experiences that align with the research conducted by Gupta et al. (2021), which revealed that reliability is considered an important factor in LSP selection.

4.1.4. Flexibility

In today's dynamic business environment, shippers require logistics service providers (LSPs) that can adapt to changing demands and provide flexible solutions. Flexibility, in terms of capacity, routing options, and service customization, is highly valued. During our interviews, several shippers highlighted the significance of flexibility in their selection criteria.

One respondent from Firm C stated, "We operate in a seasonal industry, so we need LSPs who can scale up or down their operations based on our fluctuating demand. They should also be willing to provide alternative routing options when necessary." This highlights the need for LSPs to adjust their services based on varying business conditions and provide tailored solutions to meet the unique requirements of shippers.

Another respondent from Firm I emphasized, "As our business expands into new markets, we require LSPs who can adapt to different regulations, customs procedures,

and transportation modes. Having a flexible partner enables us to efficiently navigate complex supply chain networks and respond to changing customer demands."

These insights from Firm C and Firm I shed light on the practical importance of flexibility in the selection of logistics service providers. They align with the findings of Khakdaman et al. (2022), which emphasized the significance of flexibility as a key factor considered by shippers during LSP selection.

4.1.5. Technological Capabilities

The integration of technology has emerged as a significant differentiating factor in the selection of logistics service providers (LSPs). Shippers recognize the potential benefits of advanced technologies in optimizing supply chain operations. According to the research conducted by Cichosz et al. (2020), technological capabilities are considered important by shippers when choosing LSPs.

During our interviews, one respondent from Firm F mentioned, "We prefer LSPs who leverage technology to provide real-time visibility and accurate information about our shipments." This comment highlights the increasing reliance on technological solutions to enhance transparency, efficiency, and communication within the supply chain.

The insights provided by respondents, such as the comment from Firm F, align with the findings of Cichosz et al. (2020) and emphasize the practical importance of technological capabilities in the decision-making process. Shippers seek LSPs who can effectively employ technology to improve operational processes, enhance data-driven decision-making, and provide enhanced visibility and tracking capabilities.

4.2. Operational Problems

This section delves into the operational challenges and problems faced by shippers in their logistics operations. It examines issues related to transportation, warehousing, inventory management, order fulfillment, and last-mile delivery, among others. The findings highlight the common problems encountered and the strategies employed to mitigate or overcome them.

Transportation presents significant challenges for shippers, encompassing issues such as delays, disruptions, capacity constraints, and escalating fuel costs. According to a survey conducted by Banomyong and Supatn (2011), transportation was identified as

a major operational problem by most shippers. Our respondents shed light on the specific issues they encounter in this domain. For example, Firm E highlighted, 'We face transit delays caused by traffic congestion and unpredictable weather conditions. These delays have a considerable impact on the overall efficiency of our supply chain.'

By addressing these operational problems through various strategies and solutions, shippers can enhance their logistics operations, improve customer satisfaction, and gain a competitive advantage. The examples provided by the respondents shed light on the practical implications of these challenges and the importance of overcoming them. The comments from the review articles further highlight the relevance of these operational problems in the logistics industry.

4.3. Role of Environmental Sustainability

This section explores the role of environmental sustainability in the selection of logistics service providers. It examines the significance of environmental considerations, the challenges faced in implementing sustainable logistics, and the potential benefits associated with environmentally conscious supply chain management.

4.3.1. Integration of Environmental Sustainability Criteria

The integration of environmental sustainability criteria in the selection process of logistics service providers is of paramount importance. The literature review highlights the growing recognition of environmental sustainability in supply chain management and the need for companies to align their sustainability goals with the selection of logistics partners (Schilling and Seuring, 2023) However, limited research exists on the specific criteria employed by manufacturers when evaluating logistics service providers from an environmental perspective (Bask et al., 2018).

Among the interviewees, the majority emphasized the importance of considering environmental sustainability criteria when selecting logistics service providers. The insights provided by the respondents shed light on the integration of environmental sustainability in the selection process. For example, one respondent from Firm C mentioned, 'If there is a transportation company with lower carbon emissions and a more environmentally friendly approach, we would choose them.' This indicates their preference for providers that demonstrate a commitment to reducing their

environmental impact. Similarly, a respondent from Firm D mentioned, 'If they meet our terms and conditions, and at the same time practice sustainable logistics and minimize harm to the environment, it would be convincing for us.' This highlights their interest in logistics providers that prioritize sustainability while meeting their specific requirements.

Furthermore, Firm E expressed their perspective on the relevance of environmental considerations, stating, 'Currently, the issue of carbon footprint and green logistics is on the agenda, but it does not pose a barrier as long as the content is satisfactory.' This demonstrates their recognition of the importance of environmental sustainability in logistics, despite not being a hindrance to their selection process.

These insights from the respondents emphasize their commitment to considering environmental sustainability criteria in the selection of logistics service providers. It underscores their awareness of the importance of aligning supply chain operations with sustainable practices to reduce environmental impact. The findings highlight the growing recognition of environmental considerations in the selection process and the need for logistics providers to demonstrate their environmental stewardship.

4.3.2. Challenges in Implementing Sustainable Logistics

Implementing sustainable logistics poses various challenges for companies. Among the interviewees, several obstacles were identified that hinder the adoption of environmentally friendly practices. One major obstacle highlighted by the respondents is the lack of infrastructure and resources. Insufficient support systems and limited availability of eco-friendly infrastructure present challenges for companies striving to implement sustainable logistics practices. Our respondents shared their insights related to this subsection. Firm J emphasized, 'The lack of necessary infrastructure and technology can be an impediment to the widespread adoption of environmentally friendly logistics practices.'

Firm A pointed out, 'The fundamental issue lies in the development of vehicles, such as electric or alternative fuel systems.' Firm F expressed frustration, stating, 'There is a lack of response and offerings from logistics providers, both globally and specifically in the Turkish market. There are no reliable and affordable green logistics providers in the transportation sector at present.'

In addition to these challenges mentioned by our respondents, the literature highlights the importance of investigating cultural and organizational barriers to sustainable logistics. Pietro De Giovanni and Vincenzo Esposito Vinzi (2012) emphasize that these barriers may vary across industries and regions, emphasizing the need for further investigation into the specific challenges faced by companies in different contexts. This aligns with the observations of our respondents and underscores the complexity of implementing sustainable logistics practices.

Considering both the insights from our respondents and the findings from the reviewed articles, it is evident that addressing infrastructure limitations, technology development, and the availability of reliable and affordable green logistics providers are crucial steps in overcoming the challenges of implementing sustainable logistics. These insights contribute to a comprehensive understanding of the obstacles faced by companies and highlight the importance of proactive measures to promote sustainable practices in the logistics industry.

4.3.3. Benefits and Opportunities of Environmental Consciousness

Despite the challenges, companies recognize the potential benefits and opportunities associated with environmentally conscious supply chain management. Most of the respondents believed that integrating sustainable practices could lead to cost savings and operational efficiencies. This perception aligns with the existing literature, which highlights the long-term financial benefits of sustainable logistics (Schilling and Seuring, 2023).

Collaboration between shippers and logistics service providers was identified as a crucial factor in achieving environmental sustainability goals. A significant number of interviewees emphasized the importance of fostering strong relationships and information sharing with logistics service providers to facilitate the implementation of sustainable practices. This collaboration enables joint efforts to improve environmental performance and achieve sustainability outcomes (Bask et al., 2018).

The interviewees also expressed the need for clear guidelines and regulations to promote environmental sustainability in logistics operations. An overwhelming majority of the respondents highlighted the importance of government support and policy frameworks in encouraging the adoption of sustainable logistics practices.

Government initiatives can provide the necessary incentives and regulatory frameworks to drive sustainable practices throughout the supply chain.

Respondent from Firm C noted that there is a lack of awareness and consciousness regarding environmental sustainability among local municipalities and the public. Firm E highlighted that while sustainability is inherent in the industry, it may not be implemented as much as required by regulations, and there is limited demand for it externally. Firm F suggested that governmental organizations, such as the Aegean Exporters' Association, could take the lead in driving sustainability efforts. Firm H stressed the need for direct government intervention through the establishment of specific regulations, ensuring that companies are compelled to adhere to sustainable practices. Firm I anticipated the development of an internal corporate strategy in response to the imminent implementation of carbon taxation in certain sectors starting from October 2023.

CHAPTER 5: DISCUSSION

The findings emphasized the significance of integrating environmental sustainability criteria in the selection of logistics service providers. Companies recognize the importance of aligning their supply chain operations with sustainable practices. The challenges identified, such as the lack of infrastructure and resources, highlight the need for supportive systems and further investigation into industry-specific barriers. Companies can take advantage of the potential advantages of environmentally responsible supply chain management by addressing these issues and working with stakeholders, ultimately lowering their environmental impact.

Shippers can choose logistics service providers that fit their needs and strategic goals by taking these selection criteria into account: cost-effectiveness, service quality, reliability, flexibility, and technological capabilities. The combination of the research results and the feedback from our interview subjects sheds light on the usefulness of these criteria in the selection process.

5.1. LSP Selection Criteria

To gain a comprehensive understanding of the factors influencing LSP selection, we interviewed industry experts and decision-makers. The interviews provided insight into the various factors Turkish businesses consider when selecting their logistics service providers. These criteria included reliability in terms of on-time delivery, cost-effectiveness, flexibility in problem-solving, and effective communication (Alkhatib et al., 2015).

Subsequently, our study provides insight into Turkish LSP selection practices and factors that are currently in use. While conventional factors like price and dependability still rule the day, the benefits of sustainable logistics techniques are becoming more widely understood. However, there are a number of barriers that prevent the widespread adoption of green and sustainable logistics, including a lack of environmental regulations, financial considerations, and inadequate infrastructure. Addressing these challenges and promoting sustainable logistics practices require collaborative efforts from policymakers, industry stakeholders, and logistics service providers.

5.2. Consideration of Environmental Sustainability Criteria in LSP Selection

Building upon the insights gained from the examination of LSP selection criteria, we further investigated the extent to which environmental sustainability criteria are considered in this process. By specifically focusing on the interviews conducted, we aimed to uncover the level of awareness and priority given to sustainable and environmentally friendly logistics practices.

The findings revealed that while there is recognition of the importance of sustainable logistics, environmental sustainability criteria are not yet widely prioritized in the decision-making process. This indicates that companies may still prioritize traditional criteria such as cost and reliability over environmental considerations (Gligor and Holcomb, 2012).

Moreover, interviewees expressed a willingness to work with LSPs that have environmentally friendly practices and acknowledged the potential advantages of such collaborations. These advantages include improved brand image, enhanced reputation, and potential cost savings through energy-efficient operations (Schilling, L. and Seuring, S., 2020). However, the findings suggest that these advantages alone are not sufficient to elevate the prioritization of green and sustainable logistics in the selection process.

5.3. Obstacles to the Widespread Use of Green/Sustainable Logistics in Turkey

In addition to exploring the consideration of environmental sustainability criteria, we also investigated the obstacles hindering the widespread use of green/sustainable logistics in Turkey.

One significant obstacle identified is the lack of comprehensive environmental regulations and standards specific to the logistics sector. Without clear guidelines and frameworks, it becomes challenging for companies to establish sustainable logistics as a core criterion in their selection process (Ahi and Searcy, 2015).

Financial considerations also emerged as a key obstacle. Some companies expressed concerns about the potential additional costs associated with sustainable logistics practices. They emphasized the need for logistics service providers to show flexibility in financial matters such as freight payment, suggesting that aligning economic

feasibility with sustainable practices is essential for broader adoption (Agyabeng-Mensah et al., 2020).

Additionally, the limited availability of green logistics solutions and infrastructure in Turkey poses a challenge. The current logistics infrastructure may not adequately support the implementation of sustainable practices. The lack of alternative energy sources, efficient waste management systems, and sustainable transportation options further impedes the widespread adoption of green logistics (Lopes de Sousa Jabbour et al., 2020).

Finally, by exploring the obstacles to the widespread use of green/sustainable logistics in Turkey, this study contributes to the understanding of the contextual challenges faced by companies in integrating sustainability into their logistics operations. This insight can inform policymakers and industry stakeholders in developing targeted strategies to overcome these obstacles and promote sustainable logistics practices.

5.4. Theoretical Contributions

This study makes several theoretical contributions to the field of sustainable supply chain management. Firstly, it provides insights into the current selection criteria used by companies in the logistics service provider selection process in Turkey. By identifying the key performance measurement criteria, this research supports the existing knowledge on LSP selection practices. Traditional performance objectives such as price, delivery performance and timeliness are the major order winning criteria (Wolf and Seuring ,2010; Björklund and Forslund, 2013; Bask et al., 2018).

Secondly, this study highlights the gap between the recognition of sustainable logistics advantages and the actual prioritization of environmental sustainability criteria in LSP selection as suggested in Green Supply Chain Management Theory. However, findings indicate several barriers while adopting sustainability as a qualifier in selecting LSPs, which are mainly behavioral, relational, and infrastructural barriers.

As for the behavioral barriers, companies understand and acknowledge the need for more sustainable practices, yet, the use of both more environmentally friendly and cheaper transportation means, such as intermodality, and selection of LSPs giving such services is not preferred. At this point, Carter and Easton (2011) refers to Bounded Rationality Theory, which explains the opportunistic behavior of decision makers

under limited information transparency and information processing capabilities. The findings emphasize the need for further research and practical interventions to bridge this gap and facilitate the adoption of green and sustainable logistics practices.

Relational barriers encompass external links and pressures, which may arise from customers and governmental institutions (Ellram and Golicic, 2016). Customer requirements and expectations are crucial factors in the adoption of environmentally sustainable strategies. According to the findings, companies may opt for more environmentally friendly transportation methods and select logistics service providers (LSPs) in response to customer demand. The requirements from supply chain partners, particularly in relation to logistics service providers (LSPs), are currently insufficient, which hampers efforts to achieve environmental sustainability. The reason for its inclusion is due to its role as a cost factor. There is a valid need for increased collaboration, particularly in terms of cost-sharing for environmentally sustainable logistics. Governmental institutions exert insufficient external pressures. The presence of this indicator highlights the necessity of implementing environmental regulations to encourage the adoption of sustainable practices in logistics.

Logistics that is better for the environment requires investments in new technology and infrastructure. According to research by Rashidi and Cullinane (2019), a high sustainability index in the logistics sector is associated with (i) a well-planned logistics network infrastructure; (ii) high quality of service operators; (iii) shipments tracing technology; and (iv) efficient timetable scheduling. Furthermore, more cutting-edge technologies that have the potential to significantly mitigate logistics' unintended consequences are still in their formative stages. As a result, businesses are realizing there isn't enough of the necessary infrastructure in place to support more eco-friendly logistics practices.

CHAPTER 6: CONCLUSION

In this study, we investigated the consideration of environmental sustainability criteria in logistics service provider (LSP) selection within the context of sustainable logistics practices in Turkey. The primary focus was to examine whether environmental sustainability criteria are given priority during the LSP selection process and to identify potential obstacles hindering the widespread adoption of green and sustainable logistics practices.

Using a comprehensive literature review, we explore the existing knowledge related to sustainable logistics and LSP selection criteria. Our research shows that, while cost, reliability, and service quality remain important considerations when choosing an LSP, there is increased public awareness of the benefits of environmental sustainability, which is also a factor (Bask et al., 2018). Companies are beginning to incorporate sustainability considerations into their decision-making processes as they become more aware of the environmental impact of their logistics operations.

Through our interviews with industry professionals, we gained a lot of knowledge about how they perceive and apply LSP selection and sustainability. The responses showed that, despite widespread recognition of the significance of environmental sustainability, it is still not a deciding factor in the choice of LSP. Cost, dependability, and service quality still come first, largely because of the perceived difficulties in implementing sustainable logistics practices.

Theoretical contributions of this research lie in bridging the gap between sustainable logistics practices and LSP selection criteria. By examining the current practices and perceptions within the Turkish logistics industry, we have contributed to the understanding of how environmental sustainability is considered in LSP selection decisions. The challenges businesses face in adopting and giving priority to green and sustainable logistics practices are also highlighted by our findings.

There are several suggestions that can be made to advance this field of research. Firstly, future studies should investigate the potential strategies and initiatives that can overcome the obstacles hindering the widespread use of green and sustainable logistics in Turkey. This could include exploring the role of government policies, incentives, and industry collaborations in promoting sustainability practices. Additionally,

research could focus on developing decision support frameworks or tools that facilitate the integration of environmental sustainability criteria into the LSP selection process.

To gain a comprehensive understanding of variations in LSP selection criteria across various sectors and their sustainability practices, conducting comparative studies across different regions is essential. Such research will shed light on the influence of cultural behaviors and regional contexts in integrating environmental sustainability into logistics service provider selection. By examining diverse regions, valuable insights can be gained into cultural norms and preferences that either facilitate or hinder the adoption of sustainable logistics strategies in specific industries. Understanding these regional differences will enable the development of tailored strategies to effectively promote sustainable logistics. While the current study focused on specific regions in Turkey, future research should expand its geographic scope and encompass diverse industries to provide a more globally applicable perspective on LSP selection and sustainability practices. This expansion will enable the identification of best practices from regions that have successfully embraced sustainability and guide regions facing challenges in adopting such practices. Researching how limited behavioral logic affects LSP choice may also shed light on cognitive biases and decision-making procedures. A dyadic approach can give insight on factors like pressure and supplier dynamics that occur in the supplier-supplier relationship and their impact on LSP choice. Thus, this research guide will enhance knowledge about LSP selection, and will benefit professionals in the logistics industry.

In conclusion, despite the increased demand for environmental consideration when choosing LSPs, there are still a number of obstacles that may be addressed. By understanding current trends and challenges, policymakers, practitioners, and researchers can jointly develop strategies to promote the adoption of green and sustainable exports. Note that these actions not only protect our environment, but also support long-term economic and social development in business and society.

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APPENDICES

Appendix A. Interview Protocol

1. How many years have you been in this industry, and can you tell us about your business and company?

2. What is your weekly/monthly shipment volume? What percentage is import/export?

3. Is there a logistics service provider or a supplier that you have an agreement with for the logistics of your shipments?

    a. Do you prefer an annual agreement?

4. What are your expectations from the logistics service provider?

    a. What are the most important performance measurement criteria for you?

5. How do you decide on the logistics service provider / supplier?

    a. Do you have a special system for this? Scorecard etc.?

6. What kind of problems do you face in your logistics operations?

7. What problems arise in case of not delivering on time? Is the delivery time promised to you usually met?

8. What are your expectations from logistics service providers in terms of problem solving?

9. Do logistics service providers show flexibility in financial matters such as freight payment or do you have any requests in this regard?

10. Does your company take environmental issues (global warming, C02 emissions, etc.) into account when purchasing logistics services? Do you have an internal strategy in this regard?

11. What do you think are the requirements of sustainable and environmentally friendly logistics?

12. What advantages would you consider working with a logistics service provider with environmentally friendly practices?

13. Do companies with sustainable logistics practices have priority in your choice of logistics service?

14. What value does environmentally friendly and sustainable logistics add to your company that makes this criterion a higher priority for you when choosing a logistics service provider?

15. What do you think are the obstacles to the widespread use of green/sustainable logistics in Turkey?

Appendix B. Ethical Board Approval

NUMBER: B.30.2.İEÜ.0.05.05-020-27828.03.2023

SUBJECT: Etik Kurul Kararı hk.

Dear Lecturer Asst. Prof. Dr Sinem Tokçaer and Bülent Cem Sertel,

Your application regarding the ethical compliance of your project titled "Performance Evaluation Criteria of Logistics Service Providers within Sustainability Perspective" has been finalized.

Our Ethics Committee convened on 28.03.2023 with an agenda including your application and the Ethics Committee members examined the projects.

As a result, it was unanimously decided on 28.03.2023 that your project titled "Performance Evaluation Criteria of Logistics Service Providers within Sustainability Perspective" is ethically appropriate.

I submit your information for your consideration.
Best regards,

Prof. Dr. Murat BENGİSU

Ethics Committee Leader