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LOGISTICS FLEXIBILITY, RELATIONSHIP FLEXIBILITY, AND LOGISTICS SERVICE QUALITY: THE MODERATING ROLE OF ENVIRONMENTAL UNCERTAINTY

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ABSTRACT

This study examined the moderating role of environmental uncertainty on the connection between logistics flexibility, relationship flexibility, and logistics service quality. This study covered large and medium-sized companies operating in the Gaziantep Organized Industrial Zone. Company lists were created based on records in the Gaziantep Chamber of Industry. A questionnaire was sent to a total of 1627 companies by e-mail and company managers were asked to fill in the online questionnaire. The managers of 356 companies fully completed the questionnaire. SPSS Process Macro V3.4 was used to calculate the moderator effects of environmental uncertainty.

The macro also reported the effect level of independent variables on dependent variables. According to the results of the analysis, logistics flexibility and relationship flexibility affected logistics service quality, positively and significantly. Besides, environmental uncertainty had a moderator role in the relationship between logistics flexibility and logistics service quality. There were some limitations. A questionnaire was used as a data collection tool in the study. Thus, personal perceptions of the participants could be apparent in the information given about the company since questionnaire data was formed in accordance with statements given by the respondents. In future researches, it is recommended that measurement tools that can determine environmental uncertainty more objectively could be used on a sectoral basis to secure clearer results. It is recommended that companies take into account environmental uncertainty when determining a strategy(s) to enhance the quality of logistics services.

Keywords: Logistics service quality, relationship flexibility, logistics flexibility, environmental uncertainty.

INTRODUCTION

Safe environments allow companies to take advantage of well-learned or generic responses to cope with environmental confusion quickly (Fredericks, 2005). The world is undergoing rapid changes, and future uncertainty continues in parallel. Globalization, increasingly evolving information technologies, and the growing change in market requirements are contributing to uncertain conditions affecting many businesses. The need for reforms has been illuminated by a failure to effectively respond to a changing international environment. According to Subramaniam and Kasipillai (2007), especially in times of economic crisis, companies develop models that will provide them with flexibility against environmental uncertainties.

In a perfect future, the corporate sector will rather see a government climate that completely embraces business priorities and practices with consistent and stable policies. However, a much less rewarding market situation occurs as one looks at the political environment worldwide. Given the essence of foreign operational problems and prospects, management stresses are significantly different (Badri et al., 2000).

In such instances, issues may also arise because of a mismatch among present routines, procedures, organizational responses, and outside demands (Fredericks, 2005). Firms have to be fairly bendy for the excessive diplomacy of the uncertainty of their delivery chain and to be aggressive, side the marketplace (Akben & Avşar, 2017). Flexibility as a strategic functionality that suits environmental necessities may be essential to company performance (Patel et al., 2012; Yu et al., 2013). When flexibility is taken into account due to the level of the system, it generally has economic consequences, particularly in terms of return on investment, return on profits, and market share (Duclos et al., 2003; Sánchez & Pérez, 2005; Yu et al., 2017).

Flexibility is explored in various dimensions, such as in-company flexibility and intercompany flexibility (Fredericks, 2005), the flexibility of service providers (Ivens, 2005), flexibility in purchasing/ supply chain management (Giunipero et al., 2005), and flexibility in marketing (i.e. applied consumer knowledge) (Claycomb et al., 2005). Flexibility is important in any relationship. In the study by Ivens (2005), it is associated with two basic components of flexibility, namely relationship flexibility, and logistics flexibility.

Logistics service quality is one of the factors that enable organizations to achieve their goals. There are many factors affecting the quality of logistics service. This study attempts to determine how the types of flexibility (logistics flexibility and relationship flexibility) affect logistics service quality. This study also intends to examine the moderating role of environmental uncertainty on the connection between logistics flexibility, relationship flexibility, and logistics service quality.

LITERATURE REVIEW

Logistics Service Quality

The standard of service has been described as offering the most ideal service possible to fulfill customers' needs in the broadest context (Odabaşı, 2010). Early concepts on the standard of service

were based on the "approval" framework (Caceres & Paparoidamis, 2007). According to Grönross (1984) and Parasuraman et al. (1985), the level of service quality is a product of the contrast between services delivered and planned service. From the order stage to the destination, the quality of service related to the flow of goods is conceptualized by logistics service quality (Mentzer et al., 2001). According to Mentzer et al. (1999a), the nine criteria related to logistics service efficiency are staff communications quality, order confirmation volume, information quality, order procedure, order accuracy, order terms, order quality, order inconsistency control, and timeliness.

While it is generally agreed that when it comes to measuring, the level of service quality is significant, a simple and precise approach has not been disclosed (Parasuraman et al., 1988). In service marketing literature, conceptualization and evaluation of expectations of service efficiency are among the most contentious and current concerns (Akter et al., 2019; Brady & Cronin, 2001; Prakash, 2019; Zeithaml, 2000). Since programs are not concrete, customers subjectively assess consistency. This perceived consistency of service/product has been labeled "difficult" (Parasuraman et al., 1985), and analysis on the perception of service is still regarded as unanswered (Caceres & Pararoidamis, 2007; Facchini et al., 2020; Karia, 2019).

The functional frameworks for the implementation of service quality models proposed by Grönroos (1984) and Parasuraman et al. (1985) were developed by Mentzer et al. (1999b) and Bienstock et al. (1997). Both these models are commonly used in service quality analysis (Jain & Gupta, 2004). Logistics service quality is also linked to: a) quality of information, b) order processes, c) timeliness and d) accuracy of order (Karadeniz & Başaran, 2014).

When definitions related to logistics service quality are examined, it can be considered as the necessary arrangement and organization to meet the expectations of the customer. Industrial trends and technical advances will impact the provision of logistics service quality. Ultimately, the basic criterion is to meet the criteria determined by the demands and requests of the customer.

Logistics Flexibility

The definition of flexibility is defined by Upton (1994) as time, labor cost, or the capacity to adjust or respond with very little output pressure, and is general and abstract. Moreover, its flexibility has been described as growing the existing product range, adapting rapidly to a company's broad product range and ensuring that it performs well. Flexibility, both technically and experimentally, is known to be a dynamic, multidimensional, and difficult-to-handle term. Logistics flexibility is seen in this sense as the capacity of the company to adapt quickly to the needs of consumers in terms of supply, support and operation (Zhang et al., 2002). The manufacturing method of logistics, the ability to adapt to changes in the production mix (Potter et al., 2004), or the ability to have a cost-effective structure (customer role change, globalization, and delay) as supply and customer resources change (Teng & Jaramillo, 2005). The theoretical framework is built on these definitions in recent studies (Aunyawong et al., 2019; Liao, 2020; Phaxaisithidet & Banchuen, 2020).

Stevenson and Spring (2007) describe logistics flexibility as the capability, in response to changing environmental factors, to monitor the movement and storage of raw materials, manufactured products, services, and from origin (supplier) to destination (end consumer). In another aspect, the ability of an organization to respond rapidly and easily to evolving customer demands in inbound and outbound shipping, assistance, and services is termed logistics flexibility. In order to organize these efforts, logistics flexibility requires multiple tasks, such as coordinating incoming and outgoing packages, providing manufacturing assistance, and providing information (Zhang et al., 2005). Logistics flexibility can be acknowledged as the logistics service provider's capacity in a logistics procedure, logistics operations, liaison, and developing ongoing logistics innovation activities in response to customer needs.

Relationship Flexibility

The capacity to change relationships in the face of shifting circumstances is the flexibility to relate to delivery networks (Heide & John, 1992; Sezen & Yilmaz, 2007). According to Dutta et al.

(2020), relationship flexibility is one of the critical success factors of the buyer-supplier relationship. The flexibility of relationships is regarded as a twofold expectation of readiness to change by organizing the use of connection capital. Contrary to the flexibility of logistics, which involves unilateral knowledge retrieval behaviors, relationship flexibility is focused on shared cooperation with specific details on relationship expectations (Yu et al., 2018). Relationship flexibility, involves a variety of new contractual arrangements, and a bilateral ability to adjust, alter, or adapt new knowledge without resorting to renegotiations (Dewsnap et al., 2020; Young et al., 2003). The relationship flexibility should be bidirectional depending on the meanings, the current condition should be in a problem and a reform and legislation embedded therein.

There are three mechanisms in the concept of relationship flexibility. First is a two-side readiness to adapt, a form of teamwork adjustment, and the capacity to face changing circumstances. For instance, businesses demonstrate their positive will implicitly as they show versatility in their actions towards their partners (Johnson, 1999). The second is the fact that the frequency and consistency of the sharing of information when coordinating corrections in arrangements or contracts decide the extent to which partners recognize and organize actions to meet each other's aims (Jonsson & Zineldin, 2003). Finally, to the point that a greater degree of flexibility in the arrangement will satisfy the distributor's uncertainties, channel participants increasingly desire to deal with other related undertakings in order to sell or buy goods or services from the concentrating undertaking and authorize the distributor. Being more committed to representatives or final clients of the concentrate company and maintaining the ability of either side to sustain a long-term relationship are crucial (Yu, 2013). Consequently, relationship flexibility can be accepted as a situation where institutions can mutually change their agreements depending on changing economic and environmental conditions.

Environmental Uncertainty

Organizational theory scholars identify that complexity and dynamics are two key aspects of uncertainty (Miller & Friesen, 1982; Premkumar et al., 2005; Sartor & Beamish, 2020). According to Milliken (1987), an entity cannot reliably forecast its own setting because of environmental uncertainty, the lack of knowledge, or

the lack of discernment between important and unrelated evidence. Environmental uncertainty includes the difficulty of product descriptions, technical uncertainty (Chai et al., 2019), uncertainty in demand, uncertainty in supply (Jermsittiparsert & Wajeetongratana, 2019), and product principles (Premkumar et al., 2005). Meijer et al. (2006) linked environmental uncertainty with technical vagueness, resource vagueness, uncertainty about competitiveness, seller vagueness, consumer vagueness, and political instability.

The existence and impact of environmental instability on entities have been dedicated to a major theoretical and methodological initiative. These efforts have largely concentrated on the essence of theoretical interactions between environmental insecurities and factors, such as organizational structure, business policy, and economic efficiency, for these practical research concerns (Buchko,1994).

Environmental uncertainty is commonly used as a general consideration in organizational policy and strategies. The diverse character of consumer demands is part of this ambiguity. The business can obviously be as open and as unpredictable. This is empirically shown in logistics studies that supply chain stability (i.e. volume and launch flexibility) is essential to product reactions and other marketing uncertainties (Mentzer et al., 1999a; Ndubisi et al., 2020). Environmental uncertainty can be regarded as the whole of uncertainties in the general environment, including political, regulations, legal, and economic conditions, as well as the dynamics of the market, the organization's operations, and the change in demand and supply conditions in the sector including the change in technological resources.

HYPOTHESES DEVELOPMENT

According to Parasuraman et al. (1985), understanding service quality is derived from the contrast between the consumer's impression of the service and perception of the service provider's actual performance. When we think in terms of logistics service, goods are conceptualized as a moving process from the order point to the destination point (Mentzer et al., 2001). In a sense, it can be accepted as meeting the expectations of the customer from the perspective of logistics service.

According to Guliman and Gavrila (2018), relationship flexibility is seen as a factor affecting logistics service quality. The logistics service quality has a mediating effect on satisfaction related variables such as logistics flexibility, and logistics information (Zakaria et al., 2010). Saura et al. (2008) stated that logistics flexibility caused an increase in operational efficiency and customer service. When both studies (Saura et al., 2008; Zakaria et al., 2010) were evaluated together, logistics flexibility was thought to be effective in logistics service quality.

The need for logistics consistency to ensure greater efficiency and customer support were discussed by Barad and Even Sapir (2003) and Zhang et al. (2005). The definition of logistics flexibility, which can reposition stocks based on adaptive "real-time" decisions, was the subject of Barad and Even Sapir (2003); which enabled a business to give its clients a higher degree of logistics service quality. This ensured more logistics flexibility (Yu et al., 2017). Considering that logistics service quality is related to the logistics part of the customer in the service provided or that the logistics service directly meets customer expectations regarding this service. It is thought that companies or departments that provide this service should benefit from all the possibilities of logistics flexibility to meet expectations. In a way, the client and the vendor may revisit arrangements and processes if appropriate to deliver a logistics service in order to create or increase logistics service quality.

Information flow should be provided regularly in order to obtain logistics service quality. Relationship flexibility is accepted as an indicator that the flow of information is regular (Hartmann & De Grahl, 2011). According to Rahman (2006), the first two factors that determine logistics quality are "timely delivery" and "total support of customer needs". It is expected to be flexible and meet customer expectations, especially on-time delivery. In a sense, it is necessary to provide flexibility in the relationship between the customer and the seller. The impact of relationship flexibility on the quality of logistics service was explored in the study conducted by Guliman and Gavrila (2018). According to the aforementioned research findings, the understanding of logistics service quality improves while relationship flexibility is high. The following hypotheses are created in this case based on the aforementioned studies.

H_1: Logistics flexibility affects logistics service quality, positively and significantly.
H_2: Relationship flexibility affects logistics service quality, positively and significantly.

In the light of the lack of comprehension of information complexity, environmental uncertainty is seen as the failure of the organization to correctly analyze the environment (Milliken, 1987).The ambiguity of product concepts, technical instability, uncertainty in demands, uncertainty in production, product critique, resource uncertainty, competitive uncertainty, seller uncertainty, consumer uncertainty, and policy uncertainties are synonymous with environmental uncertainty (Meijer et al., 2006; Premkumar et al., 2005). For the success and loyalty of consumers, it is necessary for businesses to overcome certain uncertainty.

The association between increased complexity and increased flexibility was explored in the analysis using a series of case studies and surveys. Moreover, data has been sought to show that greater flexibility relies on higher success in unpredictable conditions (Pagell & Krause, 2004). The bulk of the flexibility literature discusses the relationship between such aspects of uncertainty and flexibility. It is understood that there are three major types of relations between this uncertainty and flexibility.

One important finding of the study (Badri et al., 2000) is that the correlation between increased dynamism, a type of uncertainty and flexibility as a development strategy is highly positive. High and low sampling efficiency has enabled for true performance advantages to be calculated by increasing both the degree of flexibility and durability and uncertainty (Badri et al., 2000).

Uncertainty makes a favorable or detrimental contribution to good results (Samsami et al., 2015; Simangunsong et al., 2012). Institutional environmental policy relies on the market climate, as Aragón-Correa and Rubio-López (2007) have demonstrated. There is an immediate minor chance for businesses if the world is stable and perfectly predictable. Changing environmental factors, however, generate confusion and therefore endanger businesses. In a report by Çetindaş (2018), it was found that the influence of the supply chain

integration on logistics quality was moderated by environmental uncertainty.

Strategies or approaches prefer to follow general strategies such that key operations stay simple if businesses are not able to recognize new circumstance induced uncertainties (Gölgeci & Ponomarov, 2015; Samsami et al., 2015). This is a more cautious approach, while businesses reduce their negative impact on the environment. Applying this outlook on organizations' approach to green businesses appears to be difficult to introduce and incorporate green challenges in corporate choices while managers are facing elevated levels of environmental uncertainty in their market setting (Aragón-Correa & Rubio-López, 2007; Jabnoun et al., 2003). On the other hand, low environmental uncertainty allows businesses to identify their market plans. For example, if the government indicates explicitly that green plans are being created, practitioners can illustrate additional intentions in their relevant practices (Lo & Shiah, 2016).

It is critical that supply incertitude has a stronger influence on demand and competitive uncertainties after analyzing the moderator effect of the three environmental uncertainties. As suppliers may have significant environmental impact on firms, handling supply volatility correctly as regards capacities seem very necessary (Faruk et al., 2001; Lo & Shiah, 2016; Rao & Holt, 2005).

The key results indicate a major positive impact of logistics flexibility on perceived environmental uncertainty (Yu et al., 2018). Furthermore, continuity between perceived environmental uncertainty and environmental target uncertainty has a negative influence on partnership flexibility. In becoming more unsure about behavior, suggesting the prospects of bilateral relations would increase relation stability as a versatile norm to mitigate behavioral ambiguity (Yu, 2013).

There are studies in the literature (Arslan, 2015; Çetindaş & Çelik, 2017; Lo & Shiah, 2016; Patel, 2011; Yıldız et al., 2015; Yu et al., 2017) on the relationship between environmental uncertainty and many features related to firms and whether there is a plausible moderating role. Arslan (2015) investigated whether environmental uncertainties have a moderator role in the relationship between entrepreneurship characteristics and the moderator focus of real

estate agents. According to the research results, environmental uncertainty has different effects according to the type of real estate agent. In other words, there is a moderating role of environmental uncertainty. In the study conducted by Çetindaş and Çelik (2017), they investigated whether environmental uncertainty had a moderator role in the effect of supplier integration on logistics performance. According to the results of the analysis, supplier integration was found to affect logistics performance positively and significantly when environmental uncertainty was both low and high. Nevertheless, this effect was higher when environmental uncertainty was high.

Yu et al. (2017)investigated whether environmental ambiguity has a moderating effect on the direct and indirect link between relationship flexibility and relationship satisfaction. Based on findings by Yu et al. (2017), the high logistically flexible environment that fits in with this context could help suppliers to strengthen both their logistics service quality and establish more satisfying ties with their customers in an environment of high uncertainty. In low environmental uncertainty, there is more connection between relationship satisfaction and relationship flexibility. On the basis of the research, environmental uncertainty has an impact on relationship flexibility, logistics flexibility, quality of logistics service, and satisfaction. The following hypotheses are created in this case based on the aforementioned studies.

H3: Environmental uncertainty significantly moderates the relationship between logistics flexibility and logistics service quality.
H4: Environmental uncertainty significantly moderates the relationship between flexibility and logistics service quality.

METHODOLOGY

This section describes the research model, the participants, methods for data collection, and data analysis.

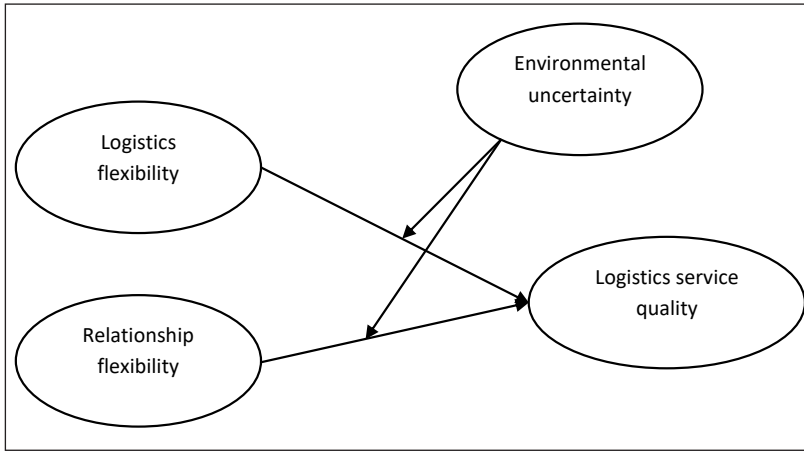
Research Model

In the study, firstly, it is proposed that there is a relationship between logistics flexibility, relationship flexibility, and logistics

service quality. The current study also purports that environmental uncertainty has a significant moderating effect on the relationships between logistics flexibility, relationship flexibility, and logistics service quality. The framework of this study is depicted in Figure 1.

Figure 1

Theoretical Model



Population

The population of this study consisted of 1627 large and medium-sized companies operating in Gaziantep Organized Industrial Zone. Gaziantep Organized Industrial Zone was established in 1969 on an area of 210 hectares. Later expansion work was carried out. Currently, this industrial zone consists of a total of five regions with a total area of 3490 hectares. Approximately 460000000 KWh of electricity is consumed per month with approximately 210000 people employed at the zone.

Company list was created based on the records in the Gaziantep Chamber of Industry. The online questionnaire was sent to a total of 1627 companies (the whole population) via email, out of which 356 of the companies submitted completed questionnaires. The

questionnaire was completed by responsible managers or company owners. The response rate was 22.5 percent. According to Can (2014), when the population size is 2000, the responses should be at least 322 from a 95 percent confidence interval. Since the number of responses was 356 out of a population of 1627, it indicated that the sample size was sufficient.

Data Collection Tools

The questionnaire (refer to Appendix I) has five sections: general information about companies, logistic flexibility, relationship flexibility, logistics service quality, and environmental uncertainty. The items were acquired and adapted from the study by Yu et al. (2017). The protocol to establish validity and reliability of the measures is explained below.

To establish validity, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were performed for each scale. Cronbach's alpha values were calculated for reliability. The suitability of the data for factor analysis was examined using the Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett's test of sphericity. For the data to be suitable for factor analysis, Kaiser-Meyer-Olkin (KMO) must be higher than 0.60. If it is between 0.70 and 0.80, it is good, if it is between 0.80 and 0.90, it is high. It is stated that above 0.90 is very good. In addition, the calculated chi-square value of Bartlett's test should be statistically significant (Field, 2009). In evaluating the results obtained for CFA, the fit index values suggested by Schermelleh-Engel et al. (2003) were used as the cutoff point.

Composite reliability was also used for structure validity. A composite reliability value greater than 0.7 is considered good (Huang et al., 2013). If composite reliability coefficients are 0.7 and above, it indicates that the reliability of the items is sufficient (Bacon et al., 1995; Fornell & Larcker, 1981).

Factor loadings and z-values were checked for convergent validity. The fact that the factor loads were higher than 0.3 and the z-values were significant in the confirmatory factor analysis confirmed this. In addition, the average variance extracted (AVE) was calculated (Fornell & Larcker, 1981). This value was expected to be above 0.5.

This value was close to 0.5 in two scales. For discrimination validity, correlation values between dimensions should not exceed the square root of AVE. As illustrated in Table 1, the correlation values between the dimensions did not exceed the square root of the AVE indicated on the diagonal line. The correlation values were between 0.26 and 0.61, the square root of AVE varied between 0.62 and 0.78. The values showed that discriminatory validity was ensured.

Table 1

Average Variance Extracted and Correlation Values

Dimension	AVE	Mean	SE	1	2	3	4
Logistics flexibility	0.41	4.00	0.61	0.64			
Relationship flexibility	0.38	4.10	0.62	0.61**	0,.2		
Logistics service quality	0.54	3.60	0.53	0.27**	0.26**	0.73	0.71
Environmental uncertainty	0.51	3.97	0.64	0.30**	0.37**	0.30**	0.39**

Notes. ** p< 0.01, * p< 0.05

When the correlation values between the dimensions were examined, the highest relationship was between relationship flexibility and logistics flexibility (r = 0.61). The level of correlation between all dimensions were statistically significant. The lowest relationship was between relationship flexibility and logistics service quality (r = 0.26).

Common method variance refers to the condition that the scales are based on the measurement method rather than the structures that they attempt to measure. This situation is more evident particularly when both the dependent and explanatory variables are obtained from the same respondents with perception-based scales (Podsakoff et al., 2003). In this study, all items used to measure logistics flexibility, relationship flexibility, logistics service quality, and environmental uncertainty were subjected to non-cycle explanatory factor analysis to determine whether there was a common method

variance tendency. A total of eight dimensions with an eigenvalue greater than 1 were formed. The variances were 26 percent, 10 percent, 7 percent, 6 percent, 6 percent, 5 percent, 5 percent and 4 percent, respectively. Since the variance of the first dimension was not more than 50 percent, it can be said that there were no common method variance biases (Podsakoff et al., 2003; Rexhausen et al., 2012; Yu et al., 2017). In addition, all substances were accepted in a single structure and CFA was established. ($\chi 2$ / df = 1032.406 / 231) 4.47 and the root mean square error of approximation (RMSEA) value was 0.131. Index values were not acceptable. It was a worse model compared to the multidimensional structure. These results showed that the observed values were not only in one structure. As a result, there was no problem in measurement results from using these scales together.

Since each dimension in the questionnaire is a separate scale, a specific model was created for each dimension and related items in the CFA study. Later, CFA was used for these models. The CFA results for each model are indicated in Table 2 as follows.

If goodness fit index (GFI), incremental fit index (IFI), comparative fit index (CFI), and normed fit index (NFI) values were bigger than 0.90, it meant that the model was at an acceptable level. If RMSEA and root mean square residual (RMR) values were smaller than 0.8, the model was at an acceptable level. Also ($\chi 2$/df) should be smaller than 3 (Schermelleh-Engel et al., 2003). When other indices were within acceptable values, a value of 0.098 could be accepted as model fit (Schmitt, 2011). Thus, in accordance with the results in Table 2, the questionnaire and items were valid and reliable to obtain data.

Data Analysis

For descriptive analysis and inferential analysis, it was first checked to ascertain whether the collected data distribution had a normal distribution. Kurtosis and skewness values were examined. Since the values were between -3 and +3, it was assumed to have a normal distribution (Hopkins & Weeks, 1990). In these analysis, SPSS V25 was used and 0.05 was accepted as the level of statistical significance.

Table 2

Validity and Reliability of Data Collection Tools

Variable	Item Source	Item number	EFA (Factor Loads) min-max	CFA	Cronbach's Alpha	Composite Reliability
Logistics flexibility	Morash & Lynch (2002); Swafford et al. (2006); Zhang et al. (2005)	4	0.645 - 0.821	$\chi 2$ / df = 1.136, RMSEA= 0.060, RMR = 0.023, GFI = 0.986, IFI = 0.991, CFI = 0.991, NFI = 0.968	0.72	0.72
Relationship flexibility	Heide & John (1992); Wang & Wei (2007)	4	0.645 - 0.821	$\chi 2$ / df = 1.136, RMSEA = 0.060, RMR = 0.023, GFI = 0.986, IFI = 0.991, CFI = 0.991, NFI = 0.968	0.72	0.72
Logistics service quality	Parasuraman et al. (1988); Yu et al., (2017)	8	0.655 -0.909	$\chi 2$ / df = 1.105, RMSEA = 0.032, RMR = 0.054, GFI = 0.956, IFI = 0.992, CFI = 0.991, NFI = 0.921	0.723	0.90
Environmental uncertainty	Kumar et al. (1992)	4	0.746 - 0.791	$\chi 2$ / df = 1.967, RMSEA = 0.098*, RMR = 0.019, GFI = 0.990, IFI = 0.991, CFI = 0.990, NFI = 0.982	0.764	0.80

SPSS Process Macro V3.4 was used to calculate the moderating effects of environmental uncertainty (Hayes, 2019). This model was used in the PROCESS macro because it is suitable for the "Model-1" research model. In accordance with the models, the independent variables (X), dependent variable (Y) and environmental uncertainty (M) were defined. The macro also reported the effect level of independent variables on dependent variables.

RESULTS

In this section, firstly, some characteristics related to the participating companies are reported. Secondly, the findings related to the hypotheses are presented.

Table 3

Participant Companies

Characteristics	N	%
Logistics Department		
No	258	72.5
Yes	92	25.8
Missing data	6	1.7
Export Rate	N	%
20% and less	183	51.4
21–40%	56	15.7
41–60%	55	15.4
61–80%	33	9.3
81% and more	23	6.5
Missing data	6	1.7
Number of Employees		
1–100	119	33.4
101–250	126	35.4
251–500	64	18.0
501–750	15	4.2
751–1000	12	3.4
1001–2000	8	2.2
2001 and more	5	1.4
Missing data	1	0.3
Partnership Type		

(continued)

Characteristics	N	%
Family	162	45.5
Person	85	23.9
Domestic partnership	86	24.2
Foreign partnership	17	4.8
Missing data	6	1.7
Foreign Trade Volume		
$15–25 million	230	64.6
$25–50 million	48	13.5
$50–75 million	32	9.0
$75–100 million	16	4.5
$100 million and more	24	6.7
Missing data	6	1.7
Years of Establishment		
Less than 1 year	3	0.8
1–2 years	13	3.7
3–5 years	29	8.1
6–10 years	51	14.3
11–20 years	107	30.1
More than 20 years	147	41.3
Missing data	6	1.7
Total	356	100

According to demographic variables in Table 3, most of the companies (72.5%) did not have a logistics department. Most of the companies (51.4%) had an export rate of their products at 20 percent and below, and the lowest ratio was 6.5 percent and 80 percent and above. In terms of the number of employees, companies with 101–300 employees constituted the highest proportion of 35.4 percent. Companies with 251 or more employees constituted 29.2 percent. This result showed that the majority (68.8%) of the companies participating in the study were small and medium sized enterprises.

In terms of partnership structure, family companies took first place with a rate of 45.5 percent. Most of the companies (64.6%) had low foreign trade volume ($15–25 million) and an average age of five years or more (85.7%). A total of 147 companies have been established for more than 20 years. In this case, it can be said that

the companies participating in the research were well-established companies in their respective sectors.

Table 4 shows the moderating effect of environmental uncertainty in the relationship between logistics flexibility and logistics service quality. Logistics flexibility ($\beta = 0.848$, $p < 0.05$) and environmental uncertainty ($\beta = 0.271$, $p < 0.05$) were statistically significant in predicting logistics service quality.

Table 4

Moderator Role of Environmental Uncertainty in the Effect of Logistics Flexibility on Logistics Service Quality

	β	*t*	*p*
Logistics flexibility	0.848	3.263	0.001
Environmental uncertainty	0.721	2.723	0.007
Logistics flexibility X Environmental uncertainty	-0.153	-2.339	0.020
	$R^2 = 0.356$	F(3,347) = 16.830**	

Notes. ** p< 0.01, * p< 0.05

Logistics flexibility and environmental uncertainty interaction was significant in the 95 percent confidence interval ($p < 0.05$) of logistics service quality. The model explained 35.6 percent of the change in dependent variable. Since the coefficient of interaction term was found to be statistically significant, it is evident that environmental uncertainty played a significant moderating role in the relationship between logistics flexibility and logistics service quality. Hence, H1 and H3were supported.

Table 5 shows that the impact size in all degrees of environmental uncertainty was statistically important. In other words, with a change in environmental uncertainty, the relationship between logistics flexibility and logistics service quality changed.

Table 5 and Figure 2 were evaluated together with regard to the moderating role of environmental uncertainty in the effect of

logistics flexibility on logistics service quality. In environments with low environmental uncertainty, logistics flexibility had a high impact on logistics service quality. However, in environments where environmental uncertainty was high, the effect of logistics flexibility on logistics service quality was low. In other words, when environmental uncertainty is high, logistics flexibility affected logistics service quality, negatively and at a low level.

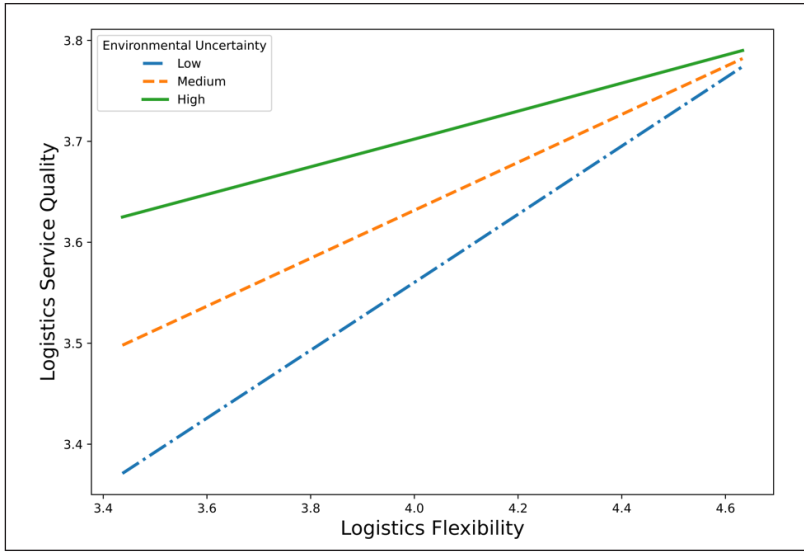
Table 5

Effect of Environmental Uncertainty According to Environmental Uncertainty Level

EU	Effect	Se	T	P	LLCI	ULCI
Mean-SD	0.337	0.060	5.620	0.000	0.219	0.455
Mean	0.237	0.047	5.005	0.000	0.144	0.331
Mean+SD	0.138	0.067	2.054	0.041	0.006	0.27

Figure 2

Logistics Flexibility and Logistics Service Quality Change According to Environmental Uncertainty



As shown in Table 6, relationship flexibility positively impacted quality logistics facilities at 5 percent (p = 0.036). Based on this finding, the hypothesis: "H_2: Relationship flexibility affects logistics service quality, positively and significantly" was supported. However, environmental uncertainty and relationship flexibility did not affect logistics service quality, statistically.

Therefore, environmental uncertainty did not have a moderating effect on the linkage between relationship flexibility and logistics service quality. Based on these findings, H4 was not substantiated. The model explained 34.6 percent of the change in dependent variable.

Table 6

The Moderating Effect of Environmental Uncertainty in the Linkage between Relationship Flexibility and Logistics Service Quality

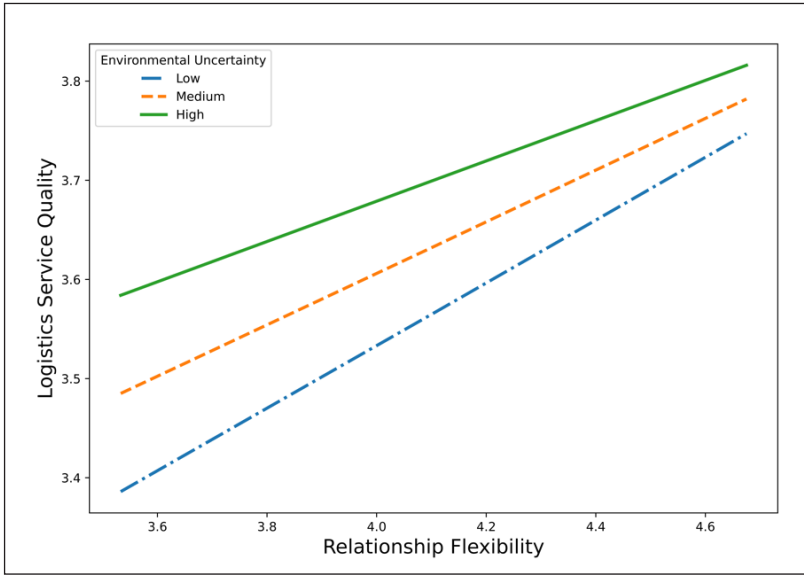
	β	*t*	*p*
Relationship flexibility	0.607	2.102	0.036
Environmental uncertainty	0.460	1.519	0.130
Relationship flexibility X Environmental uncertainty	-0.087	-1.190	0.235
	$R^2 = 0.346$	F(3.347) = 15.697*	

Notes. ** p< 0.01, * p< 0.05

As illustrated in Figure 3, the relationship between relationship flexibility and logistics service quality was similar at different levels of environmental uncertainty. The lines seemed almost parallel to each other.

Figure 3

Relationship Flexibility and Logistics Service Quality Change According to Environmental Uncertainty



DISCUSSIONS

There are two key goals in this research. First, to determine the impact of logistics flexibility and relationship flexibility on the quality of the logistics sector. Second, to examine the moderating role of environmental uncertainty on the purported linkages.

Based on the findings, H_1 is accepted. Logistics flexibility is one of the factors affecting logistics processes. It has many sub-dimensions such as physical distribution, transportation, and inventory management (Jafari, 2015). It is directly related to the satisfaction of customers to ensure the quality of logistics service. In order to meet the reasonable demands of customers, institutions must also act flexibly in logistics services. It is inevitable that there is a dynamic relationship between logistics flexibility and logistics service quality. The results of studies (Barad et al.,2003; Sahu, 2013; Yu et al., 2017; Zakaria et al., 2010) have revealed that logistics flexibility affects logistics service quality, positively and

significantly. Logistics service quality may also have had a strong interaction, as it directly affects logistics flexibility from logistics processes. Companies may have thought that logistics is necessary to ensure that the quality of logistics services that they offer to their customers is high. Therefore, it has been concluded that logistics flexibility positively affects the quality of logistics service.

Hypothesis H_3 is also supported. According to the results obtained within the scope of the research, in environments with low environmental uncertainty, logistics flexibility has a high impact on logistics service quality. However, in environments where environmental uncertainty is high, the effect of logistics flexibility on logistics service quality is negatively low. In other words, in environments where environmental uncertainty is high, logistics flexibility negatively affects logistics service quality. In studies conducted by Lo and Shiah (2016), Yıldız et al. (2015) and Yu et al. (2017), they have found that environmental uncertainty has a moderator role. Environmental uncertainty is a factor that affects the decision-making processes of companies. When environmental uncertainty is low in the study, logistics flexibility affects the quality of logistics services more. In a sense, since companies do not see much risk, they respond more positively to customers' logistics requests. However, when environmental uncertainty is high, companies do not respond positively to demand changes because they do not want to take too much risk.

Another observation was endorsed by H_3. Relationship flexibility is characterized as a two-way assumption that the consumers of partnership services will be able to adjust by way of coordination (Yu et al., 2013). There are three mechanisms at work in the concept of resilience in relationships: a two-sided readiness to respond, a kind of shift in teamwork and the capacity to deal with changing circumstances (Johnson, 1999). Relationship flexibility is accepted as a factor affecting logistics service quality (Chen et al., 2015; Guliman & Gavrila, 2018; Yu et al., 2017). When relationship flexibility is seen as a willingness to change contracts and business processes in the face of developing situations, it is reasonable that it will affect the quality of logistics service in this concept. This result may have been reached as the companies participating in the study were willing to mutually regulate the reasonable requests of the customers.

H_4 hypothesis is tested regarding the environmental uncertainty's moderating effect in the study. According to the data in the research, environmental uncertainty did not play a moderating role in the link between relationship flexibility and logistics service quality. There is a significant relationship between relationship flexibility and logistics service quality, and also, between environmental uncertainty and logistics service quality. The relationship between environmental uncertainty and relationship flexibility may have caused the non-significant moderating effect of environmental uncertainty. As shown in Table 6, "Relationship flexibility X Environmental uncertainty" must be statistically significant in order for environmental uncertainty to have a moderator effect. Further, when Figure 3 is examined, the relationship between relationship flexibility and logistics service quality is similar (the lines are close to parallel) in terms of low, medium, and high environmental uncertainty.

Different factors could be responsible for environmental instability (Paulraj & Chen, 2007; Samsami et al., 2015). For example, Davis (1993) stated in his study that there are two main sources of uncertainty: "demand uncertainty" and "supply uncertainty". Jabnoun et al. (2003) have analyzed the macro-environmental ambiguity, competitive ambiguity, consumer (and demand) ambiguity, and technology aspects as facets of environmental ambiguity. In the literature studies, factors affecting environmental uncertainty are expressed as information quality, business cost, government laws, partnership quality, political environment dynamism, eco process innovation, competitive hostility, market dynamism, and labor force presence. As the concepts influenced by environmental uncertainty, logistics flexibility, relationship flexibility, strategic flexibility, supply chain flexibility, strategic supply management, flexibility and delivery, supply chain performance, eco-product innovation, performance dimensions, cost, and quality are expressed.

CONCLUSION, IMPLICATIONS, AND LIMITATIONS

In sum, logistics flexibility has positive effects on logistics service quality. Environmental uncertainty has a moderator role on logistics flexibility's effect on logistics service quality. This means that in environments with low environmental uncertainty, logistics

flexibility has a high impact on logistics service quality. However, in environments where environmental uncertainty is high, the effect of logistics flexibility on logistics service quality is negatively low. Relationship flexibility has a positive effect on logistics service quality. Besides that, environmental uncertainty has a moderator role on the effect of relationship flexibility on logistics service quality.

This research was conducted on Gaziantep Turkish businesses. In future studies, the results can be compared by conducting a similar study in different regions or sample groups. Sectoral differences were not taken into account in this study. In future studies, sector results can be compared according to sectoral differences or by conducting studies specific to a sector. In this study, quantitative measurement tools were used and the data were analyzed according to the perceptions of the participants. In subsequent studies, analysis can be made using qualitative approaches. In this study, environmental uncertainty was measured according to the perceptions of individuals. The effect of environmental uncertainty can be remeasured by employing more objective measurements for different sectors. In addition, environmental uncertainty can be measured from a more objective perspective by taking the idea of white-collar, another stakeholder of the internal decision-making process. New researches can also be conducted by using for example, the scales of the sub-dimensions of logistics flexibility and relationship flexibility.

An important result obtained in the study is that environmental uncertainty has a negative moderating effect on the linkages tested. Therefore, work should be conducted to minimize environmental uncertainty, and necessary efforts and measures should be taken to prevent environmental uncertainty in companies. Questionnaires were used as a data collection tool in this study. As the measurements are based on the perceptions of the participants, this may not reflect the real situation about the companies. In addition, not all companies in Gaziantep Organized Industrial Zone completed the questionnaire. Therefore, this inadvertently created a limitation in generalizing from the findings of the study. The sample of the study covered large and medium-sized companies in Gaziantep Organized Industrial Zone excluding small-scale companies. The study was limited to the measurement of logistics flexibility, relationship flexibility, logistics service quality, relationship satisfaction, environmental uncertainty and determining the relationship between them.

Based on the findings, relationship flexibility and logistics flexibility have a positive and significant impact on logistics service quality. Besides that, environmental uncertainty has a moderator role in the effect of logistics flexibility on logistics service quality. In the case of low environmental uncertainty, logistics flexibility has a high impact on logistics service quality. However, in environments where environmental uncertainty is high, the effect of logistics flexibility on logistics service quality is low. In other words, in environments where environmental uncertainty is high, logistics flexibility affects logistics service quality negatively, at a low level.

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APPENDIX I

Logistics flexibility

LF1 : Adjust storage capacity if demand fluctuates

LF2 : Adjust delivery capacity to meet volume for delivering

LF3 : Make flexible use of multiple transportation modes to meet schedule for delivering

LF4 : Adjust order fulfillment time upon request

Relationship flexibility

RF1 : The relationship is able to respond quickly to requests.

RF2 : Expect to be able to make adjustments in ongoing relationship

RF3 : Revalue ongoing situation to achieve a mutually satisfactory solution when disagreements arise in transactions

RF4 : Modify working agreement rather than hold each other accountable to original terms when an unexpected situation arises

Logistics service quality

LSQ1: The time between placing and receiving an order is short.

LSQ2: The time between receiving and shipping an order is short.

LSQ3: The time between placing and receiving an order is consistent.

LSQ4: Orders are available in the inventory when ordering.

LSQ5: Products are consistently available in the inventory.

LSQ6: Respond with accurate information in replying to inquiries concerning an order.

LSQ7: All orders are fulfilled accurately (items ordered arrive, no unordered items).

LSQ8: All orders are delivered, undamaged.

Perceived environmental uncertainty

EU1 : Customers' demands are changing.

EU2 : There are a number of changes taking place in customers' preferences.

EU3 : The level of competitive activity is changing (e.g., the number or strength of competitors is increasing).

EU4 : There are a number of changes taking place in competitors' sales and promotional strategies.