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The Regulatory Role of Logistics Information Technologies in the Effect of User Trust Tendencies on Logistics Service Quality in Exporter Enterprises[1]

Abstract

Research background and purpose: The logistics sector, both globally and in Turkey, has become a strategically important and rapidly evolving industry. Technological advancements are reshaping service delivery, enabling faster and more efficient transportation. Within this dynamic landscape, understanding user expectations and perceived service quality is essential. This study investigates the impact of exporter enterprises' trust tendencies toward logistics service providers on perceived logistics service quality, while also examining the moderating role of logistics information technologies (LIT).
Design/methodology/approach: The study was conducted with exporter enterprises using services from five major logistics providers. A purposive sampling method was applied to target firms engaged in international trade. Data were collected via an online questionnaire; after removing 16 invalid responses, the final sample consisted of 434 enterprises. Data were analyzed using SmartPLS 2024.
Findings: Exporter firms' trust in logistics providers—especially regarding helpfulness and competence—significantly and positively affects perceived logistics service quality. However, as the use of LIT increases, the importance of interpersonal trust declines. Instead, system-based factors such as security and reliability gain prominence in shaping service quality perceptions.
Value added and limitations: The study offers empirical evidence of the moderating effect of LIT in the trust–service quality relationship, contributing valuable insights for logistics professionals and exporter enterprises. However, its scope is limited to specific exporters and logistics firms. Future research should consider a broader range of enterprise types and examine trust–technology interactions in varied logistics contexts.

Keywords: *User Trust Tendency, Logistics Service Quality, Logistics Information Technology, Exporters, Logistics Service Enterprises*

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1 Current research '' The Moderating Role of Logistics Information Technologies in the Relationships between Exporters' Trust Tendency, Service Quality and Repeat Use Tendency Regarding Logistics Service Provider'' Produced from doctoral thesis.

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1. Introduction

Today, the ever-changing dynamics of globalization and technological advances have profound effects on all sectors. One of the areas most affected by this process is international trade activities and the exporting enterprises that carry out these activities. Today's understanding of globalization, the acceleration of technological developments and new approaches in customer relationship management cause the relations between businesses in the context of international trade to become increasingly complex. In order to solve these increasing complexities, various researches are conducted on exporting enterprises and contribute to a better understanding of business structures. In this direction, the current study aims to understand the characteristics of the logistics services purchased by exporting enterprises operating within the scope of international trade, to determine the trust tendencies of these enterprises and their quality perceptions towards the related services. The logistics sector is of strategic importance for the efficiency of global trade and national competitiveness (World Bank, 2023).

Logistics is one of the main fields of activity that is at the center of inter-business relations and plays a critical role in the execution of processes between all actors. Logistics covers the planning, implementation and management of supply chain processes from the source of products and services to the final consumer. In this context, logistics is considered as a holistic field of activity that brings together strategic planning and operational practices in order to minimize costs, optimize delivery times and increase customer satisfaction. The wide-ranging and multifaceted nature of logistics activities requires more care in service delivery, which brings the importance of logistics service quality to the forefront. Therefore, effective and efficient management of each logistics process necessitates an increased emphasis on service quality. In this framework, a detailed examination of the importance of logistics services has become an important scientific and sectoral necessity. In recent years, especially in 2024 and 2025, the use of artificial intelligence-powered systems, real-time monitoring tools and blockchain technology in logistics has increased rapidly. These developments have made the trust-based relationships of logistics service providers more data-driven and traceable. (Zhang & Chen, 2024; Müller et al., 2025). Technologies such as artificial intelligence, blockchain and the internet of things (IoT) enable logistics operations to become faster, more flexible and more customer-focused (Govindan et al., 2024).

The value perceived by exporter enterprises regarding the quality of the services provided by logistics companies stands out as an important variable to be considered. It is known that these enterprises consider certain basic elements when evaluating logistics services. The quality of logistics services is determined by various factors such as undamaged and timely delivery of the right products, communication efficiency, service punctuality, accurate and timely order delivery, and service

flexibility. Service users evaluate logistics services in line with their experiences and expectations and shape their perceptions of service quality in this process. Within the scope of this study, the quality perceptions of exporter enterprises regarding the logistics services they receive and the factors affecting these perceptions were analyzed. The evaluation of the logistics service procurement processes of exporter enterprises and the studies to be carried out in this field both contribute to the relevant academic literature and have a strategic importance for logistics service providers and exporter enterprises.

The perception of trust is defined as the belief that exporters have in logistics companies when evaluating the services provided by them. User trust is shaped by various factors such as correct product supply, on-time delivery and consistency of service processes. In this context, in the current study, the main factors affecting users' perceptions of trust towards logistics businesses from which they purchase services were discussed and comprehensive evaluations were made regarding trust tendencies. The concept of "user trust propensity" used in this study refers to the general level of trust individuals or firms place in service providers. Traditionally, this concept has been widely used in information systems (Gefen et al., 2003), e-commerce (McKnight et al., 2002), and consumer behavior literature. However, in recent years, with the digitalization of supply chain processes and the integration of information technologies into logistics service delivery, it has become apparent that customers' trust in technology and service providers can also influence their perception of logistics service quality. Therefore, in this study, the concept of user trust propensity is modeled as an antecedent variable measuring the level of trust firms place in service providers in the use of logistics information technologies.

Logistics information technologies refer to the use of information technologies to manage and optimize logistics processes more effectively. These technologies include various software, hardware and communication tools for planning, monitoring, managing and analyzing logistics operations. Logistics information technologies can be used effectively in all stages of logistics activities such as supply chain management, inventory management, warehouse management, transportation management and customer relations. The advantages of these technologies include increasing productivity, improving inventory management, increasing customer satisfaction, reducing costs and gaining competitive advantage. In terms of today's businesses, logistics information technologies have a critical importance and have become an indispensable element to increase competitiveness and ensure sustainable success.

In terms of scope, the relationships between the variables described above may exhibit a complex structure. Understanding these variables, determining the interaction between them and analyzing their effects on each other is an important requirement to provide strategic benefits to logistics businesses. In this direction, the current research aims to examine the effect of the trust that exporting enterprises operating in the

industrial market have in logistics service providers on perceived logistics service quality and to evaluate the moderating role of logistics information technologies in this relationship. This study aims both to contribute to the academic literature and to provide valuable practical insights for professionals operating in the logistics sector. In particular, it is envisaged that it can be an important guide for logistics service providers to increase their effectiveness in management processes and strengthen their relations with international businesses. When the constraints and limitations of the study are evaluated, the large number of logistics enterprises operating in Turkey and the difficulty of defining the number of exporter enterprises within a broad and specific boundary emerges as an important limitation. The acceleration of digitalization and increasing competition on a global scale have brought customer relationship management (CRM) to a strategic position in logistics processes (Klaus & Maklan, 2023).

The research started with a literature review and the concepts and details of user trust tendency, logistics service quality and logistics information technologies were explained. Then, the subject, purpose, importance, method, limitations, population and sample, model, hypotheses, data analysis and findings of the research are explained. In the last part of the study, the results, discussions and recommendations related to the study are presented.

2. Literature review

In this section of the research, the concepts of user trust propensity, logistics service quality and logistics information technologies are explained. The definitions, characteristics, importance, types and measurement of the concepts are explained in detail below.

2.1. User trust trends

User trust propensity is a concept that expresses the level of trust that customers have in firms in the relationship between service customers and businesses. Trust-based relationships are one of the most fundamental elements that ensure the successful continuation of the interaction between the parties. This trust tendency is influenced by various factors such as the perceived reliability of businesses and risk factors. It also plays an important role in determining the strategic decisions of businesses by directly shaping users' behavior, decision-making processes and repeat purchasing habits (Sharma, 2000, p. 471).

In today's intensely competitive environment, it is of great importance for businesses to gain user trust in order to gain a sustainable competitive advantage and to retain their users. Businesses that succeed in achieving user trust both gain loyal customers and

gain significant advantages in realizing their corporate goals. In this context, user trust tendency is considered as a critical concept for businesses and this concept needs to be measured and its effects on businesses need to be analyzed (Koç, 2015, p. 1).

2.2. Logistics Service Quality

By their very nature, logistics services are sectoral structures that need to be evaluated in terms of quality. Basically, these services, which aim to meet customer expectations and demands in the most effective and efficient way, require customer satisfaction to be considered as a priority in system design. In this direction, increasing logistics service quality is of great importance. The quality of services provided in logistics enterprises is directly related to the efficiency of service flow. In particular, every service provided on time and in full strengthens the perception of quality in the eyes of customers (Burucuoğlu &Yazar, 2020, p. 112). The concept of Logistics Service Quality (LSQ) was developed by Mentzer et al. (2001), who defined it as a multidimensional construct that includes timeliness, order accuracy, communication quality, information availability, and problem-solving capability. Although the Logistics Service Quality (LSQ) model proposed by Mentzer et al. (2001) is widely adopted in contemporary logistics research, this study uses an earlier framework that better reflects the operational realities and conceptual structures relevant to Turkish exporter enterprises. The selected model emphasizes core service attributes such as reliability, responsiveness, and empathy, which align more directly with the expectations and evaluation criteria of B2B logistics clients in emerging markets. Furthermore, this model provides a more streamlined and practical approach to measurement within the specific constraints of field research in export logistics. Therefore, the choice of this framework is both contextually grounded and methodologically suitable for the goals of this study.

Logistics service quality is defined as a capability that an organization brings to its logistics system to ensure customer satisfaction in terms of customer service, time management, communication, reliability and convenience (Le et al., 2020, p. 90). From another perspective, logistics service quality refers to the extent to which a logistics provider's services meet customer expectations and contribute to customer satisfaction. Therefore, it is of great importance to manage logistics processes efficiently to meet or exceed customer expectations (Özgül et al., 2017, p. 635).

The concept of logistics service quality is considered from two main perspectives in the evaluation process: objective and subjective quality. While objective quality is based on the approach that evaluates the logistics services offered by the service provider as a physical object, subjective quality focuses on how customers perceive and experience the service (Saura et al., 2008, p.652). According to Micu et al. (2013), logistics service quality consists of various elements that determine customer

experience. These elements include customers' perception of after-sales service, the quality of the service provided, and the accuracy of the information provided by customer service representatives during the ordering and delivery processes (Micu et al., 2013: 148). On the other hand, Saura et al. (2008) state that logistics service quality refers to the efficiency of the flow of products and information in the process starting from the company's warehouse to the customer's address. Logistics services not only provide customers with a spatial advantage, but also increase customer satisfaction by offering time savings. Accordingly, perceived logistics service quality is considered to be a critical factor that directly affects the benefits customers derive from the products they purchase (Saura et al., 2008, p. 495).

2.3. Logistics information technologies

The concept of information technologies is one of the basic elements that shape the process management and information access competence of enterprises and is defined as a set of systems that provide strategic support to decision-making mechanisms. These technologies, which play a critical role in helping businesses gain competitive advantage, optimize corporate decision-making processes and contribute to the development of entrepreneurial strategies when used effectively in data collection, processing and transmission processes. At the same time, the effective management of information technologies stands out as an element that supports the creation of innovative and proactive strategies by increasing the economic sustainability of businesses (Micu et al., 2013, p. 148). Businesses operating in today's intensely competitive environment must continuously improve their knowledge capacity in order to gain a sustainable competitive advantage in dynamic and complex business environments (Daugherty et al., 2009, p. 2). Considering knowledge as a strategic resource enables businesses to adopt more effective and data-based strategies in their decision-making processes, thus knowledge management becomes as important an asset for businesses as financial capital. In the increasingly competitive business world, access to and effective use of information stands out as a critical element for businesses to create innovative and flexible structures.

Information technologies are considered a critical success factor for all businesses, regardless of sector or field of activity. In this context, the logistics sector in particular makes intensive use of information technologies to optimize operational processes and increase efficiency. These digital solutions used in logistics processes are called logistics information technologies and provide a wide range of strategic advantages from supply chain management to inventory control, route optimization to customer relationship management (Kayapınar, 2016, p. 79). The effective use of these technologies increases the competitiveness of logistics businesses and supports fast and accurate decision-making processes, thus contributing to sustainable growth in the sector.

Logistics information technologies are defined as systematic designs developed to ensure effective coordination in logistics operation processes, control material and information flow, optimize inventory management and support general logistics activities (Wood et al., 2015, p. 5136). In the broadest sense, logistics information technologies include digital solutions used in the management of logistics processes. These technologies increase the efficiency of logistics operations by offering significant advantages to businesses in critical areas such as supply chain management, inventory management, warehouse management, transportation management and customer relationship management. An effective logistics information technology management enables businesses to optimize resource utilization, while at the same time contributing to competitive advantages such as speed, accuracy and cost effectiveness in operational processes. Recent studies show that the impact of digital security systems on user trust is increasing. In particular, AI-powered forecasting systems and blockchain-based delivery tracking applications positively affect users' perception of trust (Ahmed et al., 2024). In addition, open source logistics platforms developed for data transparency increase users' level of trust in firms. (Li & Thompson, 2025).

3. Theoretical framework and hypothesis development

The theoretical basis of this research is Social Exchange Theory (SET). Developed by Blau (1964), this theory argues that relationships between individuals or institutions develop based on trust, reciprocity, and perceived benefit. According to the theory, parties act according to a balance of costs and benefits in their relationships; trust and cooperation increase when relationships are sustainable. The interaction between logistics service providers and export companies provides an institutional example of this exchange process.

This study explores the impact of user trust propensity on logistics service quality from a SET perspective. Export companies strengthen this reciprocal relationship by providing more positive service evaluations of reliable, competent, and helpful logistics companies. Furthermore, we analyze how logistics information technologies (e.g., traceability systems, digital interfaces) have transformed this relationship. In the context of SET, the rise of digital systems replaces interpersonal trust with system-based trust, reshaping relationship dynamics.

Previous studies (e.g., Daugherty et al., 2009; Ju et al., 2021) have used SET as a supporting framework for logistics trust relationships. However, this study makes a unique contribution to the literature by examining the moderating effect of digital technologies on this relationship based on SET. In this respect, it both provides a new context for the theory and develops practical insights specific to the logistics sector.

The hypotheses developed within the scope of the research and the rationales for the hypotheses are explained below:

H1: Trust tendencies of exporter enterprises have a significant effect on logistics service quality

When the impact of exporters' trust tendencies on logistics service quality is analyzed, it is seen that trust is a critical factor in terms of the robustness, effectiveness and efficiency of the relationships established with the actors in the supply chain. Trust can form the basis for strong cooperation and coordination between exporting enterprises and logistics service providers. Businesses with high levels of trust communicate more openly in logistics processes, increase information sharing and thus strengthen coordination. Relationships based on mutual trust contribute to more effective management of potential risks by providing assurance between the parties. This makes it easier for logistics service providers to deal with delays, damages and other operational problems more effectively. Koç et al. (2013) concluded that perceived service quality affects consumer trust (Koç et al., 2013, p. 18). Similarly, in another study conducted by Keating et al. (2003), it was revealed that trust is an important variable affecting service quality. These studies support the determinant role of trust tendencies of exporter enterprises on logistics service quality. Academic studies on logistics service quality show that the relationship between trust and service quality yields similar results (Prastyorini et al., 2023, p. 11; Zakaria et al., 2014, p. 138; Ali et al., 2022, p. 3; Aksaraylı & Saygın, 2011, p. 23). Koç et al. (2013) also found that perceived service quality affects consumer trust (Koç et al., 2013, p. 18). Service quality evaluations are not limited to logistics services, similar effects have been observed in different sectors. In a study conducted by Webber et al. (2012), it was concluded that customers evaluate hairdresser services as higher quality if their perception of trust is high. This study revealed that trust has a positive effect on perceived service quality (Webber et al., 2012, p. 200). In another study conducted by Keating et al. (2003), it was emphasized that trust is an important variable affecting service quality. However, in the study conducted by İlter (2009), it was determined that the effect of trust perceived by e-retailers on service quality was more limited (İlter, 2009: 110). In addition, in another study conducted by Qui et al. (2019), the relationship between trust in leaders and service quality was examined. As a result of the research, it was revealed that the trust of the business personnel in their leaders increases their efforts to provide better service and this can turn into quality service (Qui et al., 2019, p. 80). These studies support that the effect of trust on service quality may vary across sectors but has a positive effect in general. Accordingly, the main hypothesis H1 was formed to examine the effect of trust tendencies on logistics service quality.

In the sub-hypotheses of hypothesis H1, the effects of the independent variables of accuracy, competence and helpfulness, which are the sub-dimensions of the trust tendency of exporting enterprises, on the dependent variables of personnel communication quality, information quality, order processing quality, physical distribution quality, punctuality, image and social responsibility, which are the sub-dimensions of logistics service quality, were examined separately. In the current study, three sub-hypothesis analyses were conducted for the model whose dependent variable is employee communication quality and independent variables are accuracy, competence and helpfulness. The hypotheses in the analysis are expressed as follows:

H1a: Accuracy has a significant effect on staff communication quality.
H1b: Competence has a significant effect on staff communication quality.
H1c: Helpfulness has a significant effect on staff communication quality.
H1ç: Accuracy has a significant effect on information quality.
H1d: Competence has a significant effect on information quality.
H1e: Helpfulness has a significant effect on information quality.
H1f: Accuracy has a significant effect on order processing quality.
H1g: Competence has a significant effect on order processing quality.
H1ğ: Helpfulness has a significant effect on order processing quality.
H1h: Accuracy has a significant effect on physical distribution quality.
H1i: Competence has a significant effect on physical distribution quality.
H1i: Helpfulness has a significant effect on physical distribution quality.
H1j: Accuracy has a significant effect on punctuality.
H1k: Competence has a significant effect on punctuality.
H1l: Benevolence has a significant effect on punctuality.
H1m: Accuracy has a significant effect on image.
H1n: Competence has a significant effect on image.
H1o: Benevolence has a significant effect on image.
H1o: Integrity has a significant effect on social responsibility.
H1p: Competence has a significant effect on social responsibility.
H1r: Benevolence has a significant effect on social responsibility.

H2: Logistics information technologies have a moderating role in the effect of exporters' trust tendencies on logistics service quality

Trust tendencies are an important factor determining the level of trust that businesses have in logistics service providers and this trust can positively affect service quality. The strength of this effect is directly related to the effective use of logistics information technologies. Logistics information technologies contribute to trust building by increasing transparency and traceability in supply chain management. Accelerated information flow and increased accuracy improve service quality by enabling logistics processes to operate more efficiently. Successful integration of logistics information technologies can strengthen the positive impact of exporters' trust tendencies on logistics service quality. In the study conducted by Zakaria et al. (2010), the moderating role of logistics information technologies on logistics relationships and service quality was examined and as a result of the analysis, the moderating role of these technologies was found to be significant (Zakaria et al., 2010, pp. 142-143). In the study conducted by Gil-Saura and Ruiz-Molina (2011), the effect of logistics information technologies as a moderating variable in the context of logistics service quality and buyer-customer relationships was examined and it was determined that they had a significant moderating role (Gil-Saura & Ruiz-Molina, 2011, p. 1113). In the study conducted by Kayapınar (2016), the regulatory role of logistics information technologies in the effect of logistics service quality on logistics performance and business performance was analyzed and significant results were obtained (Kayapınar, 2016, pp. 150-151). In addition, in another study conducted by Ju et al. (2021), digital transformation technologies used in the logistics sector were considered as a moderating variable and it was found that information technologies assumed a significant moderating role (Ju, 2021, p. 369). Salome et al. (2021) analyzed the moderating effect of logistics information technologies on the relationship between logistics management practices and customer satisfaction and found that this relationship was significant (Salome et al., 2021, p. 71). In this context, it is argued that logistics information technologies play a determinant role in the effect of trust tendencies of exporting enterprises on logistics service quality and accordingly, H2 hypothesis is formed.

3.1. Research model

Within the scope of the study, a causal research model was used due to the effect research between the variables based on the hypotheses developed based on the literature. When the research model is evaluated, it is seen that it is aimed to determine the relationship between the effect of user trust tendencies on logistics service quality and the regulatory role of logistics information technologies in this effect.

According to the model, in the research, the effect of trust tendencies of exporter enterprises on logistics service quality was determined and the regulatory role of logistics information technologies in this effect was analyzed.

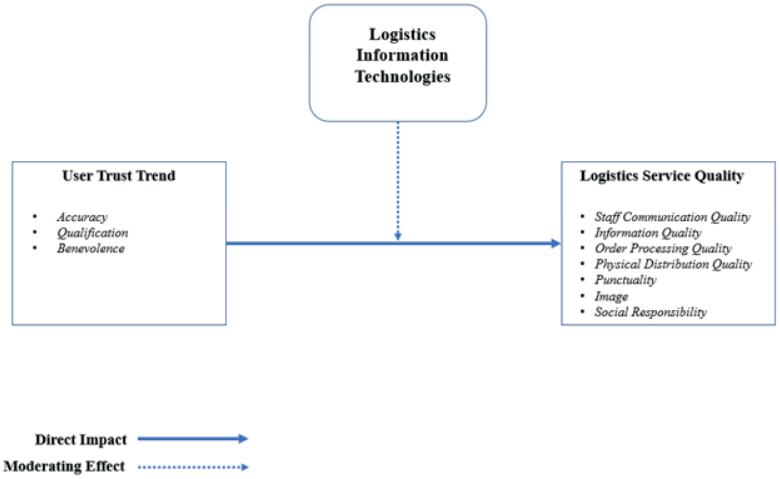

Figure 1 . **Research model**

Source: own study

4. Methods

Questionnaire technique was used as the data collection method in the study. In the creation of the questionnaire form, a literature review was conducted and back translation method was applied for each scale. In addition, the questionnaire form was finalized with the questions developed by the researcher. The researchers evaluated the suitability of the questionnaire by checking the apparent validity of the scales. The questionnaire form consisted of four sections. Before the main data collection phase, a pilot study was conducted with 30 participants from export-oriented firms to ensure the clarity, reliability, and practical applicability of the questionnaire items. Feedback from this group was used to revise ambiguous or repetitive items. In addition, to ensure content validity, the measurement items were reviewed by three academic experts in the field of logistics and two senior professionals working in export logistics management. These experts assessed the relevance, clarity, and representativeness of each item with respect to the theoretical constructs. Their evaluations led to minor refinements in wording and item alignment, thereby enhancing the validity of the instrument.

Some of the scales used in the study were directly developed, expanded, and adapted, while some items were reformulated or reworded to increase contextual distribution. To

ensure the content of these new and revised items, a five-person expert panel, consisting of three logistics and foreign trade academics and two foreign trade managers with at least ten years of industry experience, was consulted. The experts evaluated each item, representing it with the relevant theoretical dimension and degree, for clarity and contextual perspective. Based on the feedback received, linguistic and structural adjustments were made to some items to ensure clarity of meaning. Furthermore, a pilot study was conducted with 30 products from exporting companies to test the survey's applicability. The pilot services, the clarity of the statements, and the level of performance in the first version were tested; no items were deemed necessary to be removed based on the section. These results confirmed the content and practical adequacy of the measurement tool used.

In the first part of the questionnaire form, the consumer trust scale was used to analyze the trust tendencies of exporter enterprises towards the logistics enterprises from which they purchase services. As a result of the literature review, it was determined that different scales were used in the measurement of consumer trust. These scales include the three-dimensional scale developed by Hess (1995), unidimensional scales used by Lau and Lee (1999), Sirdeshmukh, Singh and Sabol (2002), Kim, Ferin and Lao (2009) and Pivato, Misani and Tencati (2008). As a result of the comprehensive analysis of these scales, it was decided that the consumer trust scale developed by Casalo, Flavian, and Guinaliu (2007), which consists of three sub-dimensions (accuracy, competence, and helpfulness) and a total of 13 statements, was the most appropriate choice for the current research. However, since some of the scale statements require answers to more than one question at the same time, the statements were separated and two separate questions were created for each of them. With this arrangement, 4 additional statements were added to the scale and a structure with a total of 17 statements was created. Since the study area of the research is exporter enterprises purchasing logistics services, the scale expressions were adapted to the sector. Businesses that purchase logistics services are defined as users and accordingly, the name of the scale has been changed as User Trust Tendency. The survey questions were prepared using a 5-point Likert scale and the response options were determined as follows: (5) Strongly Agree, (4) Agree, (3) Neither Agree nor Disagree, (2) Disagree, (1) Strongly Disagree. In line with this method, a questionnaire was applied to measure and analyze the trust tendencies of exporter enterprises purchasing logistics services.

In the second part of the questionnaire form, a comprehensive literature review was conducted to determine the quality perceptions of exporting enterprises regarding the services they receive from logistics companies. In the measurement of logistics service quality, the scale introduced to the literature by Bienstock et al. (1997) and later revised and developed by Thai (2013) was used. In order to prevent the conceptual confusion in the literature regarding the dimensions of logistics service quality, it was determined

that it would be appropriate to apply the logistics service quality scale consisting of seven dimensions and thirty-four statements, which is widely used in the literature and whose significant effects have been revealed in the studies. The scale dimensions are personnel communication quality, information quality, order processing quality, physical distribution service quality, punctuality, image and social responsibility. The scale statements were graded on a 5-point Likert-type scale (5=Strongly Agree, 4=Agree, 3=Neither Agree nor Disagree, 2=Disagree, 1=Strongly Disagree) and the survey questions were prepared in this way.

In the third part of the questionnaire form, a one-dimensional information technology scale consisting of 9 statements developed by Bienstock and Royne (2010) was used to analyze how logistics information technologies used by logistics enterprises are perceived by exporting enterprises. This scale is designed to assess the effectiveness of the use of logistics information technologies and their perceived impact on exporting businesses. The questionnaire statements are organized to measure how respondents perceive the contributions of logistics information technologies.

In the fourth part of the questionnaire form, demographic questions were asked in order to determine the descriptive characteristics of the exporting enterprises participating in the research, including business information (sector information, duration of activity in the sector and export area) and authorized respondent information (position in the business, area of specialization and working time in the business) (Kayapınar, 2016; Ercan, 2020; Kaya, 2021; Başaran, 2020; Güngör, 2021). This information was collected in order to understand the profiles of exporting enterprises and to better evaluate the data obtained.

4.1. Scope and limitations of the study

Depending on the scope of the research, the sampling method was preferred due to the large number of logistics enterprises operating in Turkey and the large and uncertain structure of the number of exporter enterprises. Accordingly, the most appropriate sample was determined by narrowing the research area. It is assumed that the answers given by the respondents participating in the research are accurate and reliable. This assumption constitutes an important basis for the validity of the survey results, and the research was conducted by assuming that the data would be evaluated correctly in the analysis processes.

4.2. Population and sample of the study

The population of the study consists of exporting enterprises that receive services from enterprises that provide logistics activities in industrial markets. In order to reach these enterprises, an invitation to participate in the research was sent to logistics

enterprise officials with a higher market volume. Five of the invited enterprises stated that they could contribute to the research. Purposive sampling method was used to select the industrial users of these five logistics enterprises. Exporting enterprises operating in international trade were determined as the research sample. Purposive sampling is a sampling method that enables in-depth analysis by selecting information-rich units in line with the purpose of the study and is used in special cases with certain characteristics and carrying certain criteria (Büyüköztürk et al., 2016: 92). In quantitative research, if the number of the population of the research is one million or more, a sample size of 384 people with a reliability level of 0.95 has a sufficient representation power (Kozaklı, 2015). Accordingly, the sample size of 384 people calculated using the unlimited sample formula was exceeded and the research sample was determined as 450 people. The survey was conducted between 20.02.2023 and 30.01.2025. After 23 months of data collection, the collected questionnaires were evaluated and checked for compliance. As a result of the examination, the questionnaires of 16 exporting enterprises were deemed invalid and the research was completed with a total of 434 respondents.

5. Analysis

The data collected through the questionnaire were analyzed with SmartPLS 2024 statistical analysis program. The analyses conducted in the research are frequency analyses, factor analyses, simple and multiple regression analyses and moderator role (moderating effect) analyses.

First, some descriptive characteristics of the exporting enterprises and the authorized participant who participated in the study on behalf of the enterprise were analyzed. Descriptive statistics tables were created and the findings were interpreted. Then, factor analyses and reliability analyses were conducted for three different scales used in the study. After this stage, normality tests were performed for all of the data to determine which methods would be used in the analysis of hypothesis tests. In the last stage, the hypotheses formed within the scope of the study were tested with multiple linear regression and moderator role analyses.

6. Research findings and discussion

Firstly, the demographic characteristics of the participants were analyzed. In the study, which included three different scales, descriptive analyses were conducted and explained in the findings section. Factor, reliability and validity analyses, normality analysis of data sets and hypothesis tests were conducted.

6.1. Descriptive statistics

In this study, a questionnaire form consisting of a total of seven questions was prepared in order to reveal the demographic and institutional characteristics of exporting enterprises and the authorized persons who participated in the survey on behalf of these enterprises. These questions were applied directly to the enterprises within the scope of field research. The first four questions were designed to identify the basic structural characteristics of exporting firms. In this context, the first question asks about the fields of activity in which the firms receive logistics services, while the second question aims to determine the total duration of the firm's activity in the sector. The third question seeks to understand the duration of the cooperation with logistics service providers, while the fourth question covers the evaluations regarding the companies from which logistics services are provided. In the construction of these questions, the studies conducted by Kayapınar (2016), Ercan (2020) and Kaya (2021) in the literature were taken as basis and the survey content was structured by utilizing these sources. Descriptive statistics of the data obtained are presented in detail in Table 1.

Table 1. **Descriptive Statistics of Enterprises**

Descriptive Characteristics		**Frequency**	**Valid Percent (%)**
Export Sector	Food	44	10,1
	Textile	69	15,9
	Automotive	50	11,5
	Machinery	107	24,7
	Construction	53	12,2
	Furniture	15	3,5
	Electrical-Electronics	31	7,1
	Metal-Steel	14	3,2
	Other	51	11,8
Total		**434**	**100,0**

Operational Duration of the Company	Less than 1 year	97	22,4
	1-5 years	181	41,7
	6-10 years	89	20,5
	11-15 years	29	6,7
	More than 15 years	38	8,8
Total		**434**	**100,0**
Duration of Cooperation with Logistics Provider	Less than 1 year	42	9,7
	1–5 years	95	21,9
	6–10 years	72	16,6
	11–15 years	47	10,8
	More than 15 years	178	41,0
Total		**434**	**100,0**
Logistics Service Provider	Company A	125	28,8
	Company B	70	16,1
	Company C	42	9,7
	Company D	53	12,2
	Company E	144	33,2
Total		434	100,0

Source: own study

In order to evaluate the sectoral structure of the exporter enterprises participating in the research, it was found that the majority of them operate in the field of machinery with 24.7%. When we look at the fields of activity in order; 15.9% textile, 12.2% construction, 11.8% other fields, 11.5% automotive, 10.5% food, 7.1% electrical-electronics, 3.2% metal steel and 3.2% furniture. It has been observed that the exporting enterprises in which the study was carried out have allocated business and action for a wide range of production and activity areas. According to the data obtained regarding the operating period of the enterprises; 41.7% of them have been operating for 1 to 5 years, 22.4% for less than 1 year, 20.5% for 6 to 10 years, 8.8% for more than 15 years and 6.7% for 11 to 15 years. These findings show that a significant portion of the enterprises participating in the research are young enterprises; however, it also reveals that 35.9% of them have reached a certain level of

experience in the sector by operating for 11 years or more. In terms of the duration of cooperation with logistics service providers, 41.0% of the enterprises have been working with the same logistics service provider for more than 15 years, 21.9% for 1 to 5 years, 16.6% for 6 to 10 years, 10.8% for 11 to 15 years and 9.7% for less than 1 year. These findings show that many enterprises attach importance to long-term logistics cooperation. Finally, when the most preferred logistics service providers of exporting enterprises are evaluated, it is seen that Company E is the most preferred company with 33.2%. This is followed by Company A with 28.8%, Company B with 16.1%, Company D with 12.2% and Company C with 9.7%. This distribution shows that some logistics companies clearly stand out in the sector.

After the descriptive statistics of the exporter enterprises were presented, statistical analyses were carried out for the questions regarding the authorized participant who took part in answering the questionnaires in the enterprise. In these analyses, three questions were administered to determine the descriptive characteristics of the authorized participant. The first question was asked to determine the position of the participant in the enterprise, the second question was asked to determine the area of specialization and the last question was asked to determine the working time in the enterprise. The prepared questions were based on the studies of Başaran, (2020), Kuyunay, (2021) and Güngör, (2021). The answers to the three questions are shown in Table 2.

Table 2. **Descriptive Statistics of Enterprises II**

Descriptive Characteristics		Frequency	Valid Percentage (%)
Participant's Position in the Company	General Manager	33	7,6
	Business Owner	49	11,3
	Executive	58	13,4
	Manager/Assistant Manager	64	14,7
	Specialist/Assistant Specialist	147	33,9
	Chief	16	3,7
	Assistant	26	6,0
	Other	41	9,4
Total		**434**	**100**

Participant's Area of Expertise	Accounting-Finance	30	6,9
	Foreign Trade	70	16,1
	Logistics	65	15,0
	Marketing	61	14,1
	Economics	46	10,6
	Production-Quality-Control	89	20,5
	Human Resources	16	3,7
	Other	57	13,1
Total		**434**	**100**
Participant's Work Experience in the Company	Less than 1 year	99	22,8
	1–5 years	151	34,8
	6–10 years	73	16,8
	11–15 years	43	9,9
	More than 15 years	68	15,7
Total		**434**	**100**

Source: own study

The authorized participants in the study were first asked questions about their positions in the organization. When the positions of the participants in the enterprises are analyzed, it is seen that the largest group with a rate of 33.9% work in the positions of experts and assistant experts. This is followed by manager and assistant manager with 14.7%, manager with 13.4%, owner with 11.3%, other positions with 9.4%, general manager with 7.6%, assistant with 6.0% and chief with 3.7%. This distribution shows that the majority of the participants in the study are at the intermediate and specialized level and that these people are in positions that directly contribute to business processes. An assessment of the respondents' areas of expertise shows that the majority of respondents are specialized in production, quality and control with 20.5%. This is followed by foreign trade with 16.1%, logistics with 15.0%, marketing with 14.1%, other fields with 13.1%, economics with 10.6%, accounting and finance with 6.9%, and human resources with 3.7%. This diversity in areas of specialization allows the research to reflect the perspectives of different disciplines and contributes to making comprehensive evaluations for multidimensional fields of activity such as logistics. When the data on the participants'

length of service in the organization is analyzed, it is determined that 34.8% of the participants have 1-5 years of experience, 22.8% have less than 1 year of experience, 16.8% have 6-10 years of experience, 15.7% have more than 15 years of experience and 9.9% have 11-15 years of experience. These findings show that the majority of the participants are relatively new employees, while a significant number of them have long-term organizational experience.

6.2. Validity and reliability analyses

Factor analysis was needed to verify the dimensions explaining the concepts used in the research (Durmuş et al., 2016). In this direction, factor analysis was performed separately for the User Trust Tendency Scale, Logistics Service Quality Scale and Logistics Information Technologies Scale used in the research, and the sub-dimensions and dimension names that emerged as a result of the analysis are presented in summary Table 3.

Table 3. **Factor Loadings and Cronbach's Alpha Values of Variables**

Variable	Factor	Items	Factor Loadings	Cronbach's Alpha
User Trust Tendency Scale	Accuracy	A1	0.615	,936
		A2	0.401	
		A3	0.702	
		A4	0.750	
		A5	0.765	
		A6	0.845	
		A6	0.747	
		A7	0.752	
		A8	0.601	
	Benevolence	B1	0.857	,921
		B2	0.858	
		B3	0.877	
		B4	0.738	
	Qualification	Q1	0.828	,940
		Q2	0.822	
		Q3	0.892	
		Q4	0.852	
		Q5	0.862	

Logistics Service Quality Scale	Staff Communication Quality	SCQ1	0.913	,936
		SCQ2	0.912	
		SCQ3	0.884	
		SCQ4	0.826	
	Information Quality	IQ1	0.881	,938
		IQ2	0.939	
		IQ3	0.883	
		IQ4	0.831	
		IQ5	0.784	
	Order Processing Quality	OPQ1	0.878	,953
		OPQ2	0.839	
		OPQ3	0.864	
		OPQ4	0.865	
		OPQ5	0.908	
		OPQ6	0.915	
	Physical Distribution Quality	PDQ1	0.919	,970
		PDQ2	0.919	
		PDQ3	0.919	
		PDQ4	0.919	
		PDQ5	0.889	
		PDQ6	0.916	
	Punctuality	P1	0.905	,949
		P2	0.951	
		P3	0.915	
		P4	0.858	
	Image	I1	0.937	,968
		I2	0.956	
		I3	0.952	
		I4	0.952	
		I5	0.950	
	Social Responsibility	SR1	0.926	,953
		SR2	0.947	
		SR3	0.883	
		SR4	0.892	

Logistics Information Technologies Scale	Logistics Information Technologies Scale	LIT1	0.784	,970
		LIT2	0.805	
		LIT3	0.881	
		LIT4	0.903	
		LIT5	0.878	
		LIT6	0.951	
		LIT7	0.931	
		LIT8	0.934	
		LIT9	0.875	

Source: own study

According to Table 3, it is seen that the scale items used in the study loaded smoothly on the relevant factors above 0.50. In addition, the reliability of the scales was found to be above 0.90 and therefore the scales used in the study were considered highly reliable (George & Mallery, 2003). The loadings and reliability coefficients of the items are also shown in Table 3. In this study, constructs were conceptualized and modeled as reflective indicators. The reason for choosing this approach is that the indicators are designed to reflect the latent constructs they are related to; that is, any variability in the underlying construct is reflected in its indicators. Since the indicators are assumed to measure the same core concept and are expected to be highly correlated with each other, the reflective approach is consistent with the theoretical underpinning of the study. This perspective is consistent with previous literature (Hair et al., 2021), which emphasizes the appropriateness of reflective models for constructs where indicators are outcomes rather than causes. As seen in Table 3, the external loadings indicate that the items (observable variables) under all constructs are strongly connected to the construct. This means that reflective measurement models are valid and each item can be explained by the construct.

Table 4. **Construct Reliability and Validity**

	Cronbach's Alpha (standardized)	**Composite Reliability (CR)**	**Average Variance Extracted (AVE)**
Logistics Information Technologies Scale	0,970	0,970	0,781

Accuracy	0,865	0,863	0,776
Benevolence	0,936	0,934	0,696
Qualification	0,949	0,949	0,725
Staff Communication Quality	0,938	0,938	0,748
Information Quality	0,950	0,949	0,824
Order Processing Quality	0,971	0,970	0,847
Physical Distribution Quality	0,975	0,974	0,901
Punctuality	0,936	0,936	0,782
Image	0,953	0,953	0,772
Social Responsibility	0,953	0,953	0,833

Source: own study

The reliability and validity of the scales used in the study were evaluated with internal consistency, composite reliability and average variance explained (AVE) criteria. According to the results obtained, Cronbach's Alpha values for all constructs ranged between 0.865 and 0.975, and all of these values were above the 0.70 limit. Similarly, all of the composite reliability (CR) values were above 0.70 (Bagozzi & Yi, 1988) and the average variance explained (AVE) values were above 0.50 (Fornell & Larcker, 1981). These findings indicate that the internal consistency of the scales is high and that they meet the conditions of convergent validity. In particular, it is seen that the Physical Distribution Quality sub-dimension provides a high level of explained variance with an AVE value of 0.901. Other sub-dimensions have similarly strong loading values. This shows that the related items consistently and meaningfully measure the related concept.

Discriminant validity was checked with the Heterotrait-Monotrait Ration (HTMT) test. Accordingly, HTMT values are expected to be below 0.90 to ensure discriminant validity (Henseler et al., 2015). According to the results shown in Table 5, discriminant validity is ensured.

Table 5. **HTMT Analysis**

	Logistics Information Technologies Scale	**Accuracy**	**Benevolence**	**Qualification**	**Staff Communication Quality**	**Information Quality**	**Order Processing Quality**	**Physical Distribution Quality**	**Punctuality**	**Image**	**Social Responsibility**
Logistics Information Technologies Scale											
Accuracy	0,445										
Benevolence	0,758	0,536									
Qualification	0,782	0,524	0,803								
Staff Communication Quality	0,770	0,486	0,801	0,819							
Information Quality	0,777	0,486	0,820	0,803	0,841						
Order Processing Quality	0,822	0,472	0,835	0,846	0,818	0,806					

Physical Distribution Quality	0,815	0,425	0,821	0,778	0,831	0,811	0,805				
Punctuality	0,716	0,497	0,767	0,742	0,836	0,780	0,807	0,783			
Image	0,618	0,459	0,615	0,548	0,701	0,685	0,697	0,717	0,727		
Social Responsibility	0,820	0,485	0,774	0,760	0,810	0,848	0,841	0,8	0,746	0,670	

Source: own study

Structural Equation Modeling (SEM) was preferred because it allows the analysis of complex relationships between variables. However, necessary precautions were taken considering the risk of common method bias (CMB), which is a common limitation of this method. In the literature, it is stated that the common method variance problem may arise when more than 50% of the data is explained by a single factor (Podsakoff et al., 2003). In this context, Harman's Single Factor Test was applied in the study, all variables were subjected to unrotated principal component analysis (PCA) and they were restricted to be grouped under only one factor. According to the results obtained, it was concluded that there was no significant common method bias in the data. In addition, methodological improvements were also implemented to prevent common method bias during the data collection phase. In this context, participants' responses were kept anonymous and survey items were randomized to minimize measurement errors. The results of the HTMT analysis show that the values between each pair of variables are below 0.90. This supports that the discriminant validity between constructs is ensured and the model does not have a common variance problem.

6.3. Normality analysis

Shapiro-Wilk and Kolmogorov-Smirnov normality tests were applied to the data obtained in the study. According to Table 6, since $p>0.05$ was found for all variables used in the study, it was accepted that the data showed normal distribution (Birkök & Albayrak, 2021: 282). Skewness and kurtosis values of the variables can be found in Table 6. It is important that these values are between 1.5 and +1.5. The results of the analysis show that they are within this value range. It was concluded that this situation has a normal distribution (Tabachnick & Fidell, 2013) and therefore parametric methods and techniques were used to test the research hypotheses.

Table 6. **Normality Values of the Scales**

Scale	Skewness	Kurtosis	Kolmogorov-Smirnov (p value)	Shapiro-Wilk (p value)
User Trust Tendency Scale	-,443	,045	0,112	0,125
Logistics Service Quality Scale	-1,100	1,263	0,121	0,113
Logistics Information Technologies Scale	-,938	,559	0,214	0,203

Source: own study

6.4. Analyses related to hypotheses

The hypotheses of the study were tested with structural equation modeling (SEM) using SMARTPLS 4 package program. The main reason for choosing SEM in the study is that the model we investigate examines complex relationships. SEM is an ideal method for multivariate structures as it can analyze both direct and indirect effects. SEM offers the opportunity to test both the measurement model and the structural model at the same time. Thus, a holistic analysis is performed. The SmartPLS program was preferred because it allows large data sets or more complex models to be analyzed with the Partial Least Squares (PLS) method. SmartPLS also provides effective results when the sample size is limited. The results obtained from the analyses are given in Tables 7 and 8.

Table 7. **Direct Effect Path Analysis Results**

		Original Sample (O) 1	Sample Mean (M) β2	Standard deviation (STDEV)	P Values
H1	User Trust Tendency Scale -> Logistics Service Quality Scale	0.631	0.631	0.044	0.000
H1a	Accuracy -> Staff Communication Quality	0.110	0.110	0.038	0.004

H1b	Qualification-> Staff Communication Quality	0.284	0.285	0.086	0.001
H1c	Benevolence-> Staff Communication Quality	0.417	0.417	0.082	0.000
H1ç	Accuracy -> Information Quality	0.067	0.067	0.029	0.022
H1d	Qualification -> Information Quality	0.476	0.479	0.076	0.000
H1e	Benevolence -> Information Quality	0.307	0.305	0.076	0.000
H1f	Accuracy -> Order Processing Quality	0.190	0.192	0.047	0.000
H1g	Qualification -> Order Processing Quality	0.016	0.021	0.099	0.874
H1ğ	Benevolence -> Order Processing Quality	0.477	0.471	0.095	0.000
H1h	Accuracy -> Physical Distribution Quality	0.034	0.035	0.026	0.205
H1ı	Qualification -> Physical Distribution Quality	0.484	0.483	0.077	0.000
H1i	Benevolence -> Physical Distribution Quality	0.359	0.360	0.074	0.000
H1j	Accuracy -> Punctuality	0.071	0.072	0.033	0.034
H1k	Qualification -> Punctuality	0.353	0.358	0.094	0.000
H1l	Benevolence -> Punctuality	0.432	0.427	0.092	0.000
H1m	Accuracy -> Image	0.005	0.007	0.031	0.868

H1n	Qualification -> Image	0.269	0.274	0.095	0.005
H1o	Benevolence -> Image	0.549	0.543	0.089	0.000
H1ö	Accuracy -> Social Responsibility	0.083	0.084	0.029	0.005
H1p	Qualification -> Social Responsibility	0.334	0.337	0.076	0.000
H1r	Benevolence -> Social Responsibility	0.428	0.425	0.078	0.000

Source: own study

Table 7 describes the moderator effect hypothesized in the main model of the study and the main effect of the sub-hypotheses. First, the main hypothesis H1 evaluates whether logistics information technologies play a moderating role in the impact of user trust propensity on logistics service quality. The effect of user trust propensity on logistics service quality appears to be positive and significant. This indicates that exporter enterprises' trust in logistics firms (accuracy, competence, helpfulness) directly increases their perception of service quality. The level of logistics information technology significantly strengthens or shapes this effect. That is, in an organization with high user trust, if logistics information technologies are used effectively, the perception of service quality is further positively affected. User trust propensity has a significant and strong effect on logistics service quality ($\beta = 0.631$, $p = 0.000$). This indicates that users' trust in logistics companies directly increases the perception of service quality. In terms of Staff Communication Quality dimension, users' perception of helpfulness towards logistics service providers has the highest effect ($\beta=0.417$, $p<0.001$). This finding is followed by competence ($\beta=0.284$, $p<0.01$) and accuracy ($\beta=0.110$, $p<0.01$). This reveals that especially benevolent attitude plays a critical role in improving communication quality. The strongest effect on Information Quality comes from users' perception of service providers as adequate ($\beta=0.476$, $p<0.001$). Helpfulness ($\beta=0.307$, $p<0.001$) also stands out as a significant factor in information transfer, while the effect of the accuracy variable is significant, albeit at a relatively low level ($\beta=0.067$, $p<0.05$). In terms of Order Processing Quality, only the helpfulness variable was found to have a significant and strong effect ($\beta=0.477$, $p<0.001$). On the other hand, accuracy produced a significant but lower effect ($\beta=0.190$, $p<0.001$), while the effect of competence variable was statistically insignificant ($p=0.874$). This indicates that help-oriented attitudes are determinant in the ordering process. In the context of Physical Distribution Quality, competence ($\beta=0.484$, $p<0.001$) and helpfulness ($\beta=0.359$, $p<0.001$) were found to be effective, while the accuracy variable had no significant effect on this sub-dimension ($p=0.205$). This result shows that

technical competence and supportive behaviors are more important in distribution processes. Both competence (β=0.353, $p<0.001$) and helpfulness (β=0.432, $p<0.001$) produced high and significant effects on the punctuality variable. Although the effect of accuracy was low, it was statistically significant (β=0.071, $p<0.05$). In this context, it is seen that the most important factors for users in time management are the level of information and assistance. The highest effect on image belongs to the helpfulness variable (β=0.549, $p<0.001$). Competence also produced a significant effect (β=0.269, $p<0.01$), but the accuracy variable did not create a statistically significant difference in this sub-dimension ($p=0.868$). These findings show that the image of logistics companies is shaped especially through empathetic and helpful approaches. In the Social Responsibility dimension, helpfulness (β=0.428, $p<0.001$) and competence (β=0.334, $p<0.001$) stand out as important determinants. Although the integrity variable showed a significant effect in this dimension, its effect was limited (β=0.083, $p<0.01$). As a result, users also evaluate social responsibility perception largely on the basis of benevolence. Analyses show that the most influential variable among the sub-dimensions of user trust tendency is benevolence, followed by competence. Accuracy, on the other hand, is statistically weaker or insignificant in many sub-dimensions. This reveals that especially in relationship-based evaluations, benevolent attitudes and level of expertise are decisive on user perception.

Regularization analysis is a much debated topic in the statistics and structural equation modeling literature, and many schools of thought offer different perspectives on how to approach and interpret regularization effects. In this study, we adopt the widely accepted approach proposed by Preacher and Hayes (2008), which combines both direct and indirect effects within a structural model framework. This method provides a comprehensive analysis by testing the effects of moderating variables through bootstrapping to ensure the reliability of the estimates. While other approaches, such as Baron and Kenny's (1986) traditional step-based approach, focus primarily on significance testing, the Preacher and Hayes (2008) methodology is preferred in modern regulatory analysis due to its robustness and ability to account for indirect effects without strict assumptions. In line with the research objectives, this methodology was chosen to provide a holistic and rigorous understanding of the moderating role of logistics information technologies in the impact of exporting enterprises' trust propensity on logistics service quality. The results of the moderating effect analysis are shown in Table 8.

Tablo 8. **Moderating Effect Path Analysis Results**

		Original Sample (O) β1	Sample Mean (M) β2	Standard deviation (STDEV)	P Values
H2	UTTS -> LITS -> LSQS	-0.067	-0.067	0.021	0.001

Source: own study

The relationship between user trust propensity and logistics service quality is tested to be moderated by logistics information technologies. The β coefficient (-0.067) is negative, indicating that as the level of logistics information technologies increases, the effect of user trust propensity on logistics service quality decreases. The p-value (0.001) is quite low, indicating that this moderating effect is statistically significant ($p < 0.01$). As a result of the moderator analysis, it was found that logistics information technologies significantly regulate (moderate) the effect of user trust tendencies on logistics service quality. Interestingly, this moderating effect is negative and the effect of trust propensity on service quality decreases as the level of technology use increases. The overall fit of the structural model was assessed using model fit indices calculated using SmartPLS 4 software. The explanatory power of the model was determined by the R^2 values of the dependent variables, which were 0.56 for LSQ and 0.62 for LIT. These results indicate that the model has moderate to high explanatory power. This suggests that the use of technology may overshadow the effect of personal trust in some cases, that is, the perception of "system security" may come to the fore. The analysis indicates that logistics information technologies have a moderating effect on the relationship between user trust propensity and service quality. However, the effect is negative; that is, the effect of trust propensity on service quality decreases as technology level increases. This was tested in the analysis results with a direct interaction effect model, and an interaction term was created using SmartPLS and added to the regression model. Therefore, this is not a classical mediation analysis, but a moderated path analysis. This distinction is important to prevent misinterpretation of the model's theoretical structure. Analyses of the structural unit were conducted using SmartPLS 4 (version 2024) software. A bootstrapping procedure was applied to test the significance of the model's estimation process and parameter estimates. This capability was achieved through a nonparametric bootstrapping method with 5,000 repetitions (resampling) for its analysis. The 95% confidence interval was disabled as the reliability level, and p-values were evaluated together. The significance of the path coefficients was tested by calculating standard errors, t-values, and confidence intervals from the resulting bootstrap samples. This method allowed for reliable assessment of the significance of direct, frequency, and data transfer in the model.

7. Conclusion and discussion

In this study, the impact of exporter enterprises' trust tendencies towards logistics service providers on perceived logistics service quality is examined and the moderating role of logistics information technologies in this relationship is analyzed. In line with the findings, it is determined that user trust tendency has a significant and positive effect on logistics service quality. In particular, helpfulness and competence dimensions stand out as the most effective factors in various sub-dimensions of service quality.

When the sub-dimensions of logistics service quality are evaluated separately, the effects of helpfulness and competence on the sub-dimensions of personnel communication quality, information quality, order processing quality, physical distribution quality, punctuality, image and social responsibility are found to be significant and strong. On the other hand, the effect of the dimension of accuracy on many sub-dimensions was more limited or insignificant. This suggests that especially in relationship-based evaluations, qualities such as empathy and expertise are decisive in terms of user perception.

The research findings are consistent with many studies in the literature. For example, Daugherty et al. (2009) and Zakaria et al. (2010) demonstrated that trust in logistics service providers is a determinant of service quality perception. Similarly, this study also found that the dimensions of helpfulness and competence have strong effects on service quality. This suggests that users prioritize trust factors based on their experiences, especially in relational-based evaluations.

However, some findings differ somewhat from previous studies in the literature. For example, İlter (2009) stated that the impact of trust perception on service quality in e-retailing is limited. This difference may stem from the study's context, as the current study was conducted at the B2B (business-to-business) level and focused on traditional logistics service providers. These different sector and relationship dynamics may lead to a stronger perception of the impact of trust on service quality.

However, the findings regarding the moderating role of logistics information technologies are parallel to some studies in the literature. Ju et al. (2021) and Gil-Saura and Ruiz-Molina (2011) emphasize that digitalization provides transparency and traceability in service processes, thus emphasizing system-based trust. The current study also observed that the impact of interpersonal trust decreases as the level of use of technological tools increases. This finding suggests that digital systems shift trust relationships from the interpersonal context to the institutional/technological context.

In conclusion, the study's findings are largely consistent with previous literature, but sectoral differences and levels of technology use led to some discrepancies in the results. This suggests that the trust-service quality relationship in the logistics field is context-sensitive and that technology transforms this relationship.

As a result of the moderation analysis conducted within the scope of the second hypothesis tested in the study, it was found that logistics information technologies have a significant and negative moderating effect on the relationship between user trust and logistics service quality. This finding suggests that when the level of technology utilization increases, the effect of trust on service quality may weaken. In other words, intensive use of digital systems may lead to a more system-centered evaluation tendency by overshadowing the effect of individual trust perception. In this context, the perception of "system security" may override personal trust factors for users.

The results of the research both contribute to the academic literature and offer important practical implications for logistics service providers. It is of great importance for companies operating in the logistics sector to develop strategies to increase customer trust while at the same time structuring their digital infrastructure with a user-oriented approach. In this direction, the balanced integration of technology use in a way to support the perception of service quality without weakening trust relationships can be considered as a critical element for sectoral success. In 2024 and beyond, increasing digital transformation trends necessitate the reshaping of trust-based service models with technology. In this context, companies need to focus not only on technical infrastructure but also on strategies that will make user trust sustainable in the digital environment (Park et al., 2025).

This study offers important implications not only for academics but also for practitioners. First and foremost, logistics service providers should develop strategies to increase customer trust inclination, which will increase the perceived value of service quality. In this context, strengthening digital traceability, order accuracy, and proactive information systems is particularly recommended.

Given the regulatory role of logistics information technologies, logistics companies should position their digital infrastructure investments not only for operational efficiency but also to support the relationship between customer trust and service quality.

Exporters are advised to consider not only cost but also qualitative criteria such as information technology integration and the ability to build trust-based relationships with customers when selecting logistics partners. Periodically measuring logistics performance through customer feedback and digital data analysis will ensure the sustainability of service providers' quality levels.

In future studies, the effects of trust tendencies of enterprises in different sectors on service quality can be examined comparatively. In addition, the sub-components of logistics information technologies can be elaborated and the conditions under which these components increase or weaken the regulatory effect can be analyzed. Since the sample of the study is limited to exporting enterprises, conducting large-scale studies covering other types of enterprises will increase the generalizability of the model.

Authors' contribution

A.A.B: article conception, theoretical content of the article, research methods applied, conducting the research, data collection, analysis and interpretation of results, draft manuscript preparation. **H.O.:** article conception, theoretical content of the article, research methods applied

Declaration of Generative AI and AI-assisted technologies in the writing process

While preparing this work, the authors did not use any tool/service.

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