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LOJISTIK YENILIKÇILIĞININ LOJISTIK YETENEKLER ÜZERINDEKI ETKISI: ARTVIN İLI LOJISTIK HIZMET SAĞLAYICI FIRMALAR[1]

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ÖZ

Lojistik hizmet sağlayıcı firmalar (3PL) arasında rekabet gücü yaratmada etkin rol oynayan lojistik ve inovasyon yeteneği lojistik hizmetlerin farklılaştırılmasında ve kalitesinin artırılmasında önemli rol oynamaktadır. Bu çalışmada temel olarak 3PL firmaların lojistik yenilikçilik tutumları ile lojistik yetenekleri arasındaki ilişki ele alınmıştır. Ayrıca firma çalışanların sahip olduğu demografik özelliklere göre firmaların lojistik yenilikçilik ve lojistik yetenekler düzeylerinde anlamlı bir farklılık olup olmadığının tespit edilmesi amaçlanmıştır. Araştırmanın örneklem alanını Artvin ilinde faaliyet gösteren 3PL firmaları oluşturmaktadır. Toplam 161 anket verisi toplanmıştır. Anket içinde lojistik yenilikçilik ve lojistik yetenekler ölçekleri kullanılmıştır. Araştırmada iki hipotez oluşturulmuştur. Birinci hipotezin ispatı için basit regresyon analizi, ikinci hipotezin ispatı için fark analizleri uygulanmıştır. Çalışma sonucunda lojistik yenilikçiliğin lojistik yetenekler üzerinde pozitif yönde anlamlı bir etkisi olduğu sonucuna ulaşılmıştır. Ayrıca demografik değişkenler arasında sadece medeni durum değişkenin lojistik yenilikçilik cevaplarında farklılaştığı sonucuna ulaşılmıştır. Elde edilen bulgulara dayanarak Artvin ilinde faaliyet gösteren 3PL firma yöneticilerine öneriler sunulmuştur.

Anahtar Kelimeler: Lojistik Yenilikçilik, Lojistik Yetenekler, 3PL, Yapısal Eşitlik Modellemesi.

Jel Kodları: M12, M19

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THE RELATIONSHIP BETWEEN LOGISTICS INNOVATIVENESS AND LOGISTICS CAPABILITIES: ARTVIN 3PL SERVICE PROVIDERS

ABSTRACT

Logistics and innovation capabilities, which play an active role in creating competitiveness among logistics service providers (3PL), play an important role in differentiation and quality of logistics services. In this study, the relationship between the logistics innovativeness attitudes of 3PL companies and their logistics capabilities is mainly discussed. In addition, it is aimed to determine whether there is a significant difference in the levels of logistics innovativeness and logistics capabilities of the companies according to the demographic characteristics of the employees of the company. The sample area of the research consists of 3PL companies operating in Artvin. A total of 161 survey data were collected. Logistics innovativeness and logistics capabilities scales were used in the survey. Two hypotheses were formed in the study. Simple regression analysis was used to prove the first hypothesis, and difference analysis was used to prove the second hypothesis. As a result of the study, it was concluded that logistics innovativeness has a positive and significant effect on logistics capabilities. In addition, it was concluded that among the demographic variables, only the marital status variable differed in logistics innovativeness responses. Based on the findings, suggestions were presented to the managers of 3PL companies operating in Artvin.

Keywords: *Logistics Innovativeness, Logistics Capabilities, 3PL, Structural Equation Modeling.*

JEL Codes: M12, M19

INTRODUCTION

To increase the competitiveness of the companies, their orientation to the main fields of activity has led to the realization of other activities in the value chain, which create added value, in the form of outsourcing. Logistics services has a significant role in the creation and development of customer value by directly affecting the outputs of companies (Stank et al., 1998). It also has a supportive role in helping companies gain competitiveness in their main fields of activity (Mentzer et al., 2001). Logistics services are provided by 3PL (Third Party Logistics) companies. At this point, the logistics service quality of the 3PL company within the supply chain of a company directly affects the success of the supply chain performance. One of the main determinants of the logistics service quality of 3PL companies is their logistics capabilities. In the literature, logistics capabilities are expressed as capabilities that increase the efficiency of other capabilities of companies and increase their competitiveness against rival companies (Fernandes et al., 2018).

Firms carry out innovation activities aimed at improving their main fields of activity. 3PL companies are innovating to improve their logistics activities. At this point, innovative approaches aiming at the development of logistics activities can be explained as logistics innovation. Ralston et al. (2013) explain the concept of logistics innovativeness as the creation of ideas by 3PL and the creation of new processes that support ideas. At the same time, Raltson et al. consider logistics innovation among logistics capabilities.

Within this study, it is objected to put forth the relationship between the concepts of logistics capabilities and logistics innovativeness. In line with this aim, two basic research questions of the research were put forward. These are as follows:

(i) Do logistics innovativeness approaches have an impact on logistics capabilities in 3PL service providers?

(ii) Is there a difference in the attitudes of employees in 3PL service providers regarding the level of logistics innovativeness and capabilities?".

To find answers research questions identified above, this article study has been discussed. This part is the introductory part of the study. In the second part of the study, conceptual framework will be discussed and the relationship between the concepts will be revealed. In the third part of the study, the methodology is conveyed. In the fourth part of the study, the findings of the research are presented. In the last part of the study, the results are explained based on the findings. At the same time, suggestions will be explained to the managers in the conclusion and discussion section and the limitations of the study will be explained.

1. CONCEPTUAL FRAMEWORK

1.1. Logistics Innovativeness

Today, the rapid progress of technological innovations and the fact that this rapid progress affects all other industries ensures that the concept of innovation is encountered almost everywhere. Different types of innovation exist in the literature. Product innovation is considered as the ability of companies to develop a new product to provide competitive advantage (Najafi-Tavani et al., 2018). The renewal of the company's operational processes is about process innovation. The renewal of all processes is explained as radical process innovation. It is explained as incremental process innovation in the gradual implementation of developments and changes in processes (Mikalef and Krogstie, 2020). Organizational innovation is the structure as the creation of flexible organizational structures that boost the adoption of technological innovations within the organization (Anzola-Román et al., 2018). At the different side, open innovation is explained as the formation of organizational structures that are open to simultaneous use of internal and external resources and open to development (Bogers et al., 2018).

Kahn (2018) explains innovation activities as an enterprise's outputs, the operating processes of the enterprises and the mentality accepted by the enterprises. Product innovation, process innovation, market innovation, organizational innovation, supply chain innovation and business model innovations are the innovation outputs of businesses (Kahn, 2018). Product development processes describe the activity processes of innovation. It explains the acceptance of innovation as a mentality in ensuring the formation of an organizational culture open to innovation. Logistics innovation activities related to logistics activities within the supply chain can also be considered among the outputs of innovation. Flint et al. (2005) describe innovative activities that support and complement the logistics activities of companies as logistics innovativeness. Flint et al. explained the conceptual framework of logistics innovation from different perspectives. The market-oriented perspective is the creation of logistics innovation outputs according to the needs and expectations of the market. Customer-oriented perspective is the creation of logistics innovation outputs according to customer needs and expectations. Organizational learning-oriented logistics innovation is based on the determination of the expectations of the market and customers and the continuous innovation of the organization in this direction. In addition, logistics innovativeness contributes to the formation of an innovative organizational culture within the company and the acceptance of innovative mentality in logistics activities by ensuring that innovative steps that ensure the minimum cost and maximum benefit of logistics activities are adopted within the company.

It is seen that there are few studies in the literature that deal with the concept of logistics innovation. Ralston et al. (2013) stated that logistics innovation has a significant positive effect on

logistics performance. it has been finalized that the level of importance given to logistics within the company has a significant effect on logistics innovation. The resource-based perspective suggests that firms create competitive strategies based on their capabilities. With this study, logistics innovation and logistics capabilities relation will be revealed and the place of logistics innovation in company competitive strategies will be revealed.

1.2. Logistics Capabilities

The twenty-first century is a period in which competition between businesses is experienced more deeply than ever before. Products and services are diversified and can be offered by many different companies. As a result of intense competition, businesses whose main purpose is to make profits focus more on their main fields of activity. This situation causes businesses to use outsourcing for works outside their core business areas. Although logistics seems to be concerned with the delivery of products, processes directly related to production such as order management and stock management are also included in the field of logistics (Schroeder & Goldstein, 2018). Today, businesses buy the services of carrying out many logistics activities, especially transportation, from companies that specialize in outsourcing. The logistics capabilities of 3PL companies play a significant position in the formation of consumer perception of the product. Regardless of the value of the product, it cannot be expected to have the same value in the eyes of the customers if it does not take place in the market in accordance with customer demands and expectations. At this point, the value that logistics adds to the product emerges (Long, 2012). In terms of logistics businesses, it is a process that needs to be managed in a customer-oriented manner. Good management of logistics is important in terms of production management as well as being able to respond to the demands of the market. The fact that the inputs to be used in production arrive at the factory at the desired time and that the production can continue without interruption is directly related to the quality of logistics services.

There are different approaches to the assessment of logistics capabilities. Hayes et al. (1988) logistics capabilities in terms of manufacturing enterprises; evaluated in four categories as cost, quality, flexibility, and innovation. On the other hand, logistics capabilities that businesses should focus on; delivery speed, service quality, flexibility and cost (Fawcett ve Stanley, 1997). Morash et al. (1996), considered logistics capabilities in separate categories as supply and demand oriented in order to draw a more general perspective. Demand-oriented capabilities include “pre-sales customer service, after-sales customer service, delivery speed, safe delivery and target market-oriented service”. Supply-oriented logistics capabilities are as follows: to offer an extensive distribution network, to perform diversified distribution operations according to customer expectations, and to realize all these at low cost (Morash et al., 1996). The logistics capabilities of logistics service providers are discussed in th

study. For this reason, it would be more appropriate to focus on the logistics capabilities of enterprises providing logistics services.

The general view is to transport "the right product, in the right quantity, with the right methods, to the right place, at the right time, with the right route and at the right cost". According to this point of view, the most basic capabilities of logistics service can be listed as cost, time, speed and flexibility. In addition, it should not be forgotten that 3PL has specialized logistics capabilities according to the fields in which it operates. For this reason, logistics capabilities may vary according to the area of operation of the enterprise, customer base and even geographical location. Logistics capabilities are critical for businesses to provide customer satisfaction by responding quickly to demand fluctuations in the market. Building agile supply chains in free market conditions where there is intense competition for businesses is a necessity in order to continue their existence. One of the important steps in establishing an agile supply chain network is to have solid logistics capabilities (Gligor & Holcomb, 2012).

1.3. Logistics Innovativeness and Logistics Capabilities Relation

Strategic management is expected to focus on core competencies of businesses to create competitiveness (Lu, 2007). To gain advantage in the long run competition, companies must develop their core competencies. In addition, it is necessary to develop logistics capabilities that directly contribute to the competitiveness of companies. This requirement has led to an increase in studies on logistics capabilities in the literature (Yang et al., 2009). Taking part in the supply chain structures created by companies with strong logistics capabilities gives companies a competitive advantage. Strengthening logistics capabilities depends on the sub-dimensions of logistics capabilities. Bakan et al. (2020) expressed the sub-dimensions of logistics capabilities as logistics innovation and logistics service differences. All innovation approaches aiming at the development of logistics activities are considered within logistics innovativeness.

Ho and Chang (2015) stated that significant relationship between the innovation capabilities of logistics service providers and their logistics service capabilities is procurable. It has also been stated that companies can gain competitive advantage by strengthening their logistics capabilities. Amling and Daugherty (2018) explain that 3 basic environmental conditions must be created for logistics innovation to take place. These are "(i) Ubiquitous connectivity and applications, (ii) Dynamic, low-cost labor environment, (iii) Government support". In addition, logistics innovation activities target speed, adaptability and new business models. At this point, it can be mentioned that the logistics capabilities of logistics innovation can be improved.

Wang et al. (2020) show logistics innovation among the capabilities of companies. The acceptance of logistics innovation as a talent supports the acceptance of innovation among logistics capabilities, pending to the existence of the effect of logistics innovativeness on capabilities. Dai et al.

(2020) stated that with the application of service innovation in the development of logistics activities, the quality of logistics service will increase, and this effect is high, especially in cold chain logistics activities. When the literature is examined, it is understood that although there are not enough studies about logistics innovation and logistics capabilities, it has a significant effect on business capabilities and considers logistics innovation among firm capabilities. At this point, it is aimed to explain the relationship between logistics capabilities and logistics innovation concepts with this study.

2. METHODOLOGY

2.1. Research Model

In this article, it is aimed to explain the intercourse between the concepts of logistics innovativeness and logistics capabilities, which are discussed in the conceptual framework. We have two variables within the scope of our research. These variables are logistics innovativeness and logistics capabilities. Logistics innovativeness variable constitutes the independent variable of the research. Logistics capabilities variable is the dependent variable of the research. Figure 1 presents the research model. In addition, within the scope of the research, it is determined whether there is a differentiation in the perceptions of logistics innovation and logistics capabilities according to the demographic characteristics of the personnel working in logistics companies.

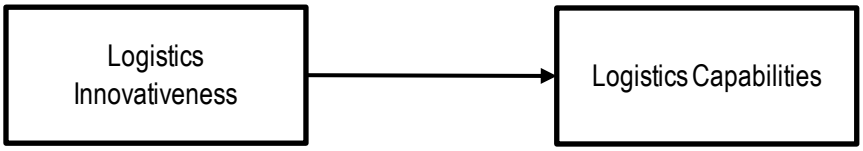

Figure 1. Research Model

2.2. Hypotheses

Considering the contribution of innovative approaches in logistics activities to the development of logistics capabilities, it can be explained that relationship among logistics innovativeness and logistics capabilities is necessary. Logistics innovation aims to speed up logistics activities and make them more reliable. In particular, 3PL logistics companies need to exhibit augmentative innovative attitudes for the development of their logistics capabilities. Logistics innovation, which aims to increase the quality of logistics service, can be beneficial in improving the capabilities of logistics service providers and may also lead to the emergence of a new talent. Logistics innovation basically aims at displaying innovative attitudes in logistics activities. In the literature, the contribution of the innovative attitude to the performance, productivity, etc. of the enterprises in many different evaluation areas has been discussed. The concept of logistics innovation, on the other hand, is not sufficiently included in the literature compared to other innovation approaches. In order to complete this deficiency in the literature, it is aimed to explain the intercourse between logistics innovativeness and logistics capabilities in the sample

area of logistics companies operating in Artvin. Our hypotheses created to reveal the level of significance of the relationship between logistics innovativeness and logistics capabilities are as follows:

H1: *Logistics innovativeness levels of logistics companies operating in Artvin province have a positive and significant effect on their logistics capabilities.*

H2: *Logistics innovativeness and logistics capabilities levels of logistics companies operating in Artvin province differ according to demographic variables.*

H2a: *Logistics innovativeness levels of logistics companies operating in Artvin province differ according to gender variable.*

H2b: *Logistics capabilities levels of logistics companies operating in Artvin province differ according to gender variable.*

H2c*: Logistics innovativeness levels of logistics companies operating in Artvin province differ according to marital status variable.*

H2d: *Logistics capabilities levels of logistics companies operating in Artvin province differ according to marital status variable.*

H2e*: Logistics innovativeness levels of logistics companies operating in Artvin province differ according to age variable.*

H2f: *Logistics capabilities levels of logistics companies operating in Artvin province differ according to age variable.*

H2g*: Logistics innovativeness levels of logistics companies operating in Artvin province differ according to educational status variable.*

H2h: *Logistics capabilities levels of logistics companies operating in Artvin province differ according to tenure variable.*

H2i*: Logistics innovativeness levels of logistics companies operating in Artvin province differ according to educational status variable.*

H2j: *Logistics capabilities levels of logistics companies operating in Artvin province differ according to educational status variable.*

H2k: *Logistics innovativeness levels of logistics companies operating in Artvin province differ according to logistics area variable.*

H2l: *Logistics capabilities levels of logistics companies operating in Artvin province differ according to logistics area variable.*

2.3. Sampling and Research Scales

The main objection of this study is to specify the relationship between logistics innovativeness and logistics capabilities. In this context, Artvin province logistics service providers constitute the sample area of the study. Artvin province constitutes one of the important centers for Turkey in terms

of logistics. In Artvin, there is one port (Hopa Port), one customs (Sarp Customs) and many international transportation companies. At the same time, warehousing services are offered in the port. In order to apply the logistics innovativeness and logistics capabilities scales, a sample area was created among the logistics service providers operating in Artvin with the simple random sampling method. Survey questions prepared for the realization of the survey application were delivered to Hopa port, Sarp customs and 14 logistics companies providing international logistics services through the SurveyMonkey application. The survey application was carried out in 2021. As a result of the survey application, we received a total of 173 survey responses. 12 survey results were excluded from the data set because they did not have sufficient qualifications for analysis. At this point, analyzes were carried out with a total of 161 survey results. Kline (1994) explained that in structural equation model applications, structural equation model applications can be realized with 10 times the number of scale items. Considering that there are 13 items in total within the scope of our research, it is understood that the sample area is sufficient. Another aim of the study is to specify whether there is a differentiation in the answers according to the demographic status of the logistics company employees operating in Artvin. In this context, questions of age, gender, marital status, working time, education level and the logistics field of activity of the company were asked in the survey application.

Logistics innovativeness scale items are taken from the study which is conducted by Ralston et al (2013) on logistics companies. According to Ralston et al (2013), it was stated that the reliability level of the scale was $\alpha = 0.96$ and Variance extracted is 0.82. Logistics innovativeness scale items are 5 in total and single dimension. Logistics capabilities scale was created by Wang et al. (2018). The Logistics Capabilities Scale consists of a single dimension and a total of 8 items. The logistics capabilities scale application by Wang et al (2018) was applied in the courier industry operating in Australia. It is seen that the reliability ($\alpha = 0.89$) and validity levels (CR=0.91, AVE=0.62) of the logistic abilities scale are sufficient (Hair et el., 2012). In addition, a 7-point Likert scale was used within the scope of the research ("1 strongly disagree, 2 mostly disagree, 3 disagree, 4 neutral, 5 agree, 6 mostly agree, 7 strongly agree").

3. FINDINGS

3.1. Demographic Findings

The frequency analysis results of the data collected from the logistics service providers operating in Artvin province are presented in Table 1. Within the scope of the survey application, information about the gender, age, marital status, education level, tenure and logistics service areas of the companies served by the participants were collected. As presented in the table, 66.5% of the participators are male and 33.5% are female. Approximately half of the participators are married, and the other half are single. According to age groups, it is understood that the participants are mostly in the "26-33" age group. According to their education level, nearly half of the participants have a

undergraduate degree. Approximately 60% of the participants have been serving in the logistics sector for 0-10 years. Considering the logistics service areas of the companies, approximately 80% operate in the transportation sector.

Table 1. Demographic Findings

Gender	**Number**	**%**	**Marital status**	**Number**	**%**
Woman	54	33,5	Married	92	57,1
Man	107	66,5	Single	69	42,9
Total	161	100	Total	161	100
Age	**Number**	**%**	**Education Status**	**Number**	**%**
18-25	26	16,1	High school and pre high school	36	22,4
26-33	67	41,6	Associate degree	28	17,4
34-41	41	25,5	Undergraduate	83	51,6
42 +	27	16,8	Postgraduate	14	8,7
Total	161	100	Total	161	100
Tenure	**Number**	**%**	**Logistics Area**	**Number**	**%**
0-5	60	37,3	Transportation	126	78,3
6-11	37	23,0	Warehouse	5	3,1
12-17	32	19,9	Customs	22	13,7
18 +	32	19,9	Others	8	5,0
Total	161	100	Total	161	100

3.2. Findings Regarding the Scales

The Kolmogorov-Smirnov normality test is used to test whether the data set collected because of the questionnaire applied within the scope of the research showed a normal distribution. The results of the Kolmogorov-Smirnov normality test are presented in Table 2. According to the Kolmogorov-Smirnov test of normality, the p value was found to be less than 0.05 in both scales. This situation explains that the data collected from Artvin province do not show a normal distribution.

Table 2. Kolmogorov-Smirnov Normality Test Results

Scales	**N**	**Mean**	**SS**	**Test Value**	**P**
Logistics Innovativeness Scale	161	5.62	1.32	1.895	0.002
Logistics Capabilities Scale	161	6.02	0.86	1.648	0.009

The exploratory factor analysis (EFA) findings of the logistics innovativeness and logistics capability scales applied within the scope of the research are shown in Table 3 and Table 4. The findings of EFA were obtained with the help of the SPSS package program. Büyüköztürk et al (2017) explains that factor loads of scale items have to be greater than 0.32. According to the EFA findings of the logistics innovativeness scale, it was determined that the factor loads of all original scale items were greater than 0.32. However, when the results of the EFA was examined, it was found that the factor

loadings of the first and second items of the scale were less than 0.32. For this reason, the first and second items of the logistic capabilities scale were taken out from the scale and rediscovery factor analysis was performed. According to second EFA, it was determined that all factor loads were greater than 0.32. In the analyzes made after that, the logistic capabilities scale was carried out with a total of 6 items.

Table 3. EFA Results of Logistics Innovativeness Scale

Items	**Logistics Innovativeness**
LI5- "Our logistics staff provide practical support for ideas and applications."	0.937
LI3- "Our logistics employees collaborate to help develop and implement new ideas."	0.927
LI4- "Our logistics people find and share resources to help implement new ideas."	0.919
LI2- "Our logistics employees have enough time to develop new ideas."	0.901
LI1- "Our logistics employees are open and sensitive to change."	0840
Eigenvalues	4.099
Total Variance Percentage (%)	81.98

Table 4. EFA Results of Logistics Capabilities Scale

Items	**Logistics Capabilities**
LC5- "My firm is capable to maintain consistent on-time delivery for all customers"	0.806
LC6- "My firm is capable to handle problems and complaints"	0.791
LC8- "My firm is capable to offer routine services"	0.786
LC7- "My firm has skilled and qualified personnel"	0.756
LC4- "My firm is capable to keep low freight damage / loss rate"	0.641
LC3- "My firm applies protection for freight safety and risk"	0.586
Eigenvalues	3.218
Total Variance Percentage (%)	53.63

Table 5. CFA Results of Logistics Innovativeness Scale

Parameter Estimates Measuring Model	**S.E.**	**Estimate**	**Fit Values**
"Logistics Innovativeness > LI1"	0.093	0.791*	"X^2 [5.9, N=161] = 4, CMIN/df (1.481)**, CFI (0.998)***, RFI (0.981)***, IFI (0.998)***, TLI (0.994) NFI (0.993)***, RMSA (0.055)****"
"Logistics Innovativeness > LI2"	0.122	0.875*	
"Logistics Innovativeness > LI3"	0.106	0.926*	
"Logistics Innovativeness > LI4"	0.111	0.875*	
"Logistics Innovativeness > LI5"	0.105	0.906*	

"* p<0.01
"** CMIN/df < 3 (Good fit)"
"*** CFI, NFI, RFI, IFI, TLI > 0.95 (Good fit)"
"**** 0.05 < RMSA < 0.08 (Acceptable fit) "

To verify the validity levels of the scale items, confirmatory factor analysis (CFA) was conducted with the help of AMOS package program. Factor loadings and fit values of scale expressions within the scope of confirmatory factor analysis are presented in Table 5 and Table 6. Tabachnick and Fidell et al. (2013) stated that the fit value of confirmatory factor analyzes should be at an acceptable level. As presented in Table 5 and 6, fit values of both logistics innovativeness and logistics capability scales are at an acceptable level. Therefore, the confirmatory factor analysis results of the scales are at an acceptable level.

Table 6. CFA Results of Logistics Capabilities Scale

Parameter Estimates	**S.E.**	**Estimate**	**Fit Values**
Measuring Model			
"Logistics Capabilities > LC3"	0.134	0.463*	"X^2 [8.9, N=161] = 6, CMIN/df (1.489)**, CFI (0.992)***, RFI (0.939)***, IFI (0.992)***, TLI (0.979) NFI (0.975)***, RMSA (0.055)****"
"Logistics Capabilities > LC4"	0.174	0.552*	
"Logistics Capabilities > LC5"	0.200	0.829*	
"Logistics Capabilities > LC6"	0.195	0.702*	
"Logistics Capabilities > LC7"	0.194	0.561*	
"Logistics Capabilities > LC8"	0.127	0.687*	

"* p<0.01" "
"** CMIN/df < 3 (Good fit)"
"*** CFI, NFI, RFI, IFI, TLI > 0.90 (Accaptable fit)"
"**** 0.05 < RMSA < 0.08 (Acceptable fit)"

Kaiser - Meyer - Olkin (KMO) and Bartlett Tests were conducted to determine the validity of the scales. SPSS package program was used to perform the KMO test. KMO test results are presented in Table 7. According to the KMO Test results, it is understood the logistics innovativeness scale is 0.883 and the logistics capabilities scale is 0.792. According to the Bartlett Sphericity Test results, the p values of both scales were found to be less than 0.01. Obtained KMO values are at the desired level (Kalaycı, 2005). These results explain that the validity level of both scales applied is sufficient.

Table 7. Kaiser Meyer Olkin (KMO) and Bartlett Tests Results of the Scales

		LI	**LC**
Kaiser Meyer Olkin Sampling Adequacy Test		0.883	0.792
Bartlett Sphericity Test	**Approximate Chi-square**	783.028	358.256
	Degrees of Freedom (df)	10	15
	P	0.000	0.000

Reliability test results are shown in Table 8. Reliability analyzes were determined with the help of SPSS package program. "The Cronbach's Alpha" value for the logistics innovativeness scale is 0.943 and the "Cronbach's Alpha" value for the logistics capabilities scale is 0.791. When the "Cronbach's

Alpha" values obtained are examined, it is understood that the reliability level of both scales is high (Hair, 2010).

Table 8. Reliability Analysis Results of the Scales

Scales	Items	Cronbach's Alfa (α)
Logistics Innovation Scale	5	0.943
Logistics Capabilities Scale	6	0.791

3.3. Findings Regarding the Hypotheses

In order to test the hypotheses formed, the correlation relationship between the expressions of the variables and the correlation relationship between the variables were examined. Table 9 shows the correlation relationships between logistic innovativeness scale items. When Table 9 is reviewed, it is understood that the correlation between the fourth and fifth items (0.888) is at the highest level from the items of the logistic innovativeness scale.

Table 9. Correlation Relationship of Logistics Innovativeness Scale Items

Items	Mean	S.D	LI1	LI2	LI3	LI4	LI5	LI_Mean
LI1	6.080	1.183	1					
LI2	5.354	1.671	0.709*	1				
LI3	5.596	1.480	0.729*	0.806*	1			
LI4	5.490	1.508	0.667*	0.783*	0.808*	1		
LI5	5.608	1.441	0.719*	0.779*	0.845*	0.888*	1	
LI_Mean	5.626	1.322	0.831*	0.909*	0.927*	0.920*	0.936*	**1**

* $p < 0.01$

Table 10 shows the correlation between the items of logistic capabilities scales. It is understood from the items of logistic capabilities that the correlation relations of the third statement with other expressions are at a lower level than the other correlation relations.

Table 10. Correlation Relationship of Logistics Capabilities Scale Items

Items	Mean	S.D	LC3	LC4	LC5	LC6	LC7	LC8	LC_Mean
LC3	5.490	1.699	1						
LC4	5.875	1.390	0.491*	1					
LC5	6.173	1.015	0.428*	0.493*	1				
LC6	6.161	1.123	0.263*	0.321*	0.578*	1			
LC7	5.968	1.262	0.261*	0.247*	0.448*	0.665*	1		
LC8	6.453	0.741	0.299*	0.376*	0.542*	0.542*	0.610*	1	
LC_Mean	6.020	0.868	0.703*	0.705*	0.776*	0.737*	0.710*	0.710*	1

* $p < 0.01$

Table 11 presents the correlation between logistics innovativeness and logistics capabilities variables. The correlation value between the variables is 0.567. In addition, the significance level of all correlation relationships is less than 0.01. This situation explains that all correlation relations are at a significant level (Evans, 1996).

Table 11. Correlation Relations of the Variables

Variables	Mean	S.D.	Logistics Innovativeness	Logistics Capabilities
Logistics Innovativeness	5.626	1.322	1	
Logistics Capabilities	6.020	0.868	0.567*	1

* $p < 0.01$

With the H1 hypothesis, it is aimed to test whether the logistics innovativeness levels of logistics companies operating in Artvin influence their logistics capabilities. To test the H1 hypothesis, a path model analysis structure was established with structural equation modeling. The established path model analysis structure was analyzed with the help of AMOS package program. Figure 2 shows the path model analysis structure. As seen in Figure 2, it is understood that logistics innovation has a positive and significant effect on logistics capabilities ($\beta = 0.66, p<0.01$). For the structural equation model to be considered meaningful, the fit values are expected to be at an acceptable level. The fit values of the model are presented in Table 12. It is seen that all of the fit values are at an acceptable level. In addition, the correlation relationship between the model indices was strengthened to increase the fit values of the model structure. The correlation relationship between e4 and e5 was included in the model. The correlation between e6 - e7 and e8 - e10 were included in the model within the scope of the logistic capabilities' variable. For the structural equation model structure and the fit values, first hypothesis is accepted.

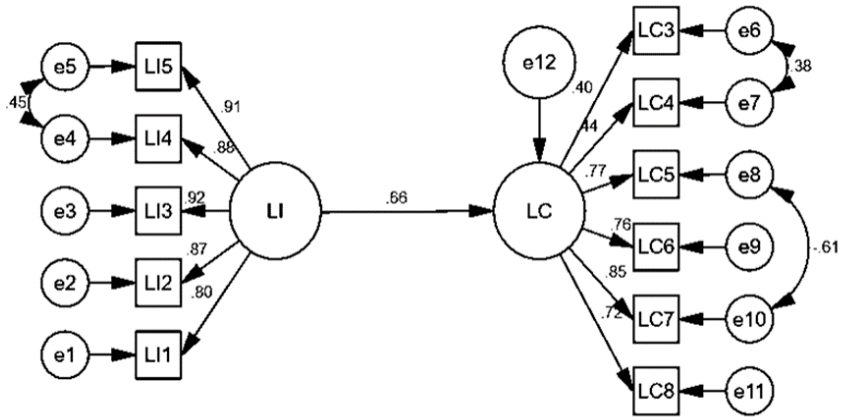

Figure 2. Path Analysis (Standardized)

Table 12. Path Analysis Results of the Structural Equation Model

Parameter Estimates Structural Model	S.E.	Estimate	Fit Values
LC <--- LI	0.105	0.66*	"X^2 [91.8, N=161] = 40, CMIN/df (2.295)**, CFI (0.958)***, RFI (0.903)***, IFI (0.959)***,

	TLI (0.943) NFI (0.929)***, RMSA (0.090)****

"* p<0.01"
"** CMIN/df < 3 (Good fit)"
"*** CFI, NFI, RFI, IFI, TLI > 0.90 (Acceptable fit)"
"**** 0.05 < RMSA < 0.08 (Mediocre Acceptable fit)"

Difference analyzes of logistics innovativeness and logistics capabilities variables were performed according to demographic variables of the sample area. Non-parametric analyzes were applied because the data collected for the variables of logistics innovativeness and logistics capabilities did not show normal distribution. "Mann-Whitney Test" was applied to analyze the difference between the variables of logistics innovation and logistics capabilities according to the gender variable. Mann-Whitney Test results based on gender variable are shown in Table 13. It is seen that the variables of logistics innovativeness (M-U score = 2526.500, p> 0.05), and logistics capabilities (M-U score = 2871.500, p> 0.05) do not differ according to the gender variable. Therefore, the H2a and H2b hypotheses of the research are rejected.

Table 13. Mann-Whitney Test Results for the Gender Variable

	Gender	**N**	**Mean Rank**	**M-U Score**	**p**
Logistics Innovativeness	Man	107	84.39	2526.500	0.190
	Woman	54	74.29		
	Gender	**N**	**Mean**	**M-U Score**	**p**
Logistics Capabilities	Man	107	80.84	2871.500	0.950
	Woman	54	81.32		

"Mann-Whitney Test" was applied to analyze the difference between the variables of logistics innovativeness and logistics capabilities according to the martial status variable. Mann-Whitney Test results based on marital status variable are shown in Table 14. It is seen that the variable of logistics capabilities (M-U score = 2932.000, p> 0.05) does not differ according to the martial status variable. But variable of logistics innovativeness (M-U score = 2370.500, p< 0.05) differs according to the martial status variable. Therefore, the H2c is accepted and H2d is rejected.

Table 14. Mann-Whitney Test Results for the Martial Status Variable

	Martial Status	**N**	**Mean Rank**	**M-U Score**	**p**
Logistics Innovativeness	Single	69	69.36	2370.500	0.006
	Married	92	89.73		
	Marital Status	**N**	**Mean**	**M-U Score**	**p**
Logistics Capabilities	Single	69	77.49	2932.000	0.407
	Married	92	83.63		

Kruskal-Wallis Test was applied in order to analyze the difference between the variables of logistics innovativeness and logistics capabilities according to the age variable. Kruskal-Wallis Test results are shown in Table 15. It is seen that the variables of logistics innovativeness (X2= 4.460, p> 0.05), and logistics capabilities (X2= 3.360, p> 0.05) do not differ according to the age variable. Therefore, the H2e and H2f hypotheses of the research are rejected.

"Kruskal-Wallis Test" was applied in order to analyze the variables of logistics innovativeness and logistics capabilities according to the education status variable. Kruskal-Wallis Test results based on education status variable are shown in Table 16. It is seen logistics innovativeness (X2= 2.789, p> 0.05) and logistics capabilities (X2= 3.299, p> 0.05) do not differ according to the education status variable. Therefore, the H2g and H2h hypotheses of the research are rejected.

Table 15. Kruskal-Wallis Test Results for the Age Variable

	Age	**N**	**Mean Rank**	X^2	**p**
Logistics Innovativeness	18-25	26	66.96	4.460	0.216
	26-33	67	81.79		
	34-41	41	90.88		
	42 +	27	77.56		
	Age	**N**	**Mean Rank**	X^2	**p**
Logistics Capabilities	18-25	26	73.06	3.360	0.339
	26-33	67	81.45		
	34-41	41	90.65		
	42 +	27	72.89		

Table 16. Kruskal-Wallis Test Results for the Education Status Variable

	Education	**N**	**Mean Rank**	X^2	**p**
Logistics Innovativeness	High school and pre high school	36	88.03	2.789	0.425
	Associate degree	28	69.66		
	Undergraduate	83	80.72		
	Postgraduate	14	87.25		
	Education	**N**	**Mean Rank**	X^2	**p**
Logistics Capabilities	High school and pre high school	36	81.64	3.299	0.348
	Associate degree	28	69.95		
	Undergraduate	83	81.73		
	Postgraduate	14	97.11		

"Kruskal-Wallis Test" was applied to analyze logistics innovativeness and logistics capabilities according to the tenure variable. Kruskal-Wallis Test results based on tenure variable are shown in Table 17. It is seen that the variables of logistics innovativeness (X2= 1.721, p> 0.05), and logistics capabilities

(X2= 0.854, p> 0.05) do not differ according to the tenure variable. Therefore, the H2i and H2j hypotheses of the research are rejected.

"Kruskal-Wallis Test" was applied to analyze ogistics innovativeness and logistics capabilities according to the logistics area variable. Kruskal-Wallis Test results based on logistics area variable are shown in Table 18. It is seen that the variables of logistics innovativeness (X2= 2.226, p> 0.05), and logistics capabilities (X2= 2.778, p> 0.05) do not differ according to the logistics area variable. Therefore, the H2k and H2l hypotheses of the research are rejected. The acceptance and rejection status of the hypotheses created within the scope of the research are shown in Table 19.

Table 17. Kruskal-Wallis Test Results for the Tenure Variable

	Tenure	**N**	**Mean Rank**	X^2	**p**
Logistics Innovativeness	0-5	60	76.61	1.721	0.632
	6-11	37	81.55		
	12-17	32	89.75		
	18 +	32	79.84		
	Tenure	**N**	**Mean Rank**	X^2	**p**
Logistics Capabilities	0-5	60	77.58	0.854	0.837
	6-11	37	81.20		
	12-17	32	86.95		
	18 +	32	81.23		

Table 18. Kruskal-Wallis Test Results for the Logistics Area Variable

	Logistics Area	**N**	**Mean Rank**	X^2	**p**
Logistics Innovativeness	Transportation	126	80.70	2.226	0.523
	Warehouse	5	77.20		
	Customs	22	90.34		
	Others	8	62.38		
	Logistics Area	**N**	**Mean Rank**	X^2	**p**
Logistics Capabilities	Transportation	126	83.02	2.778	0.427
	Warehouse	5	90.90		
	Customs	22	75.70		
	Others	8	57.63		

Table 19. Acceptance / rejection status of hypotheses

H	**Acceptance / Rejection**	**Explanation**
H1	"Accepted"	Logistics innovativeness has a significant positive effect on logistics capabilities
H2a	"Rejected"	There is no significant difference in logistics innovativeness responses according to gender demographic variable.
H2b	"Rejected"	There is no significant difference in logistics capabilities responses according to gender demographic variable.
H2c	"Accepted"	There is a significant difference in logistics innovativeness responses according to marital status demographic variable.
H2d	"Rejected"	There is no significant difference in logistics capabilities responses according to the marital status variable.

H2e	"Rejected"	There is no significant difference in logistics innovativeness responses according to age demographic variable.
H2f	"Rejected"	There is no significant difference in the logistics capabilities responses according to the age variable.
H2g	"Rejected"	There is no significant difference in logistics innovativeness responses according to the educational level variable.
H2h	"Rejected"	There is no significant difference in logistics capabilities responses according to educational status.
H2ı	"Rejected"	There is no significant difference in logistics innovativeness responses according to the tenure variable.
H2j	"Rejected"	There is no significant difference in logistics capabilities responses according to tenure.
H2k	"Rejected"	There is no significant difference in logistics innovativeness responses according to the logistics area variable.
H2l	"Rejected"	There is no significant difference in logistics capabilities responses according to the logistics area.

DISCUSSION AND CONCLUSION

The concepts of logistics innovativeness and logistics capabilities complete each other and have a direct impact on each other. Both innovative activities and logistics activities are actions that provide added value to companies. In this study, 3PL companies were chosen as the sample area. This situation reveals the necessity of determining to what extent the existing logistics capabilities of 3PL companies, whose main service area is logistics activities, are affected by logistics innovation actions. The effect of logistics innovativeness levels of companies serving in different logistics service areas on logistics capabilities has been determined. In addition, the logistics innovativeness and capabilities levels of the companies do not differ according to the others demographic characteristics.

In the research, it can be mentioned that the logistics innovation approaches of the logistics service providers operating in the province of Artvin and the actions they have developed in this direction are directly affected by their logistics capabilities. This finding is in line with the conclusion by Ho and Chang (2015) that the innovation capabilities of companies will affect logistics services significantly and positively. In the literature, logistics innovation is shown among the capabilities of the company. In this context, within the scope of our study, it has been concluded that logistics innovation can be shown among the antecedent capabilities that affect logistics capabilities.

For findings, it is seen that the logistic capabilities scale items did not differ according to the demographic characteristics. This supports the fact that there is no relation the demographic characteristics of the employees (gender, marital status, age, educational level, tenure, logistics area) and logistics capabilities. Another result of the research is that logistics innovativeness attitudes differ only according to the marital status of the personnel. At this point, it is understood that the companies where married people work compared to single people accept that their logistics innovation level is higher. Another result of our study is that there is no differentiation in logistics innovativeness levels according to other demographic characteristics of the personnel (gender, age, educational level, tenure, logistics area).

Considering the research findings, it can be mentioned that the logistics service providers operating in Artvin province need to increase their logistics capabilities in order to increase the logistics service quality and to adopt and internalize logistics innovation approaches in order to achieve this. In this case, it is recommended to logistics company owners and logistics company managers to develop their logistics innovative attitudes within the company, to increase the use of innovative products that increase logistics services, to offer service alternatives to customers with innovative and different service proposals, to strengthen their innovative behaviors and logistics capabilities,

Conducting the research under pandemic conditions in 2021 is the main limitation of the study. Conducting the research in environmental conditions where the importance of logistics services is understood even more, especially in pandemic conditions, makes a significant contribution to the importance of the research. Finally, it can be explained that Logistics service quality depends on the existing logistics capabilities and the existing logistics innovation levels in logistics capabilities.

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